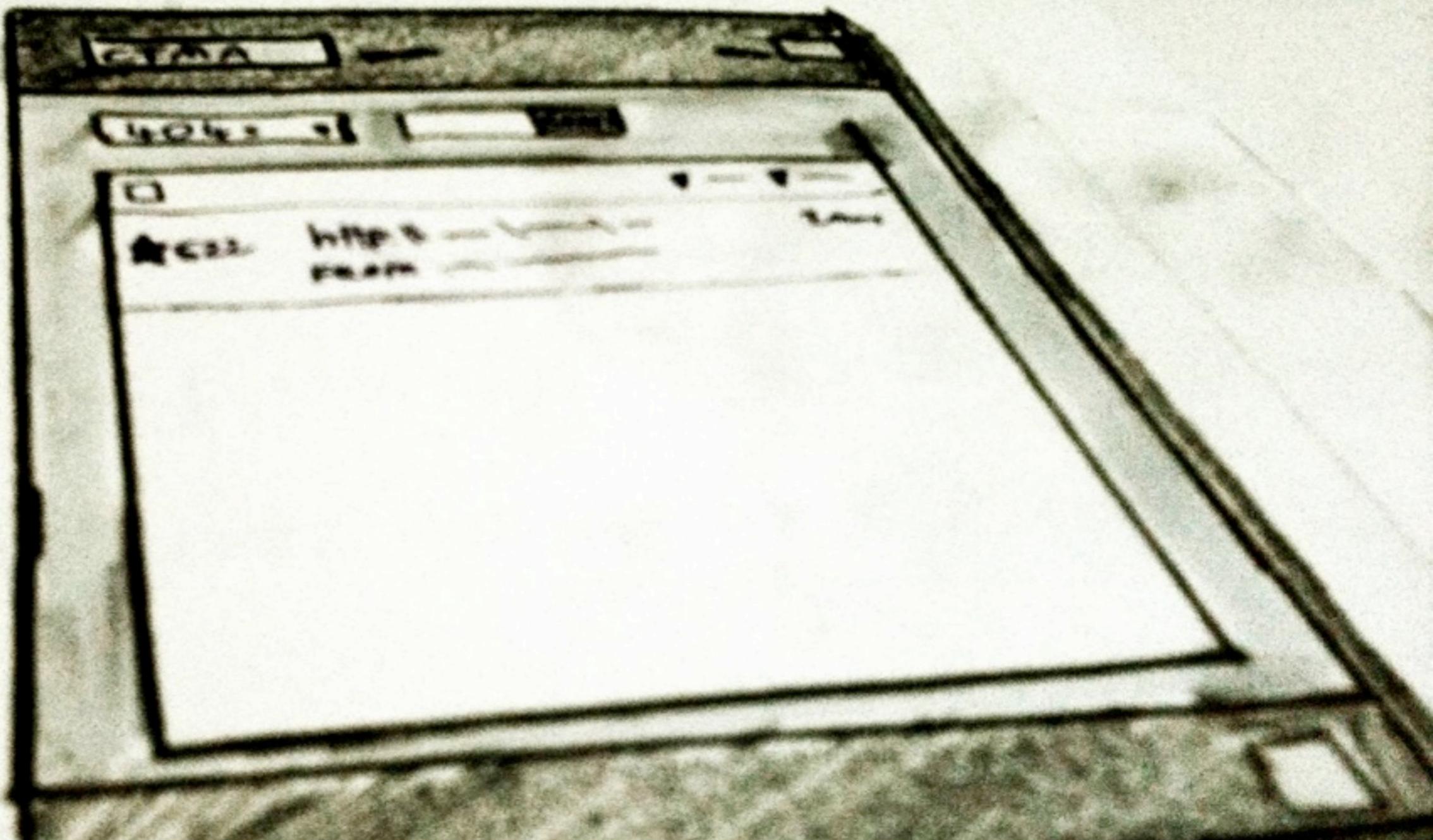


404's

- TYPE
- AMOUNT
- TIME
- URL
- REGION



Data visualisations and Dashboard Design

Des Traynor

@destraynor,  
COO of @intercom



TIME REMAINING

INTRO

KNOW YOUR AUDIENCE

KNOW YOUR DOMAIN

KNOW YOUR DATA

KNOW YOUR VISUALS

KNOW YOUR STYLE

CLOSING POINTS

FIN

TOPIC



We are drowning in data.

Better than  
text

Adaptable

IT'S HARD TO MAKE VISUALS

Useful

Meaningful

Readable

“Be **clear** first and **clever** second. If you have to throw one of those out, throw out **clever**.

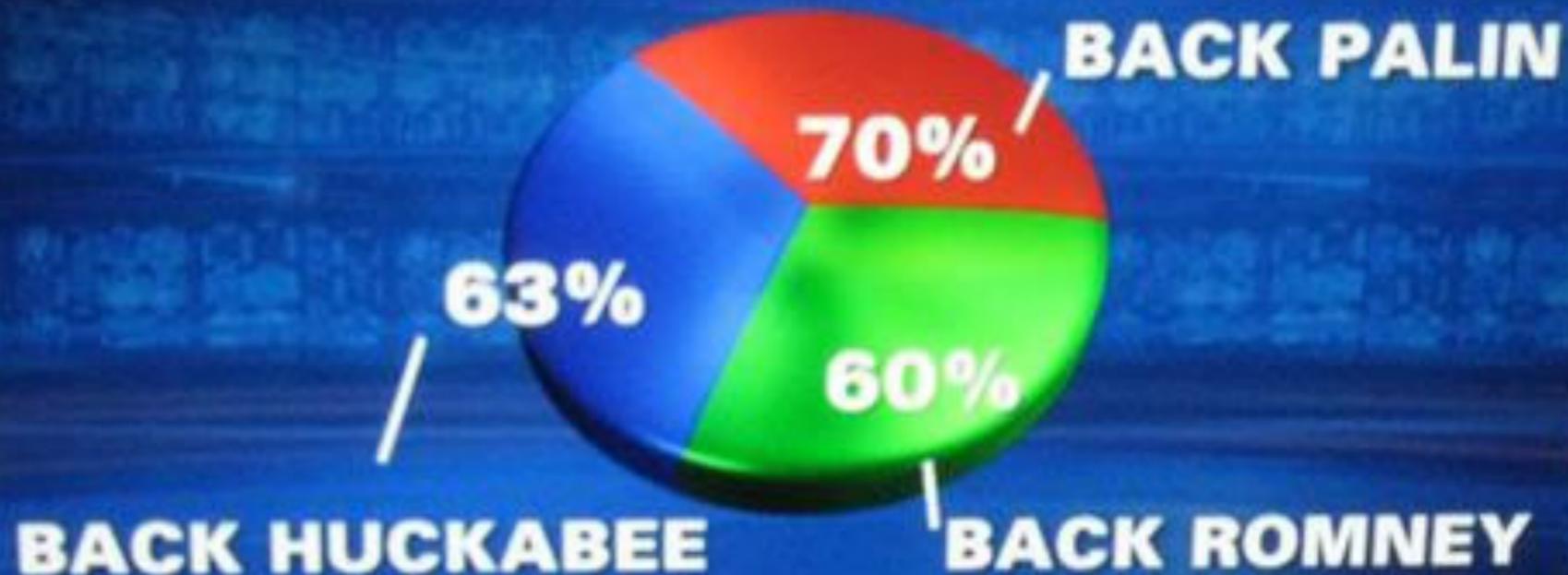
— Jason Fried



VISUALS CAN CONFUSE

## 2012 PRESIDENTIAL RUN

GOP CANDIDATES



FOX

47°

SOURCE: OPINIONS  
DYNAMIC

## **UNEMPLOYMENT RATE UNDER PRESIDENT OBAMA**



**FOX**  
**NEWS**  
radio

**2011**  
**SOURCE: BUREAU OF LABOR STATISTICS**

**EAR WAR AND A TROOP WITHDRAWAL AT THE END OF THE MONTH** NAS FUT 2,292.50

## **UNEMPLOYMENT RATE UNDER PRESIDENT OBAMA**



**FOX**  
**NEWS**  
radio

**2011**  
**SOURCE: BUREAU OF LABOR STATISTICS**

**CAR WAR AND A TROOP WITHDRAWAL AT THE END OF THE MONTH** NAS FUT 2,292.50

## **UNEMPLOYMENT RATE UNDER PRESIDENT OBAMA**



**FOX**  
**NEWS**  
radio

**2011**  
**SOURCE: BUREAU OF LABOR STATISTICS**

**EAR WAR AND A TROOP WITHDRAWAL AT THE END OF THE MONTH** NAS FUT 2,292.50

# COST OF GAS

## NATIONAL AVERAGE

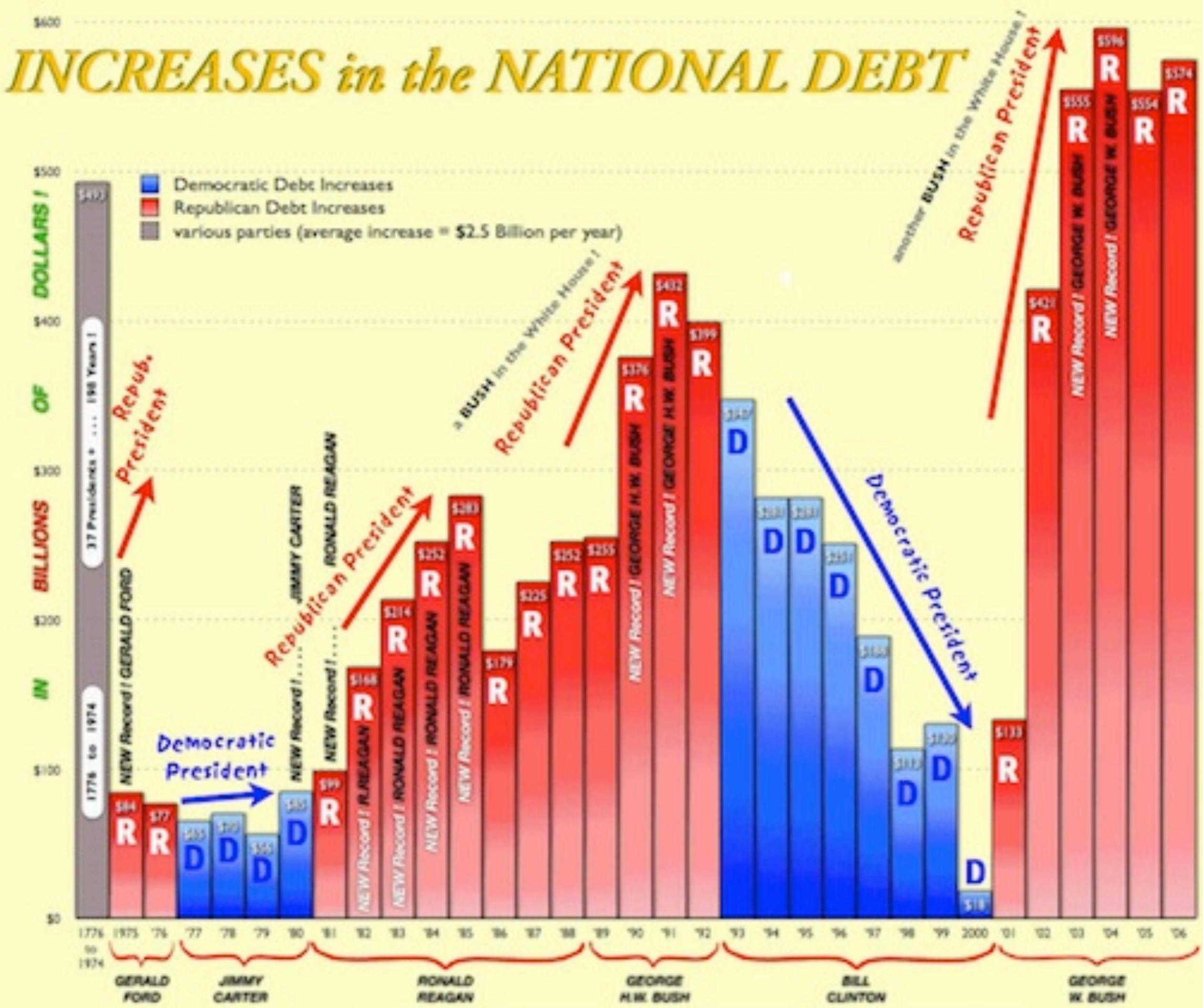


**FOX**  
NEWS  
channel

SOURCE: AAA FUEL GAUGE REPORT

PAY... THE STRIKE, WHICH BEGAN LAST WEEK, IS

DOW ▲ 45.79

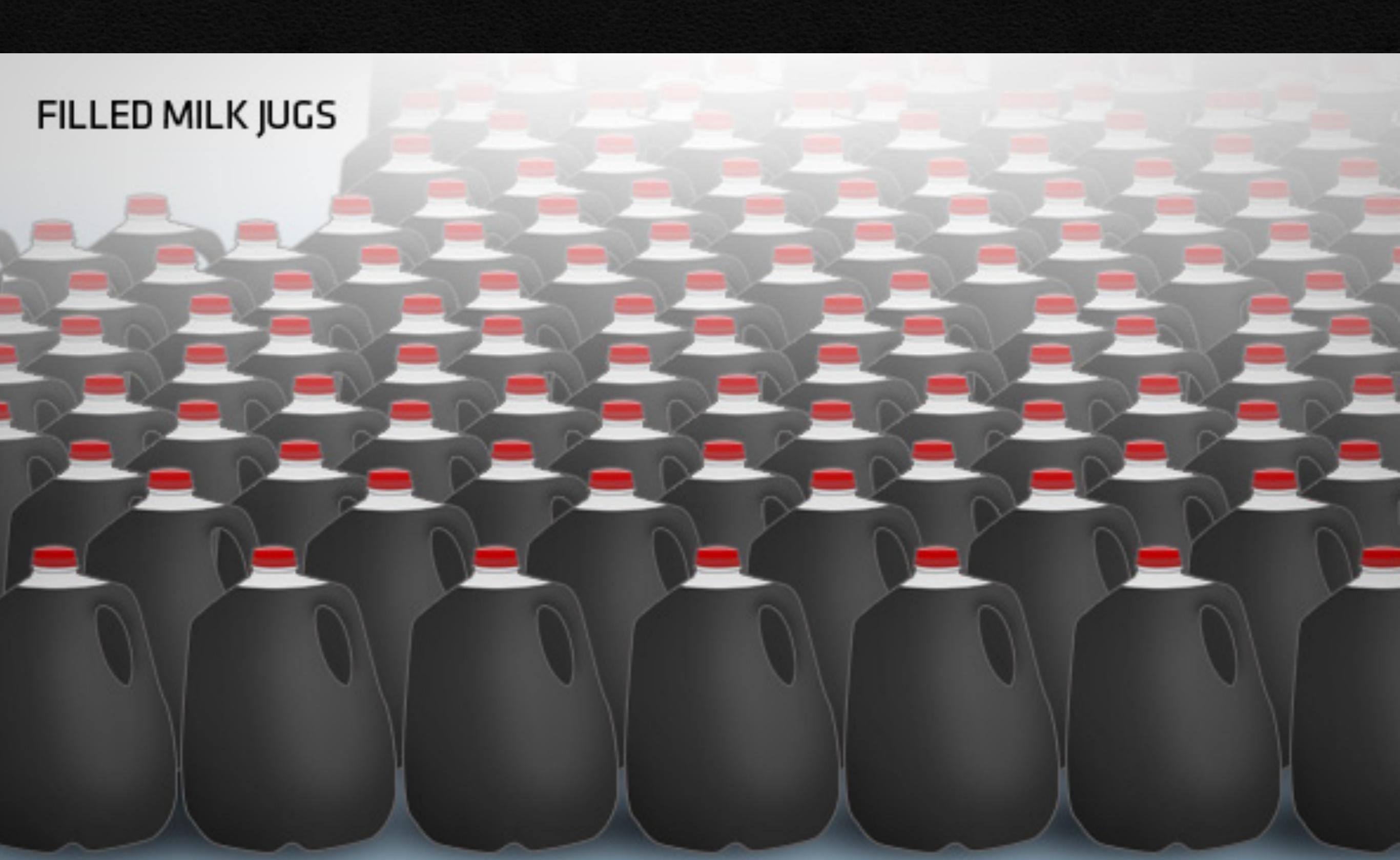


Gee, Maw! The news always says the **Democrats** are the big spenders!



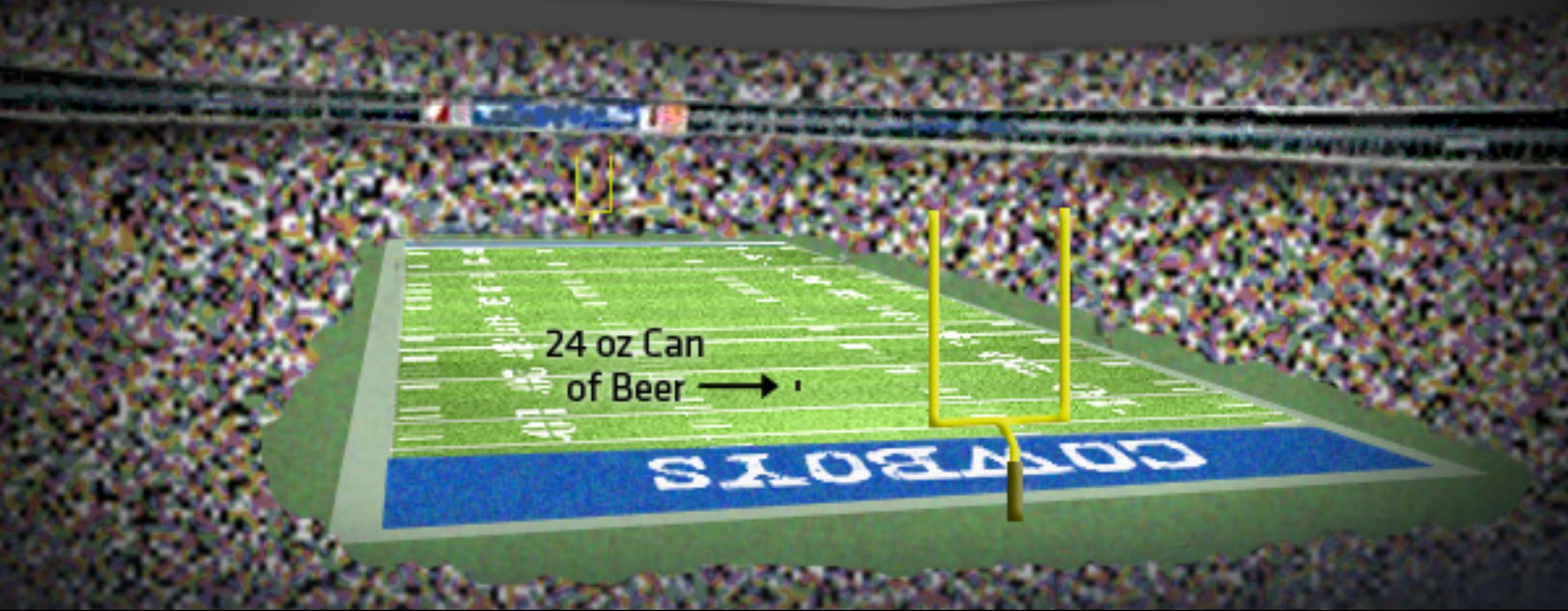
Visualising the Gulf Oil Spill...

## FILLED MILK JUGS



184 Million Milk Jugs

IF THE GULF WAS A FOOTBALL STADIUM...



Okay, lets try with football...

If the Gulf of Mexico - the 7th largest body of water in the world, containing approximately 660 quadrillion gallons of water (that's 660 with 15 zeros) - was represented by Cowboys Stadium in Dallas - the largest domed stadium in the world - how would the spill stack up? In this example, the amount of oil spilled - if the Gulf of Mexico was the size of Cowboys Stadium - would be about the size of a 24 ounce can of beer. Cowboys stadium has an internal volume of approximately 104 million cubic feet, compared to the just over 50 cubic inches of volume in a 24-ounce can.

Just like the can, the spilled oil represents only .00000002788% of the liquid volume present in the Gulf of Mexico, although as the oil is dispersed, the amount of water affected becomes substantially greater.

If the Gulf of Mexico - the 7th largest body of water in the world, containing approximately 660 quadrillion gallons of water (that's 660 with 15 zeros) - was represented by Cowboys Stadium in Dallas - the largest domed stadium in the world - how would the spill stack up? In this example, the amount of oil spilled - if the Gulf of Mexico was the size of Cowboys Stadium - would be about the size of a 24 ounce can of beer. Cowboys stadium has an internal volume of approximately 104 million cubic feet, compared to the just over 50 cubic inches of volume in a 24-ounce can.

Just like the can, the spilled oil represents only .00000002788% of the liquid volume present in the Gulf of Mexico, although as the oil is dispersed, the amount of water affected becomes substantially greater.



The “anti-infographic movement”

No data was harmed in the making of these infographics



@destraynor

Des Traynor

Please consider the environment before creating another infographic.

2 Nov via Twitter for Mac Favorite Reply Delete

Retweeted by [andrew\\_twit](#) and 9 others



TIME REMAINING

INTRO

KNOW YOUR AUDIENCE

KNOW YOUR DOMAIN

KNOW YOUR DATA

KNOW YOUR VISUALS

KNOW YOUR STYLE

CLOSING POINTS

FIN

TOPIC

WHO ARE WE DESIGNING FOR?

# **WHAT ROLE?**

The role defines the level of abstraction required.

# CEO Level Detail

Strategic view

Focus on the long term

High level overview

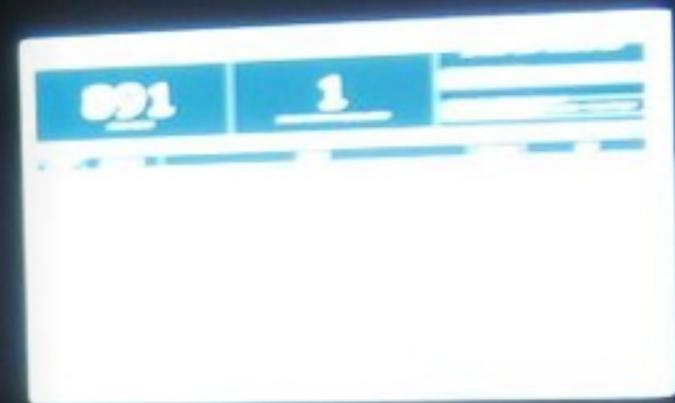
Simple summary



# Analyst role

Query driven analysis  
Precision required  
Emphasis on trends,  
and correlations

# Operations/Logistics



Focus on current status  
Issue & Event driven

e.g. Alerts, spikes, trouble



# **WHAT DEPARTMENT?**

The department defines the domain knowledge

# **SALES DEPARTMENT**

Leads, conversions, avg. value per sale, etc

# **MARKETING DEPARTMENT**

Impressions, loyalty, awareness, share

# NETWORK & IT

Issues, tickets, lead time, open cases, uptime

	<b>SALES</b>	<b>MARKETING</b>	<b>CUSTOMER SUPPORT</b>
<b>MANAGEMENT</b>			<ul style="list-style-type: none"> <li>* Satisfaction Rating</li> <li>* Trend per quarter</li> <li>* Comparison with competitors</li> </ul>
<b>ANALYST</b>	<ul style="list-style-type: none"> <li>* My Active leads</li> <li>* Value per lead</li> <li>* Progress towards target</li> </ul>		
<b>OPERATIONS</b>		<ul style="list-style-type: none"> <li>* Active campaigns</li> <li>* Current CPM/CPC</li> <li>* Landing page</li> </ul>	

**Role + Department = Information needed**

	<b>SALES</b>	<b>MARKETING</b>	<b>CUSTOMER SUPPORT</b>
<b>MANAGEMENT</b>			<ul style="list-style-type: none"> <li>* Satisfaction Rating</li> <li>* Trend per quarter</li> <li>* Comparison with competitors</li> </ul>
<b>ANALYST</b>	<ul style="list-style-type: none"> <li>* My Active leads</li> <li>* Value per lead</li> <li>* Progress towards target</li> </ul>		 <p>1st Takeaway</p>
<b>OPERATIONS</b>		<ul style="list-style-type: none"> <li>* Active campaigns</li> <li>* Current CPM/CPC</li> <li>* Landing page</li> </ul>	

**Role + Department = Information needed**

TIME REMAINING

INTRO

KNOW YOUR AUDIENCE

KNOW YOUR DOMAIN

KNOW YOUR DATA

KNOW YOUR VISUALS

KNOW YOUR STYLE

CLOSING POINTS

FIN

TOPIC

\$ Sales today	# Unit sales
Avg \$ per sale	
Us vs Competitor	

## WHICH OF THESE?

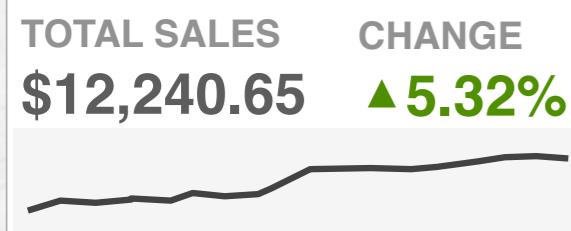
Avg. \$ per  
customer

This period vs last  
period

Total this  
month

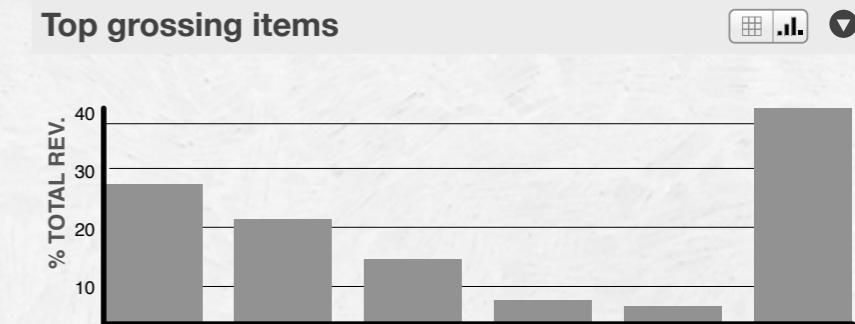
% Change  
in sales

Popular  
products

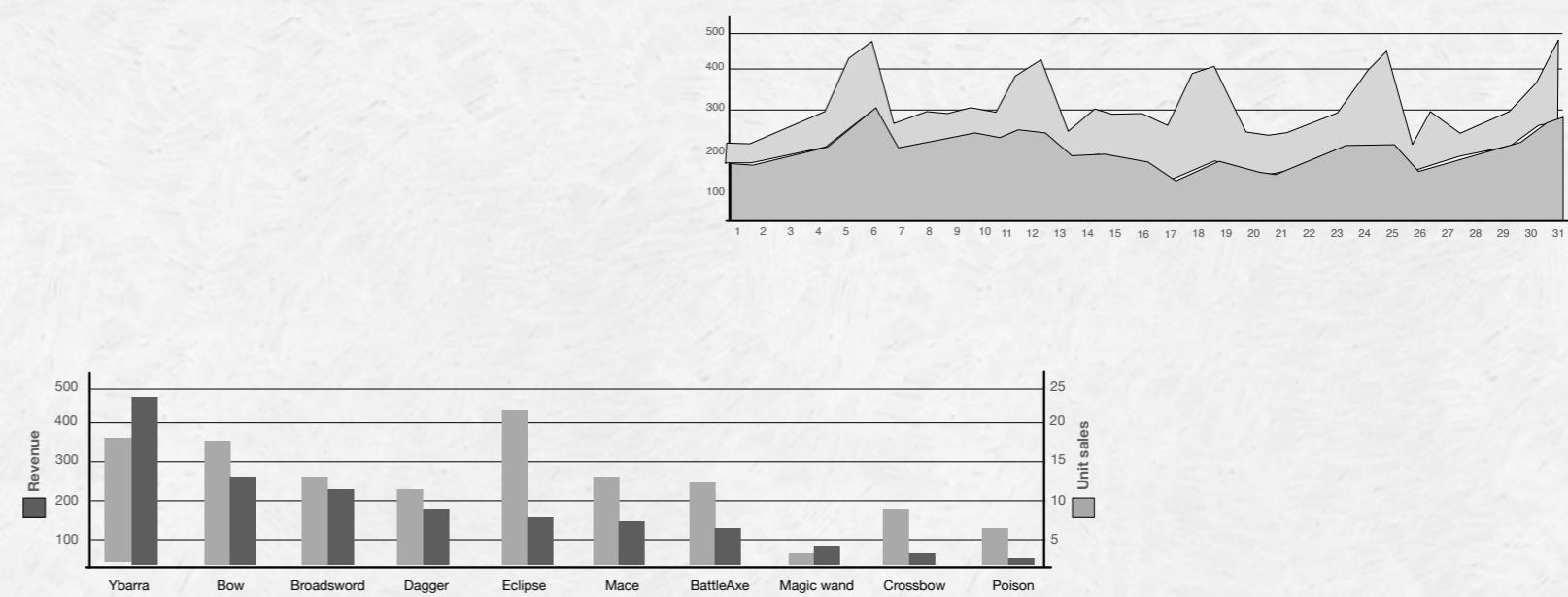


**Top selling items**

Item name	Unit sales	% of total	Change
Oak tree (special edition)	803	16%	11.52%
Pet Kitten	607	12%	100%
<u>Skyscraper (high rise)</u>	511	11%	1.52%
Sycamore tree	430	9%	5.23%
Dancing disco.	203	4%	1.20%
Other items	2495	52%	--



# WHICH OF THESE?



6 THINGS TO COMMUNICATE

# 1. COMMUNICATE A SINGLE FIGURE

Used when context is obvious, precision is required, and past/future is irrelevant to user.

Examples:

AA clerk with a waiting list

Checking bank balance

Sys admin checking current status

**BALANCE**

**\$23.00**

**BALANCE**

**\$11.32**

**BALANCE**

**\$11.32**

Notes:

Single numbers can have states

## 2. SINGLE FIGURE WITH CONTEXT

"How are we doing lately? Any problems on horizon?"

Examples:

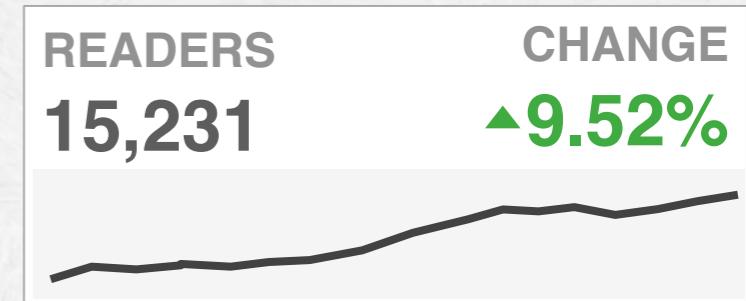
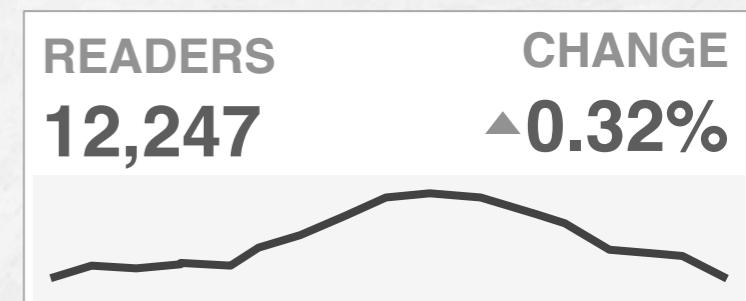
How were this months sales?

Is the network performing well?

Hows our user figures looking?

Notes:

Spark-lines can save space, and



### 3. ANALYSIS OF A PERIOD

"Show me all the key moments this month"

Examples:

Looking for patterns in longer data sets

Looking ahead based on current data

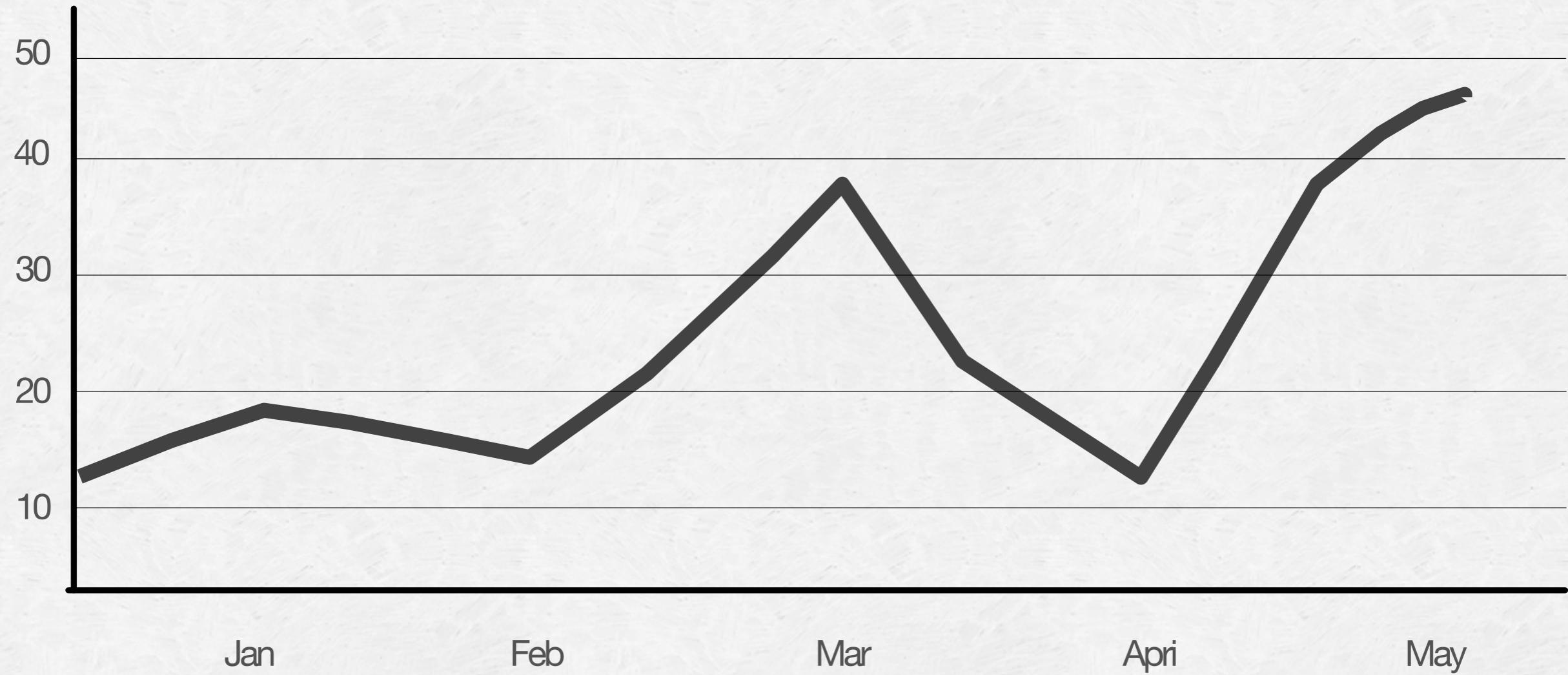
Comparison with previous period

# GOOD LINE CHART

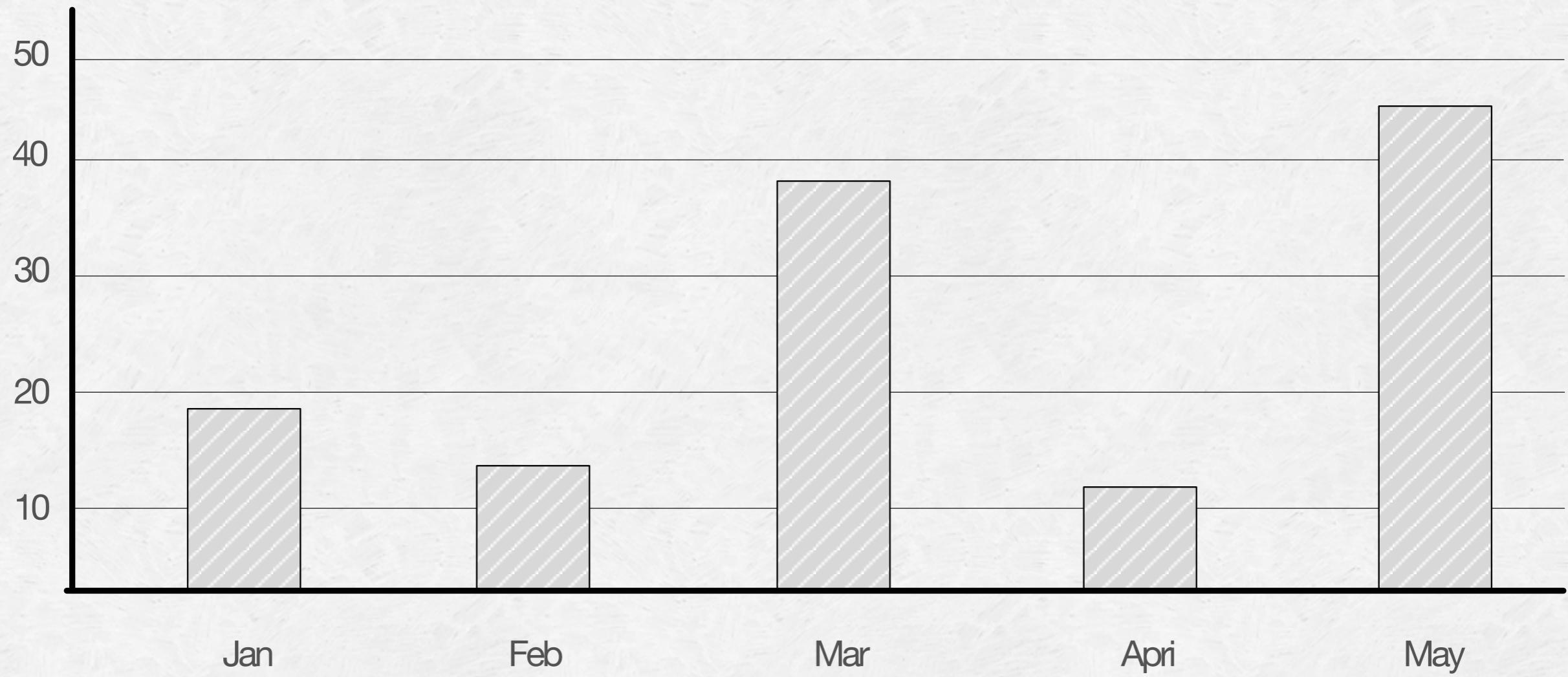


Work best with precise data (e.g. day to day)

# BAD LINE CHART

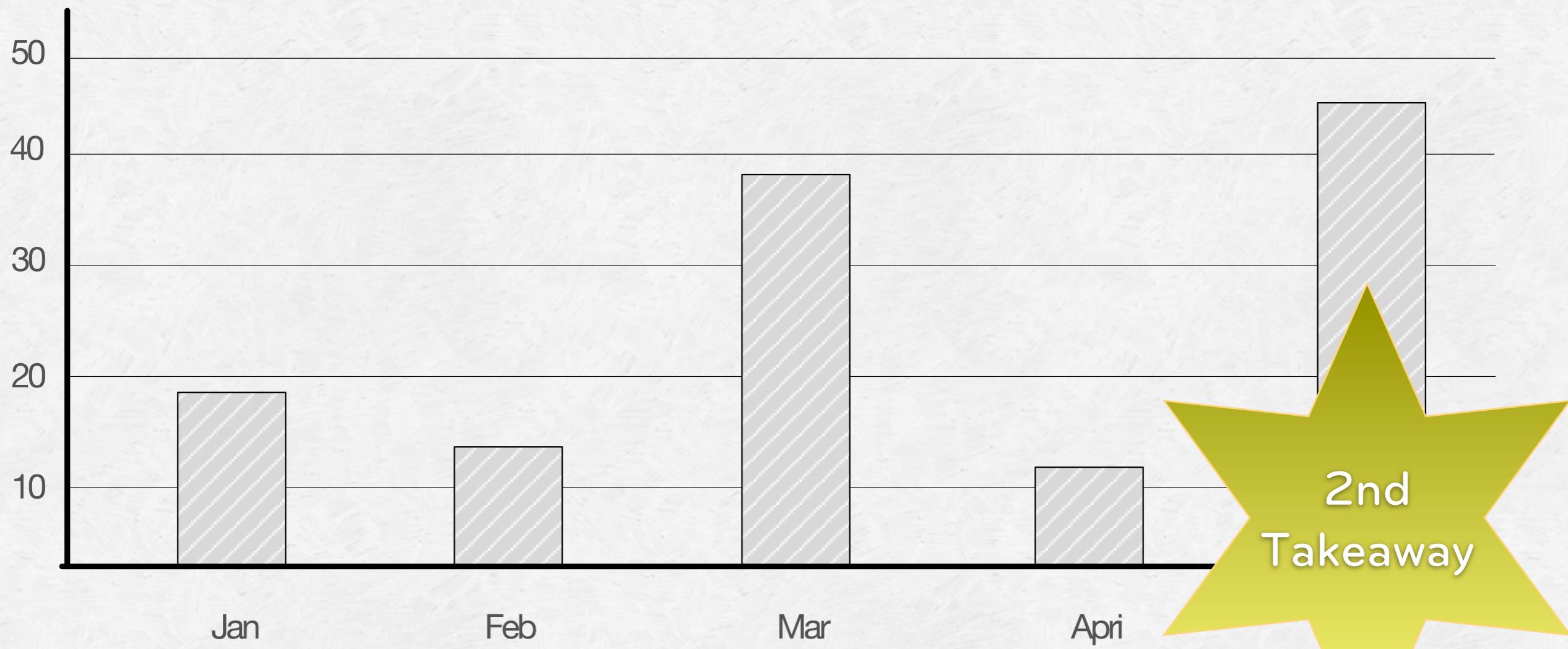


# BAR CHART



Never imply precision you don't have.

# BAR CHART



Never imply precision you don't have.

## 4. ANALYSIS OF PERIOD, WITH TARGET

Did we hit our sales figures?

Are we fulfilling our five nines quota?

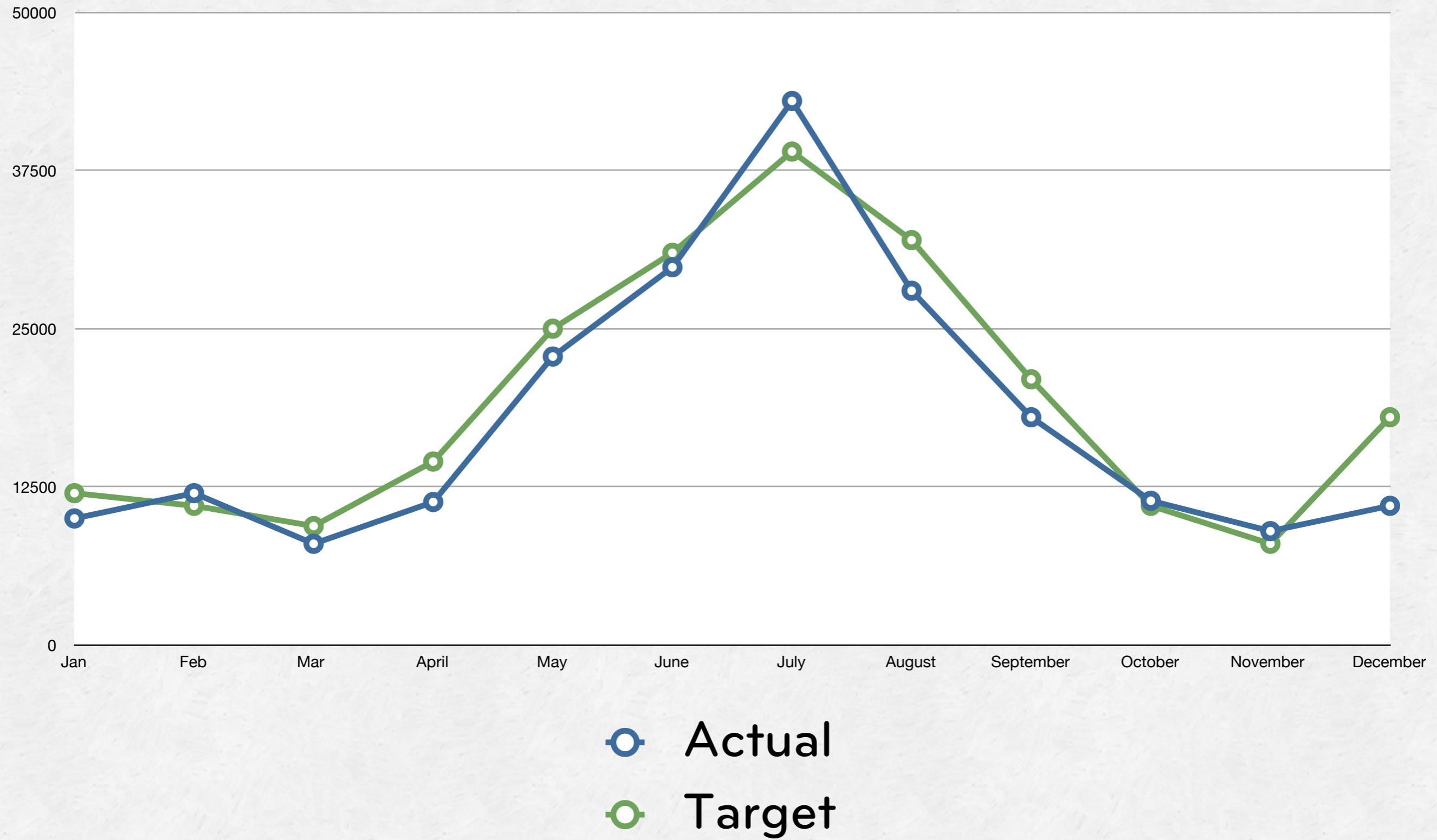
Examples:

Are sales where they should be?

Are all our employees performing okay?

Is our response time better than industry standard?

# BAD LINE CHART



A common error in visualisation is leaving all the processing to the reader. At a glance it looks like we're doing okay here.

In this case, we're talking about a delta, but we're not showing the delta...

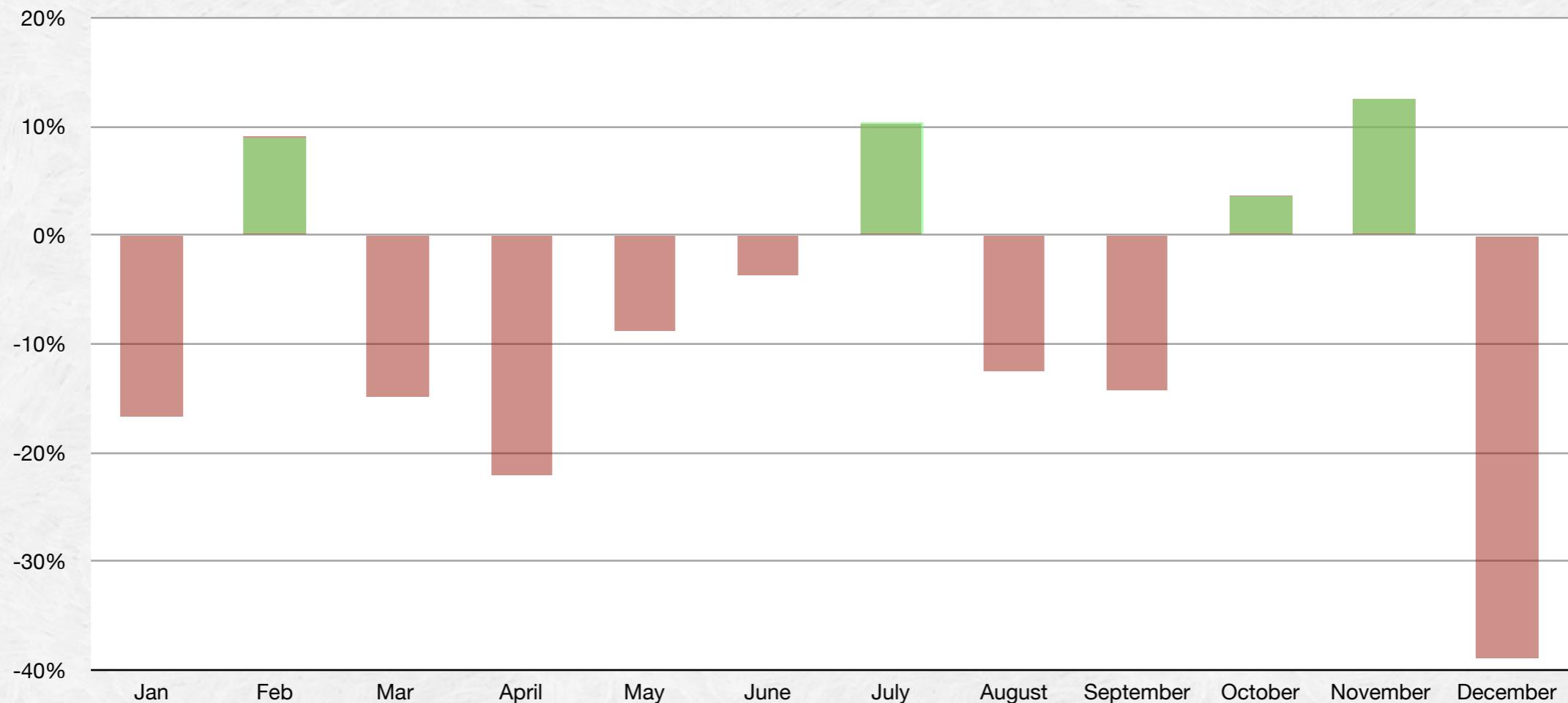
A common error in visualisation is leaving all the processing to the reader. At a glance it looks like we're doing okay here.

In this case, we're talking about a delta, but we're not showing the delta...



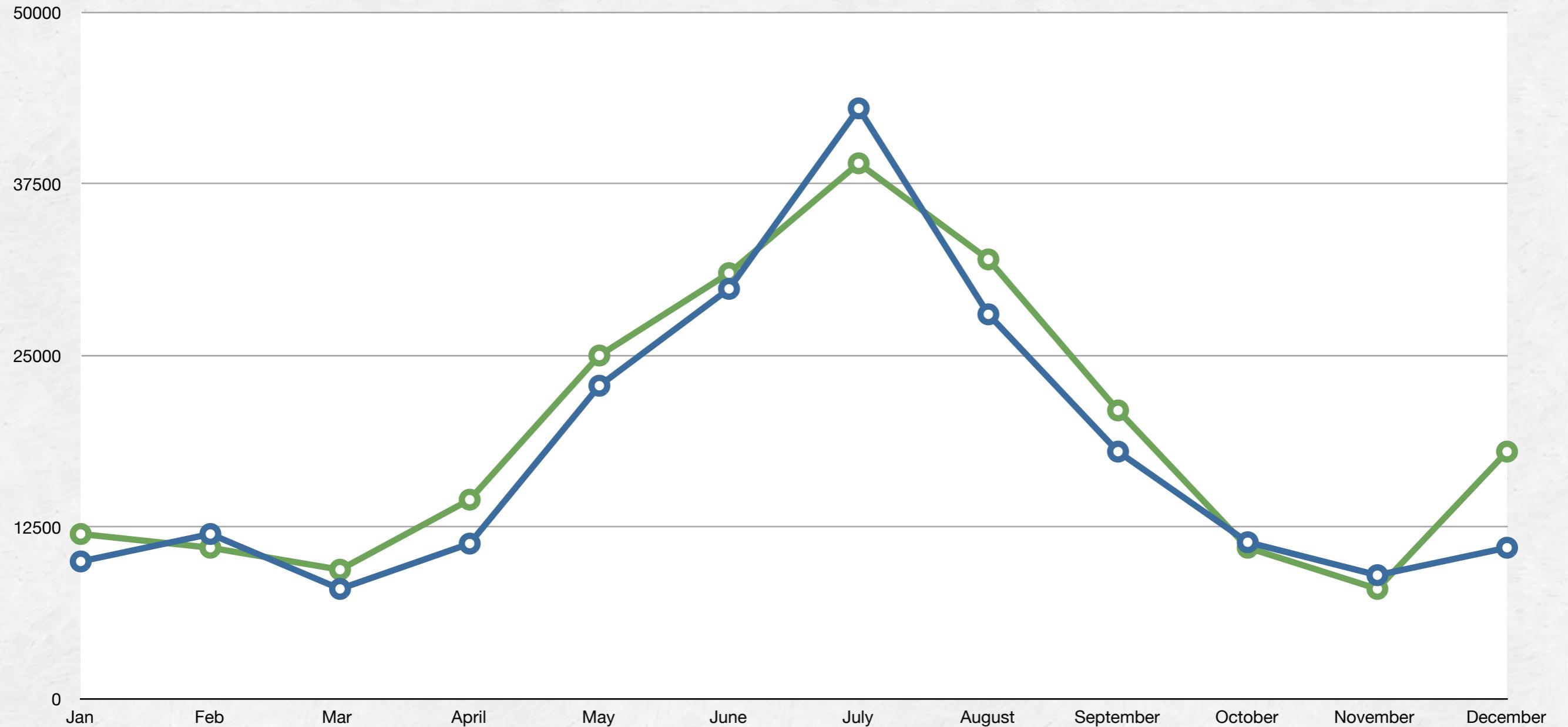
3rd  
Takeaway

# FOCUS ON THE DELTA



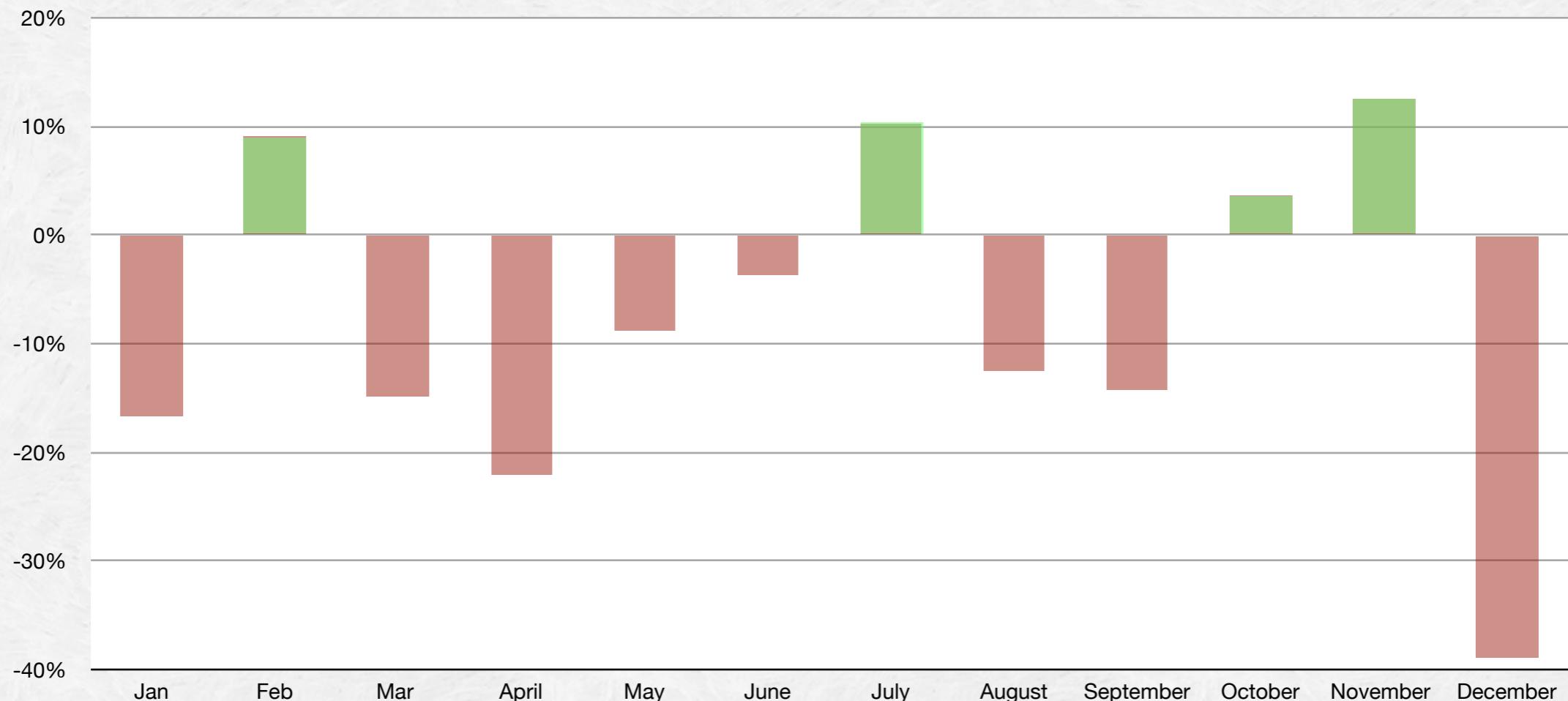
Same data, big difference

# BAD LINE CHART



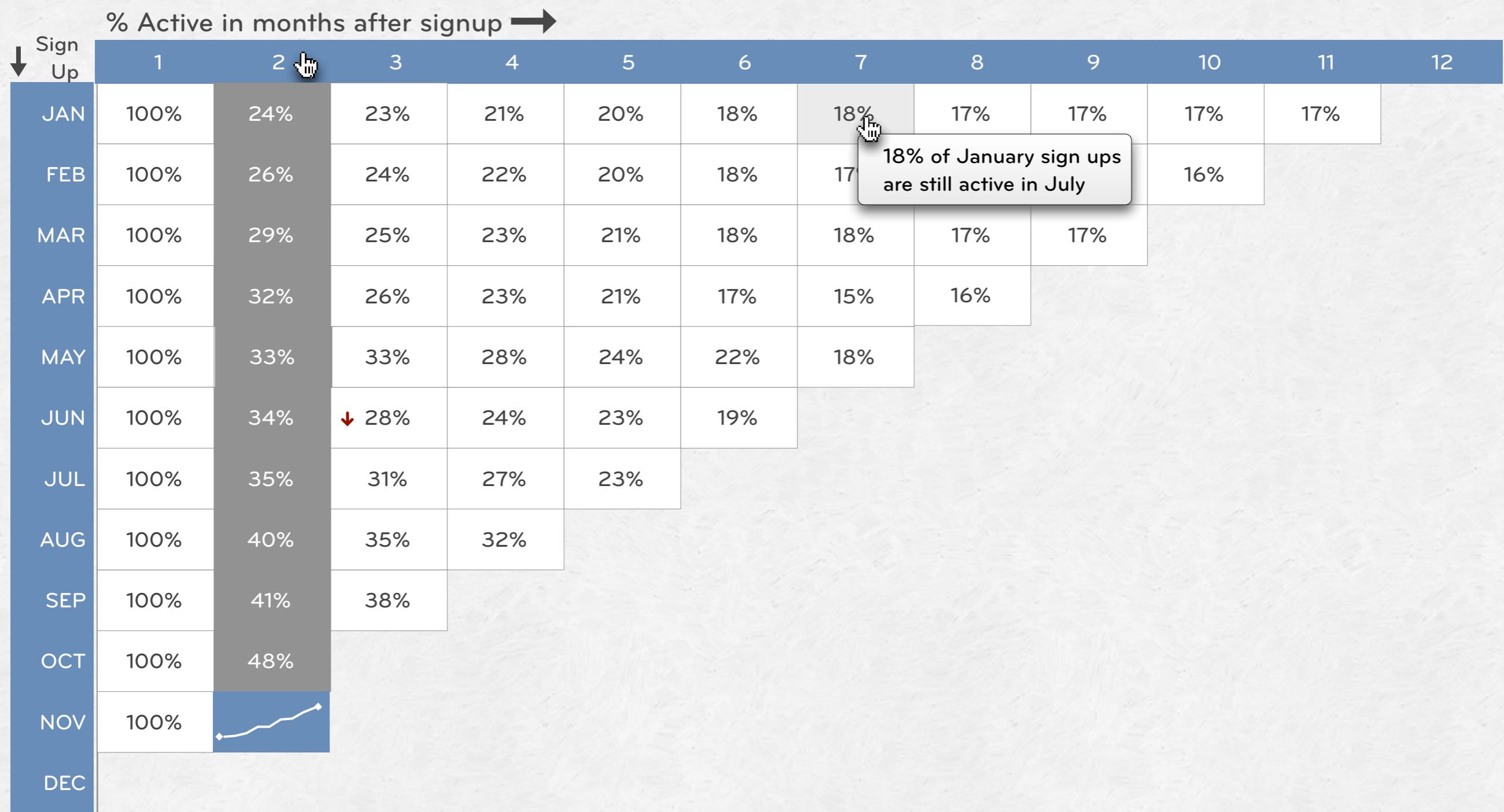
This guy is getting a bonus

# FOCUS ON THE DELTA

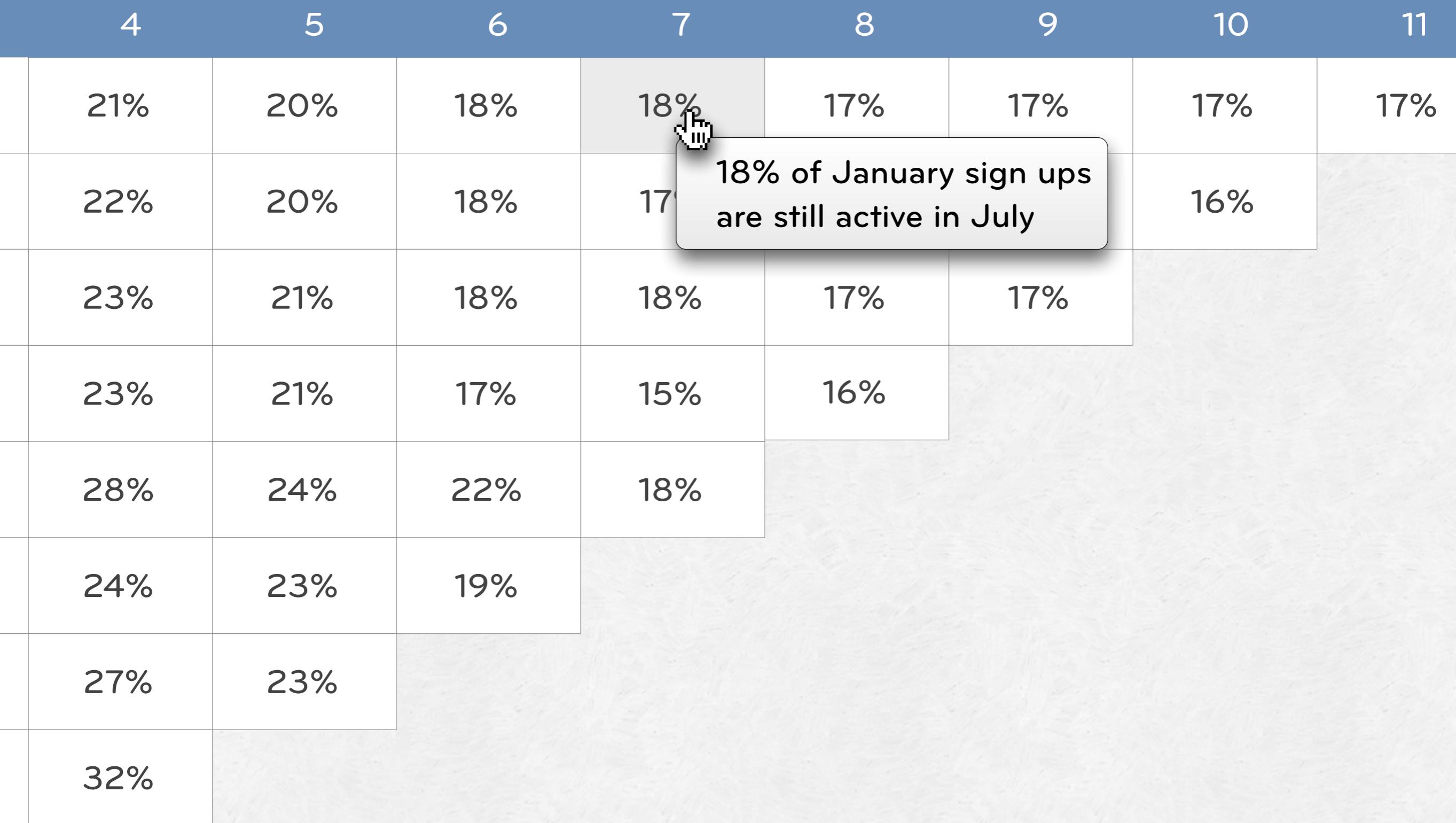


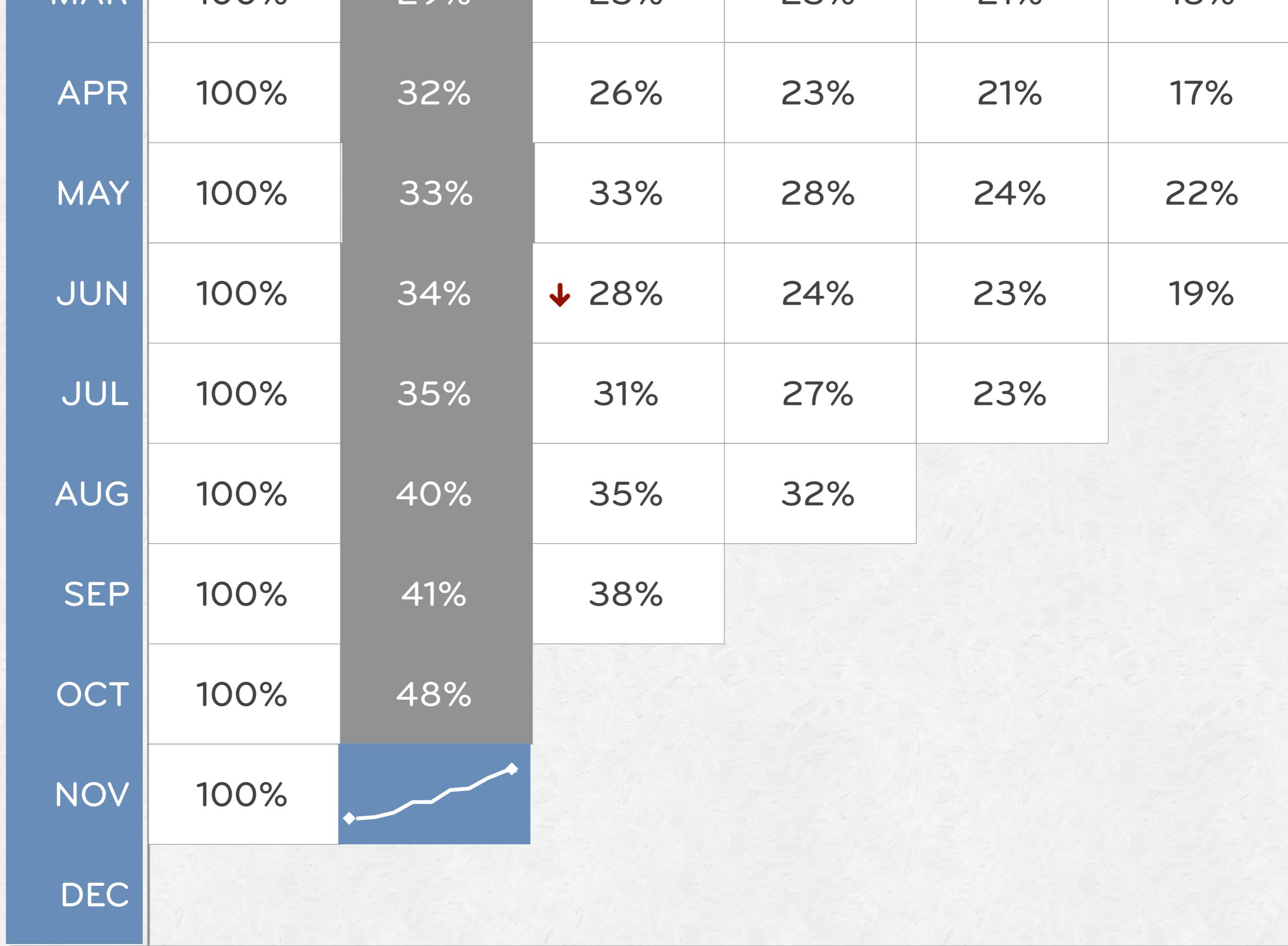
This guy is getting fired.

# A full cohort analysis



signup ➔





Showing:

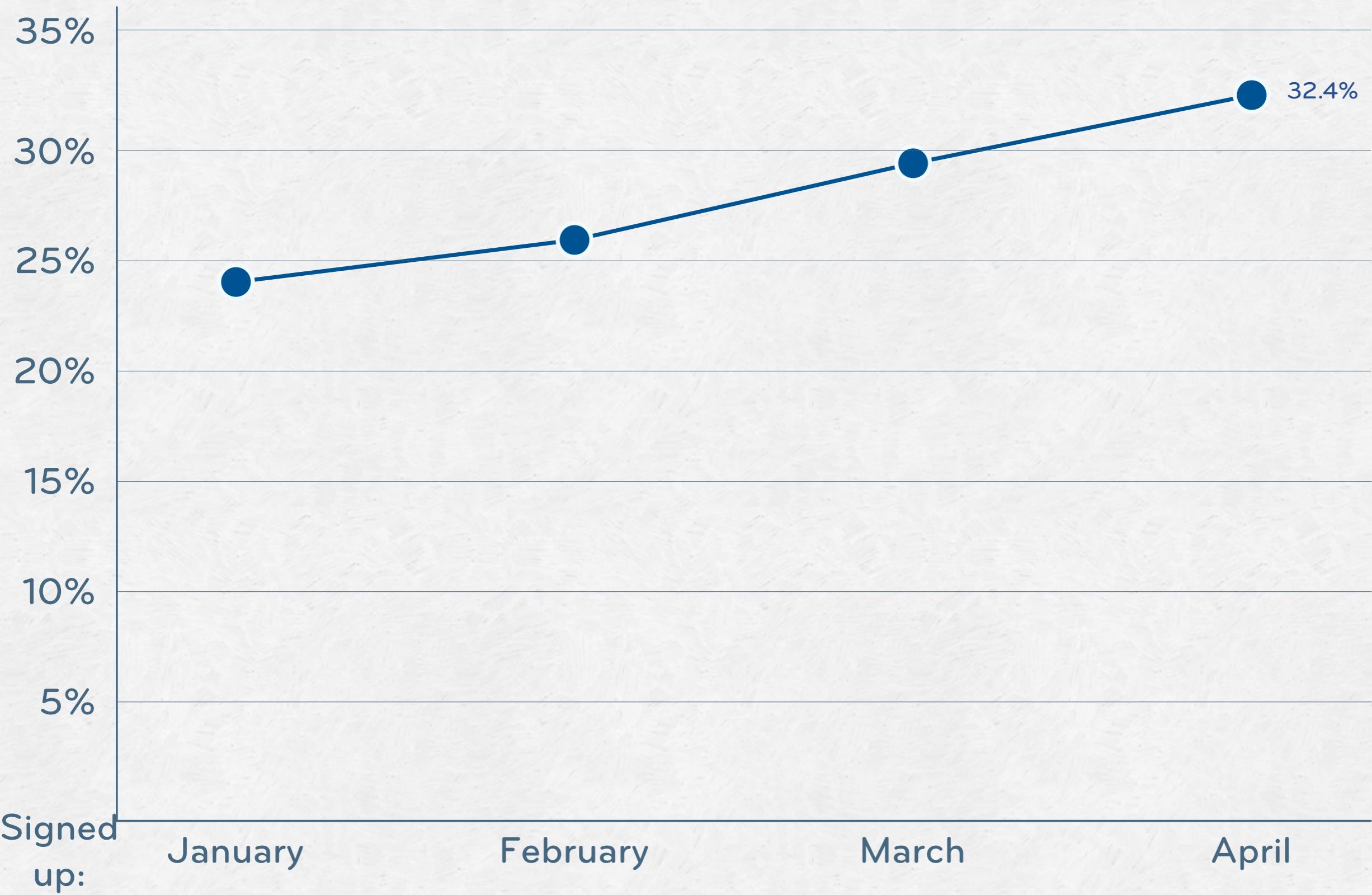


% of total

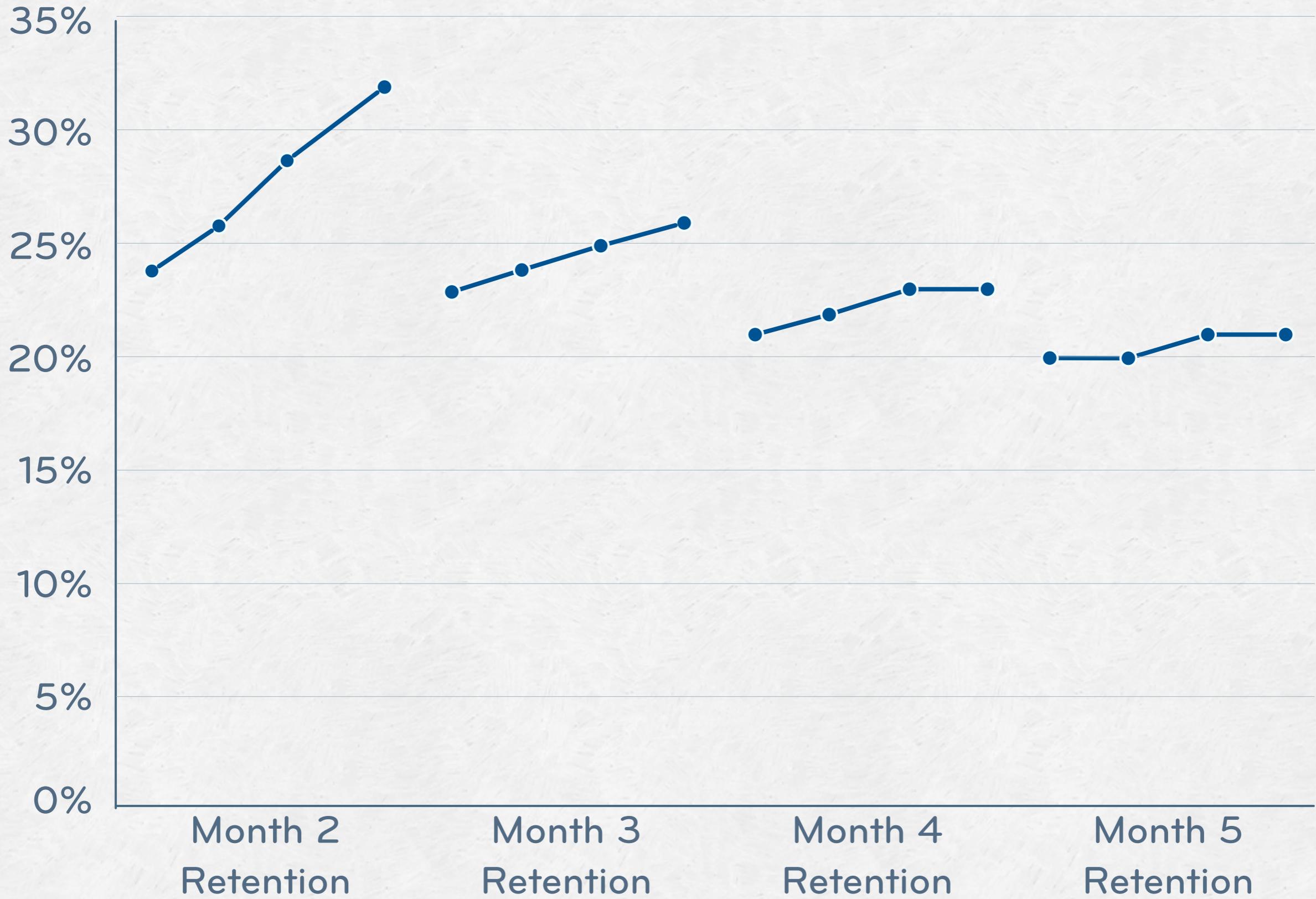


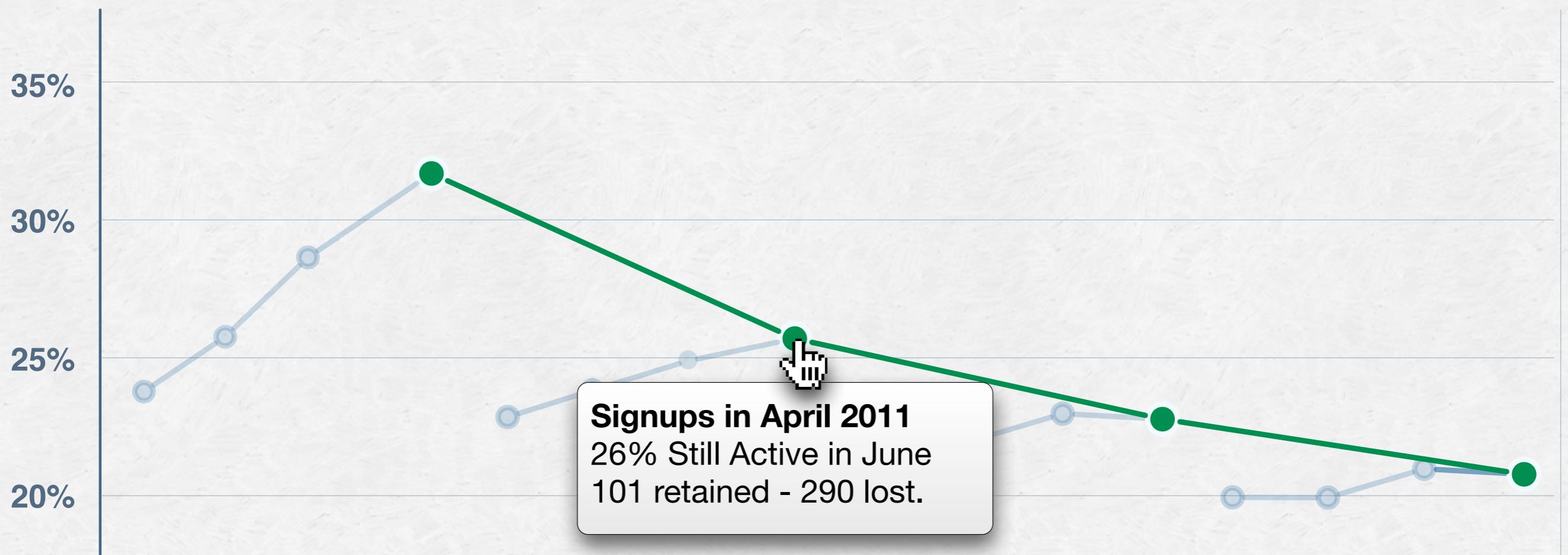
% of prev. month

# How many stick around for a second month?



# Retention using a cycle plot





## 5. BREAKDOWN OF A VARIABLE

"What age groups are buying our stuff? What countries are we big in?"

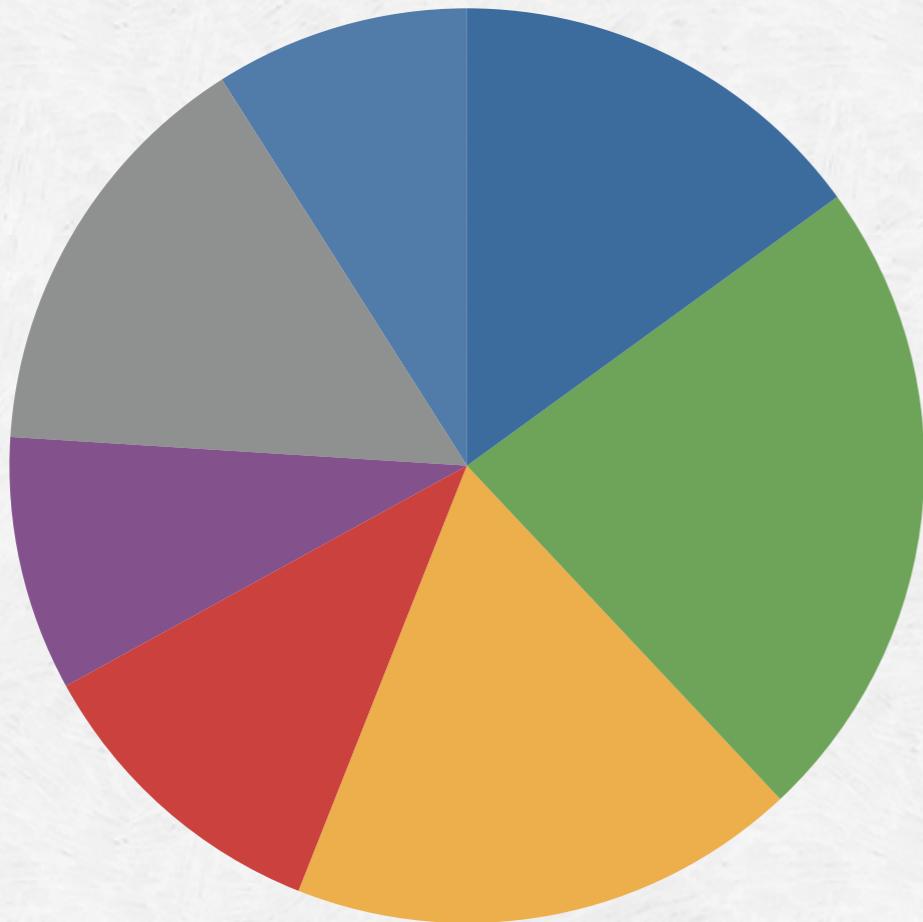
Examples:

Who are our customers?

What's our awareness like in each demographic?

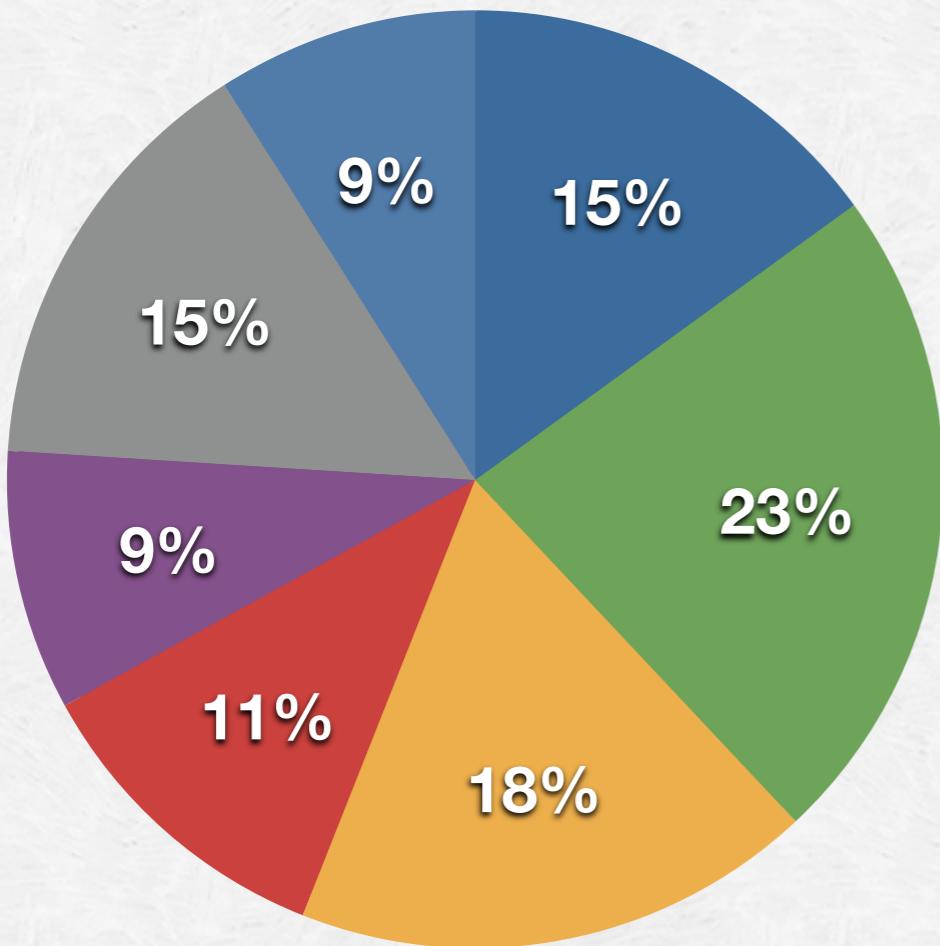
What browsers are people using these days?

# BAD PIE CHART



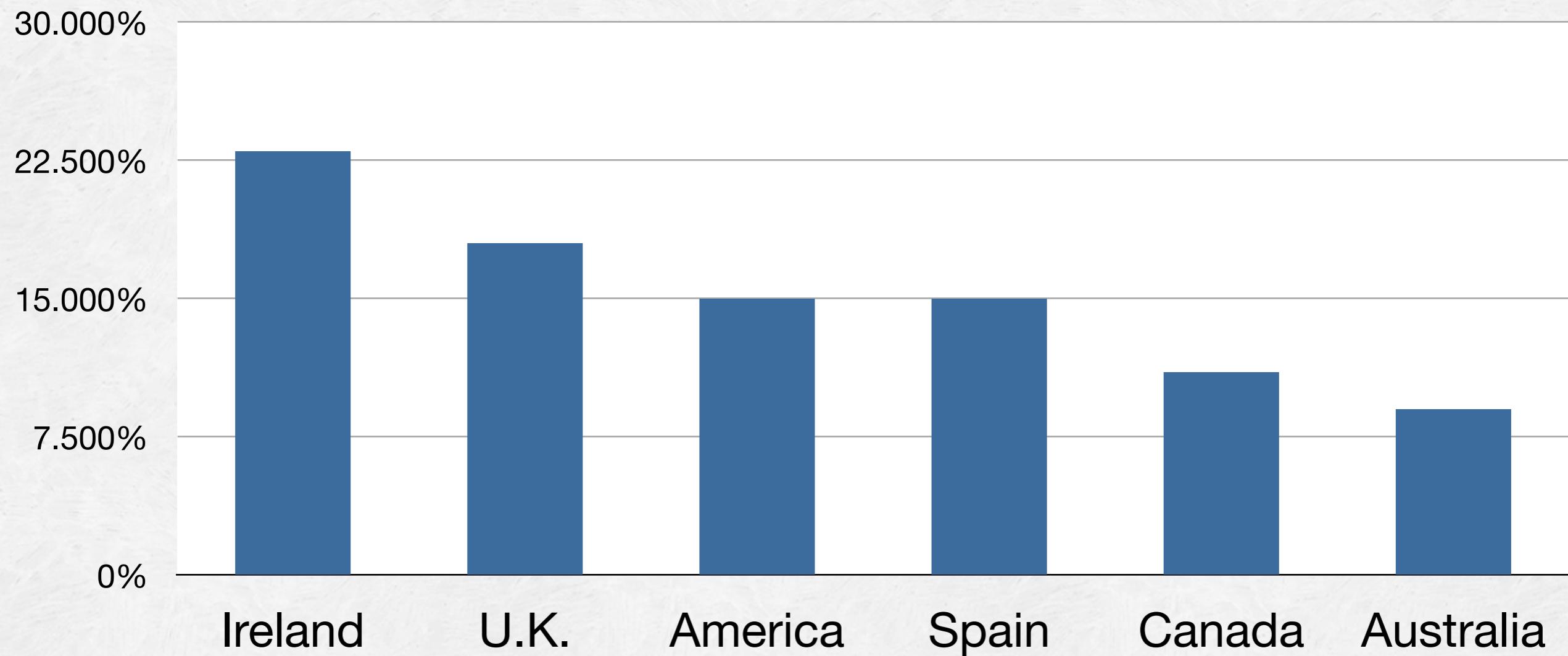
- America
- Ireland
- U.K.
- Canada
- Australia
- Spain
- France

YOU COULD ADD THE DATA...

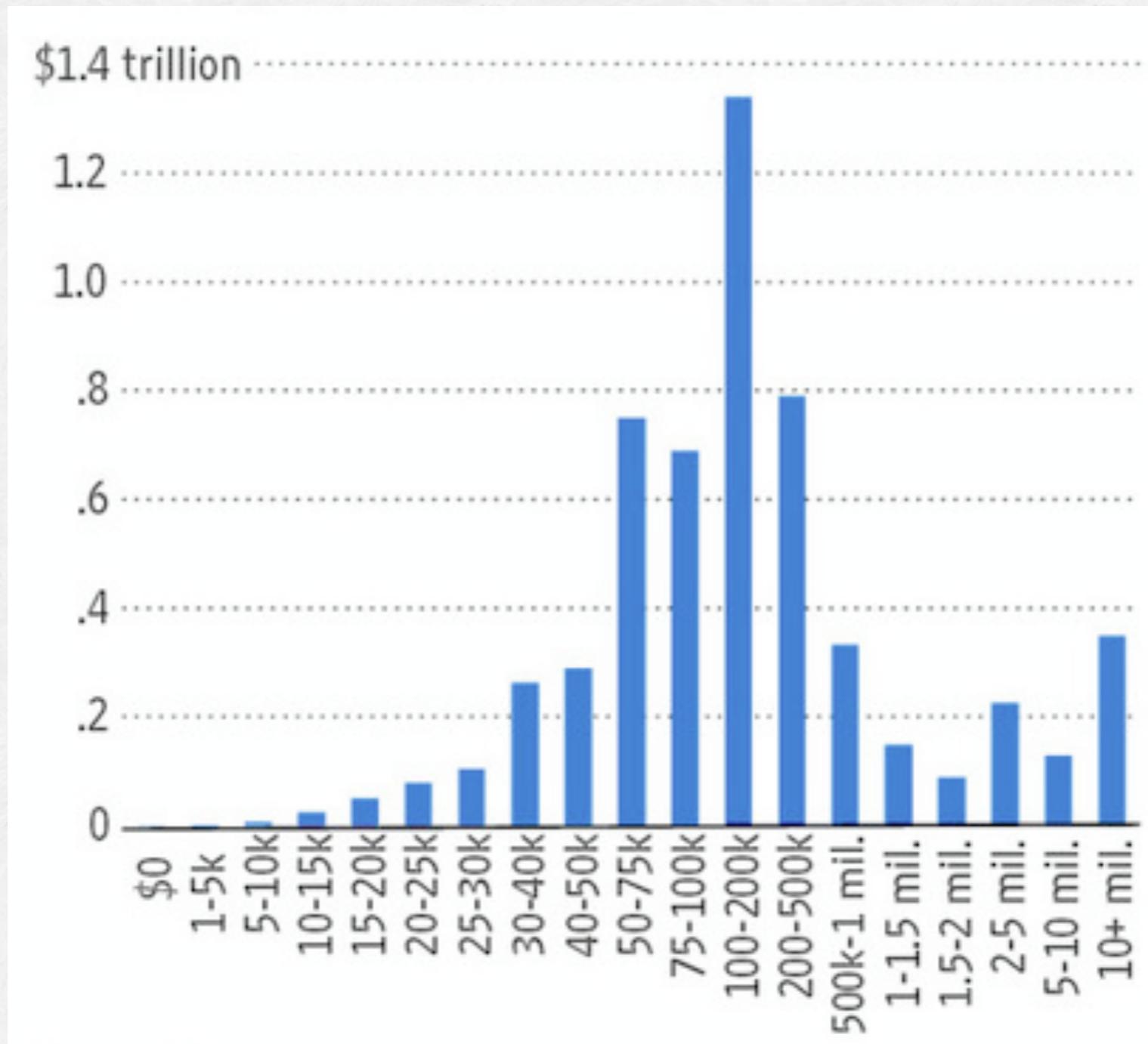


- America
- Ireland
- U.K.
- Canada
- Australia
- Spain
- France

# SORTED BAR CHART

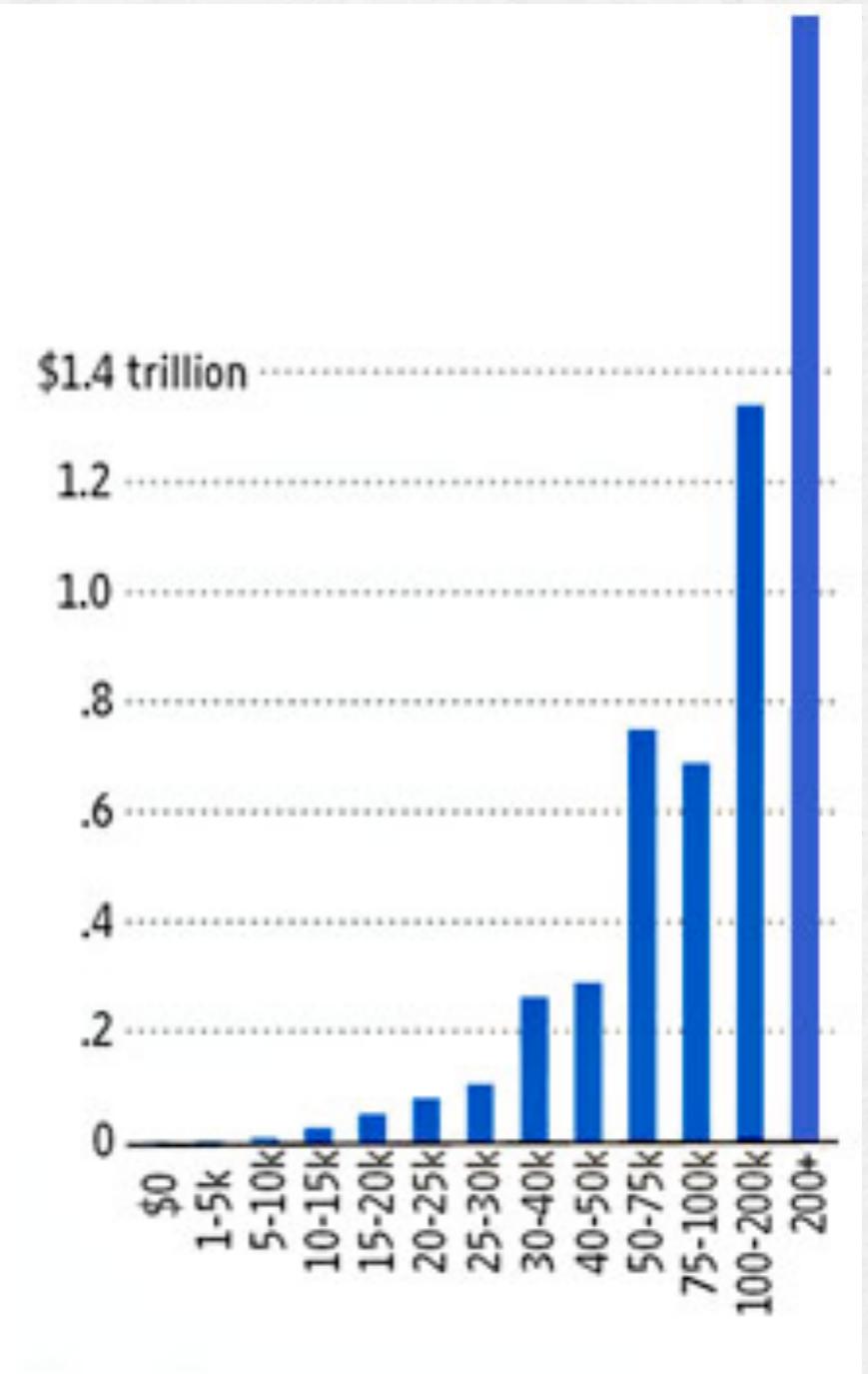
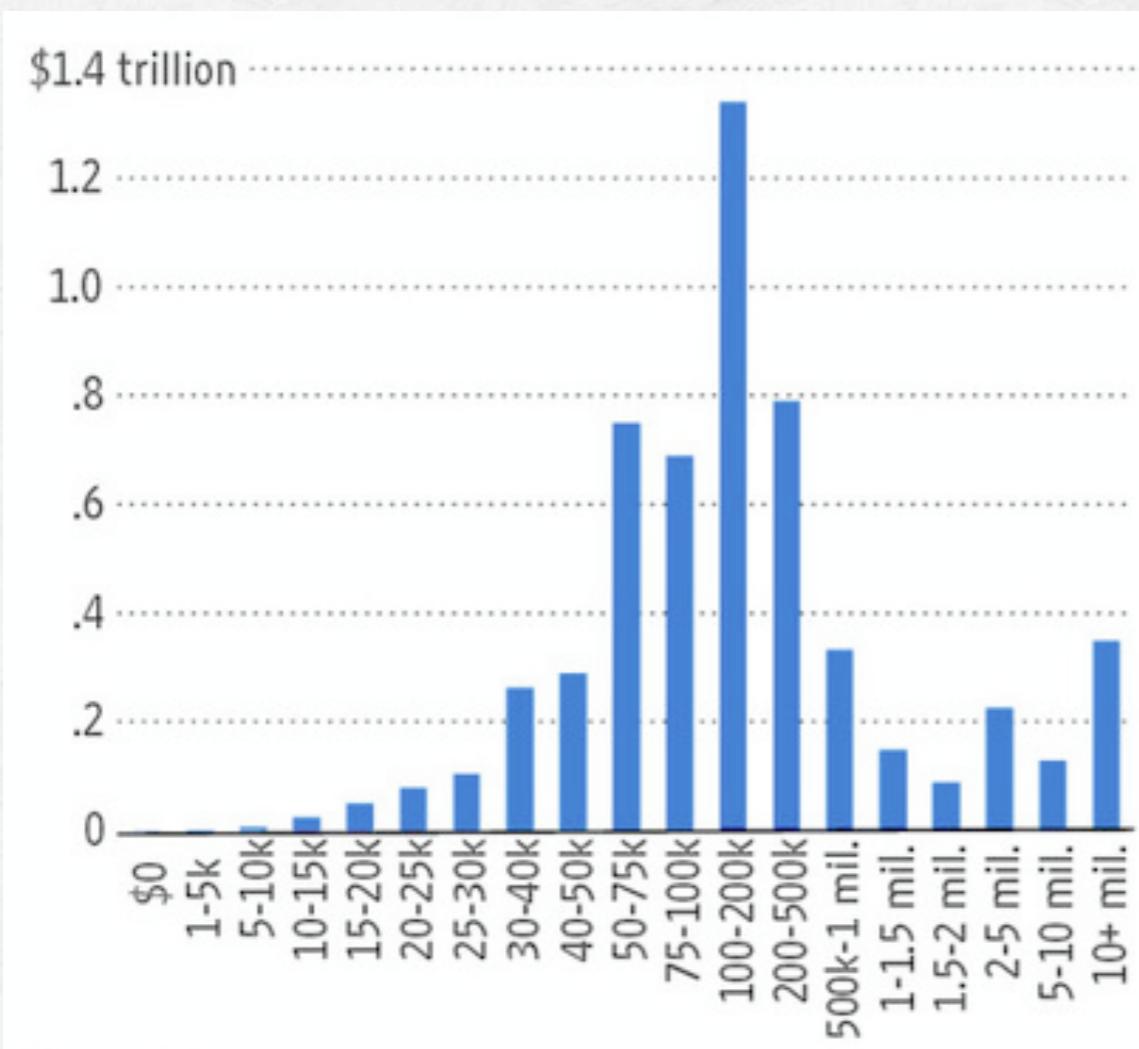


# LYING WITH GROUPINGS



The 100K to 200k is where we need to tax!

# LYING WITH GROUPINGS



Or maybe not...

# LIES WITH GROUPINGS

The screenshot shows a web page from Mother Jones. At the top, there's a banner for Antioch University Los Angeles. Below the banner, the Mother Jones logo is on the left, and a photo of a beach with waves crashing onto sand is on the right. A navigation bar with links for HOME, POLITICS, ENVIRONMENT, CULTURE, PHOTO ESSAYS, and BLOGS follows. Under the navigation, a section titled "Must Reads" lists "Disapproval of Tea Party Higher Than Ever | Org. Berries Grown With Poisons | Rise In Premiums Shows In" (partially cut off). The main article title is "Fun With Charts: Making the Rich Look Poor" by Kevin Drum, dated Thu May 12, 2011 10:21 AM PDT. It has a "Like" button with 1K likes. The article discusses a chart from the Wall Street Journal that appears to show the middle class has all the money. The author argues this is an optical illusion. The chart is shown at the bottom of the article.

## Fun With Charts: Making the Rich Look Poor

—By [Kevin Drum](#) | Thu May 12, 2011 10:21 AM PDT [Like](#) 1K

Jon Chait takes a closer look at a *Wall Street Journal* chart intended to suggest that the middle class has all the money:

The chart has been making the conservative blog rounds, from Powerline to Hoosierpundit to Reihan Salam to (not really conservative) Andrew Sullivan, who reproduces it under the headline "Where the Money Is." The chart most certainly does not demonstrate the *Journal's* point. It instead relies upon an optical illusion. Democrats have been arguing that their tax increases should solely affect income over \$250,000 a year. The *Journal* makes that pot of income appear small by divvying it up into seven different lines. See, the \$100,000-\$200,000 line is *tall*, and all the other lines to the right of it are *short*. That tall line must be where the money is!

As a public service, I've redrawn the chart for the *Journal*. On the left is the original. On the right is the chart that shows the actual amount of money earned by the tiny handful of people making over \$200,000. It's a lot.

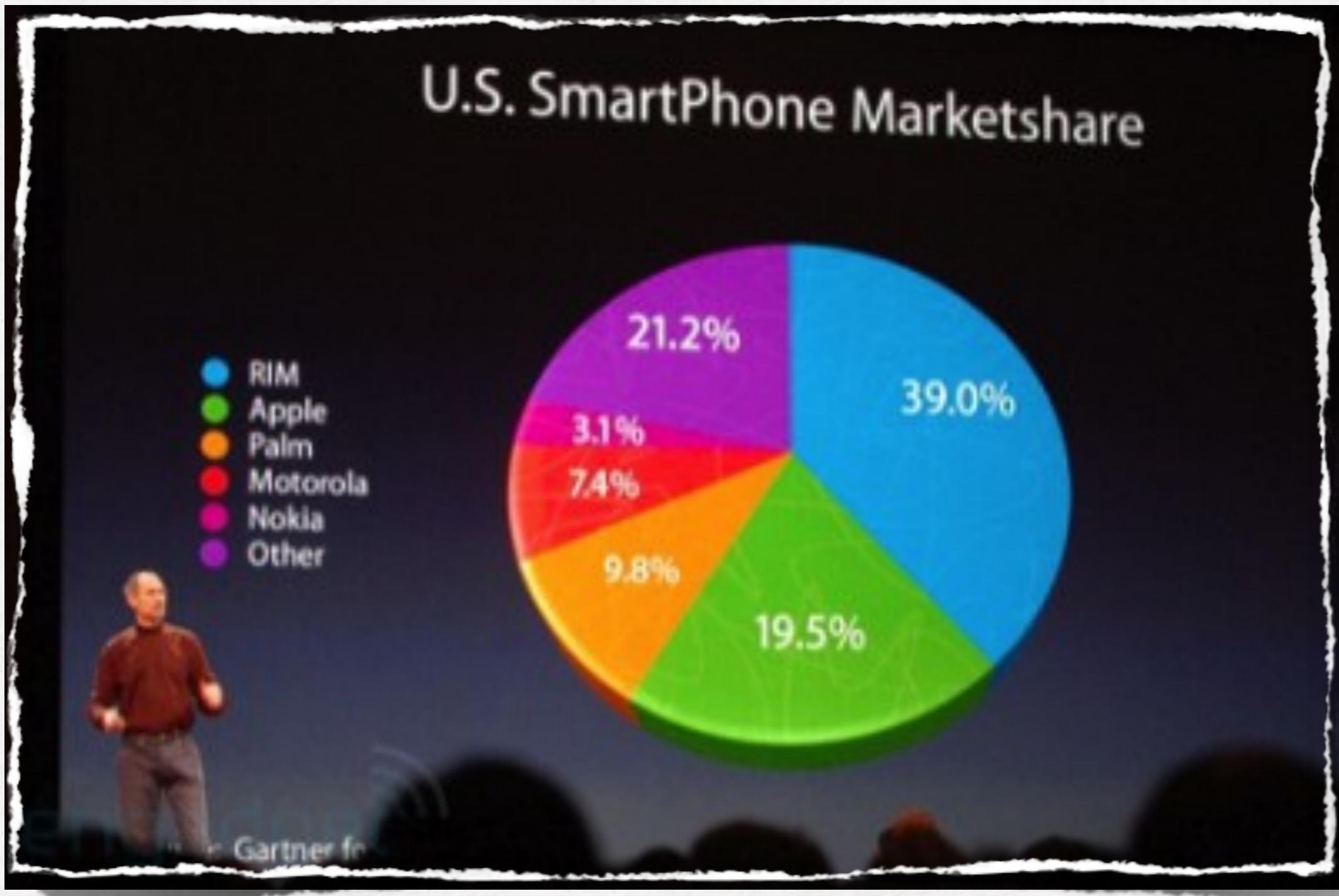
### The Middle Class Tax Target

The amount of total taxable income (left scale) for all filers by adjusted gross income level for 2008

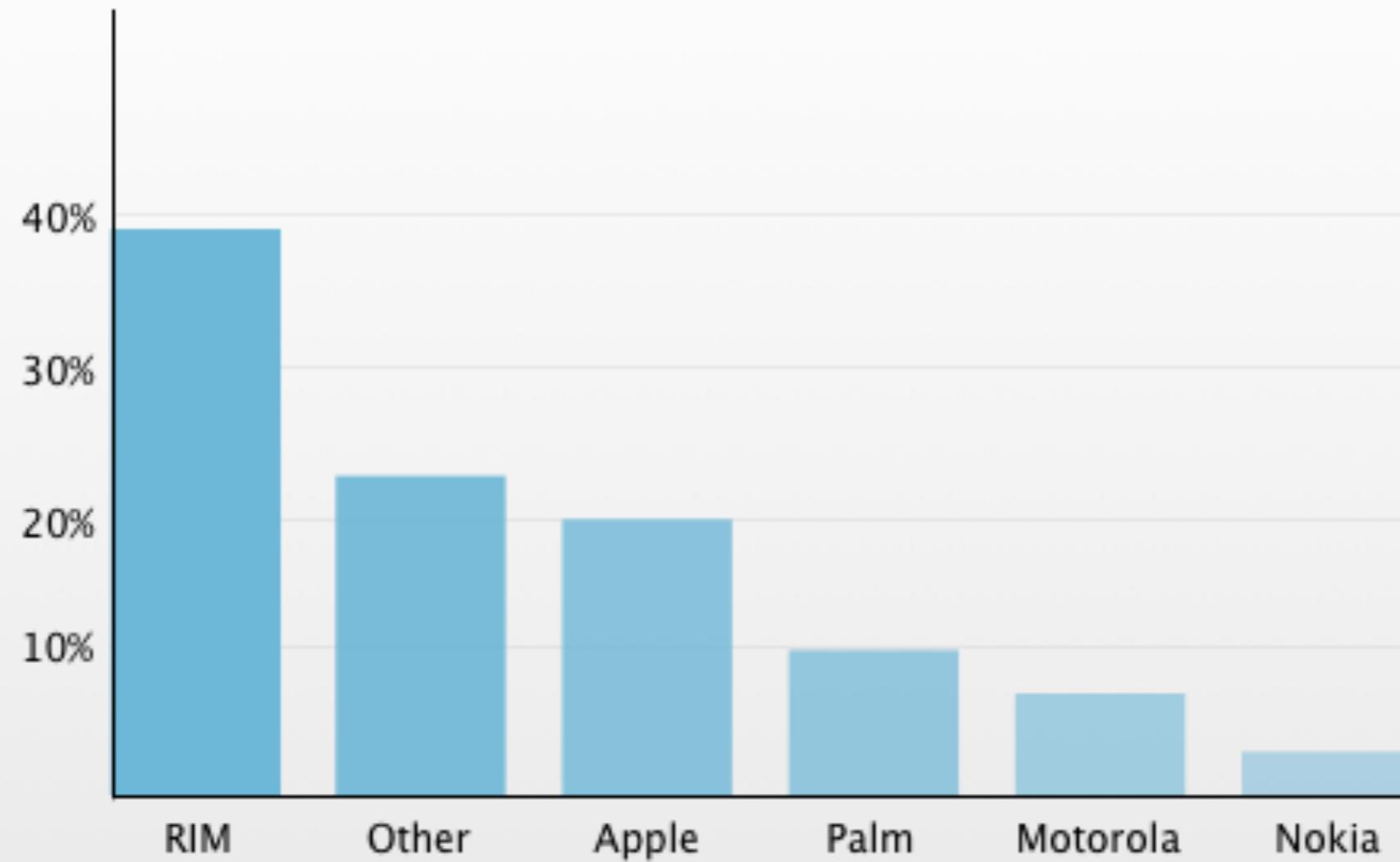
Income Level	Original Scale (\$ Trillion)	Redrawn Scale (\$ Trillion)
\$1.4 trillion	~\$0.15	~\$1.4
\$1.0 trillion	~\$0.05	~\$0.05
\$0.8 trillion	~\$0.03	~\$0.03
\$0.6 trillion	~\$0.02	~\$0.02
\$0.4 trillion	~\$0.01	~\$0.01
\$0.2 trillion	~\$0.005	~\$0.005
\$0.1 trillion	~\$0.002	~\$0.002

<http://motherjones.com/kevin-drum/2011/05/fun-charts-making-rich-look-poor>

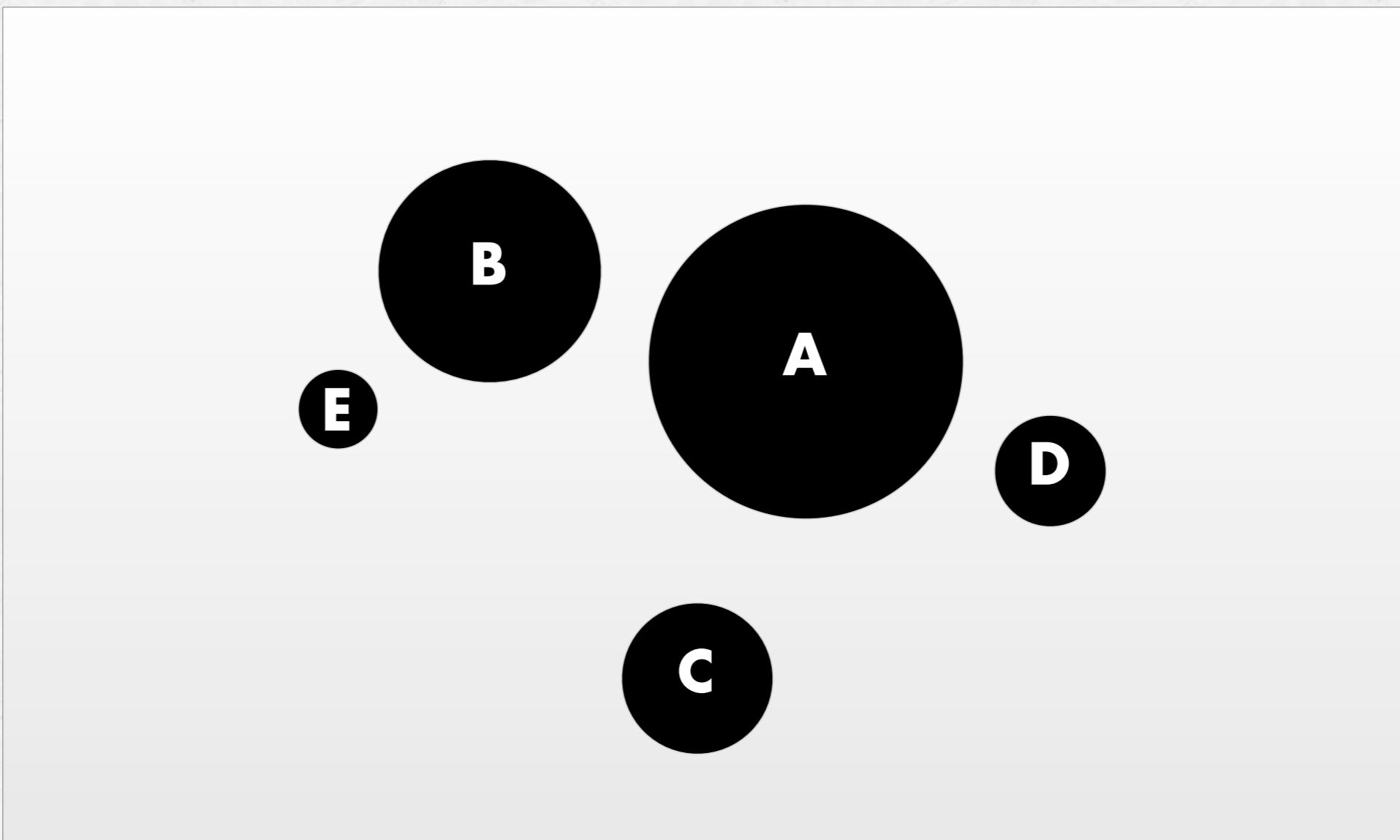
# LYING WITH ROTATIONS



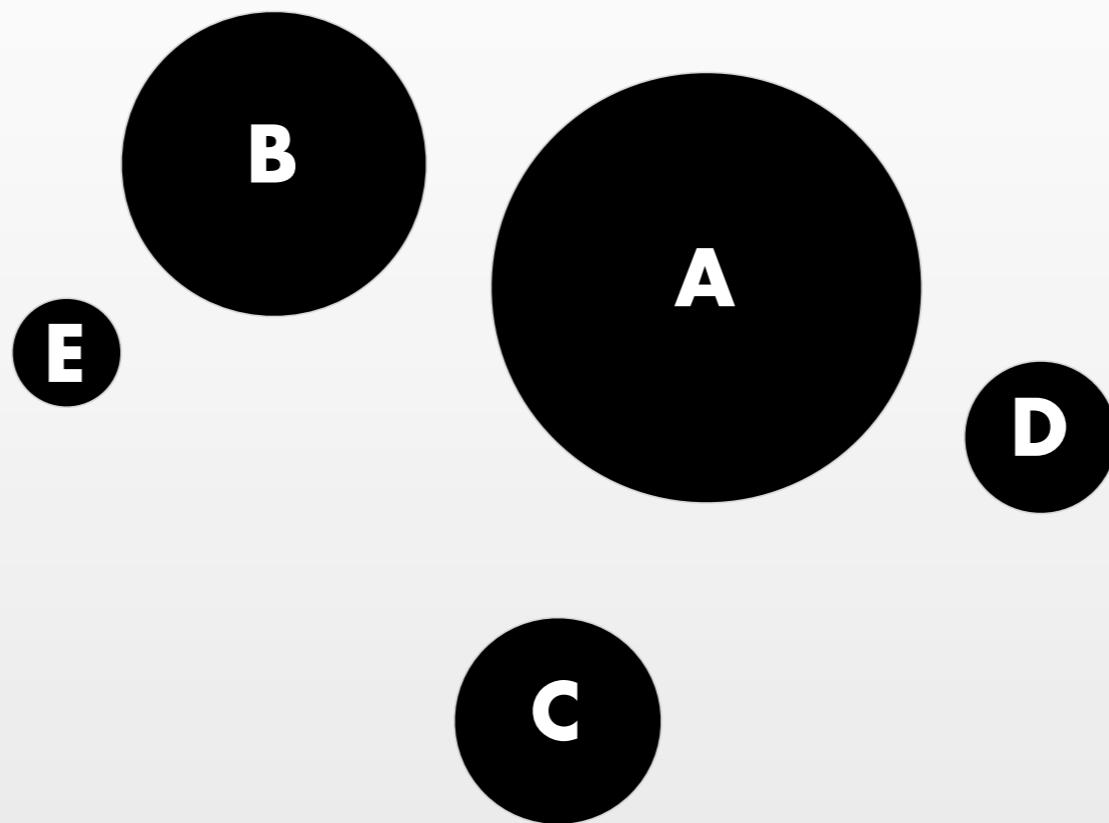
# LYING WITH DIMENSIONS



# BAD: AREA PLOT

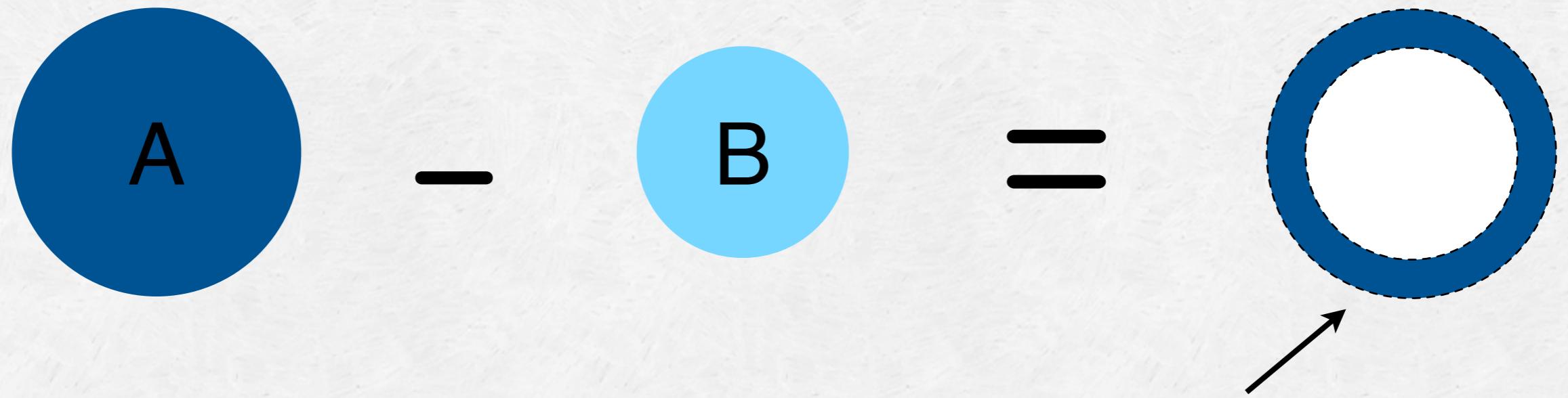


# BAD: AREA PLOT



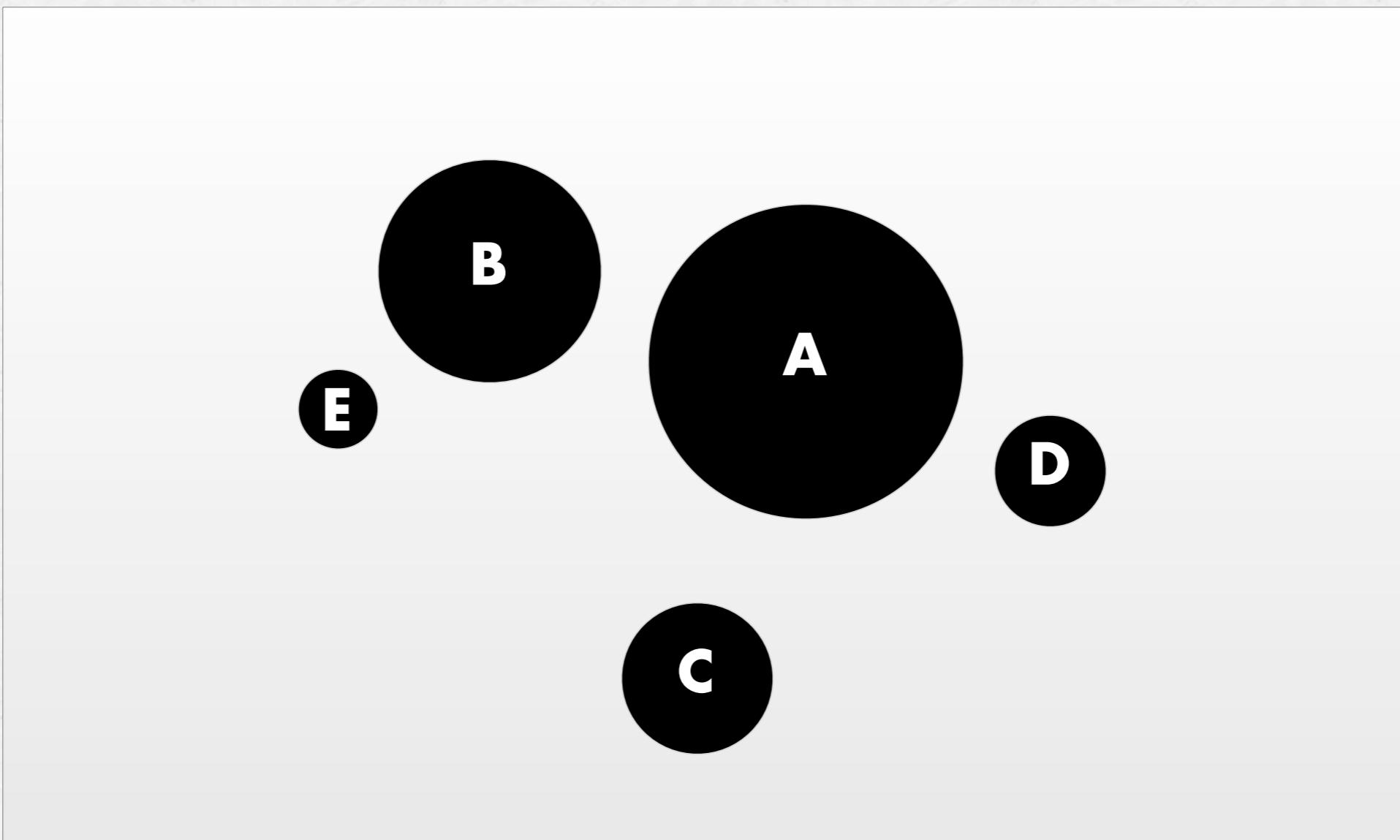
Which would you pick?

# BAD: AREA PLOT

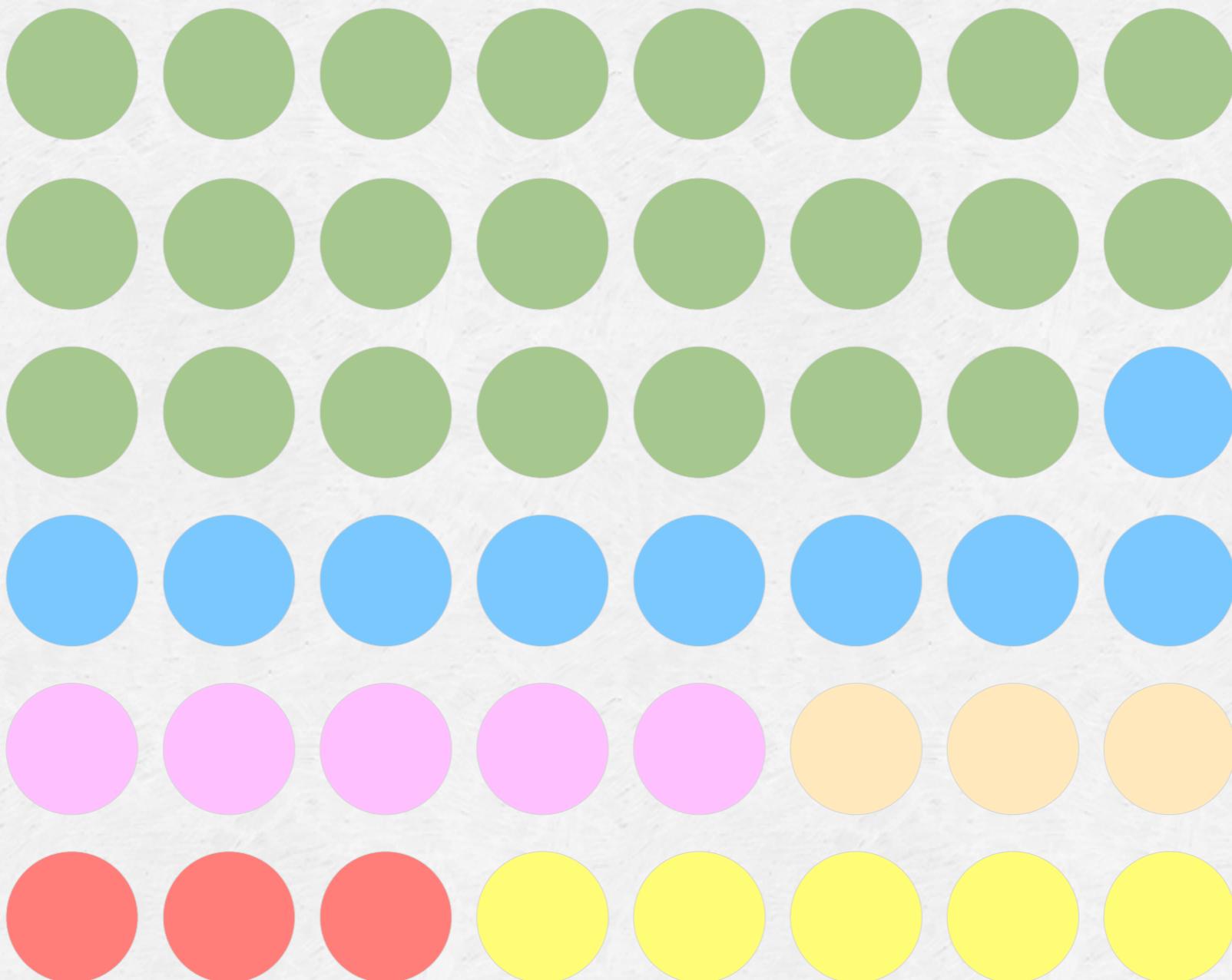


How “big” is this?

# BAD: AREA PLOT

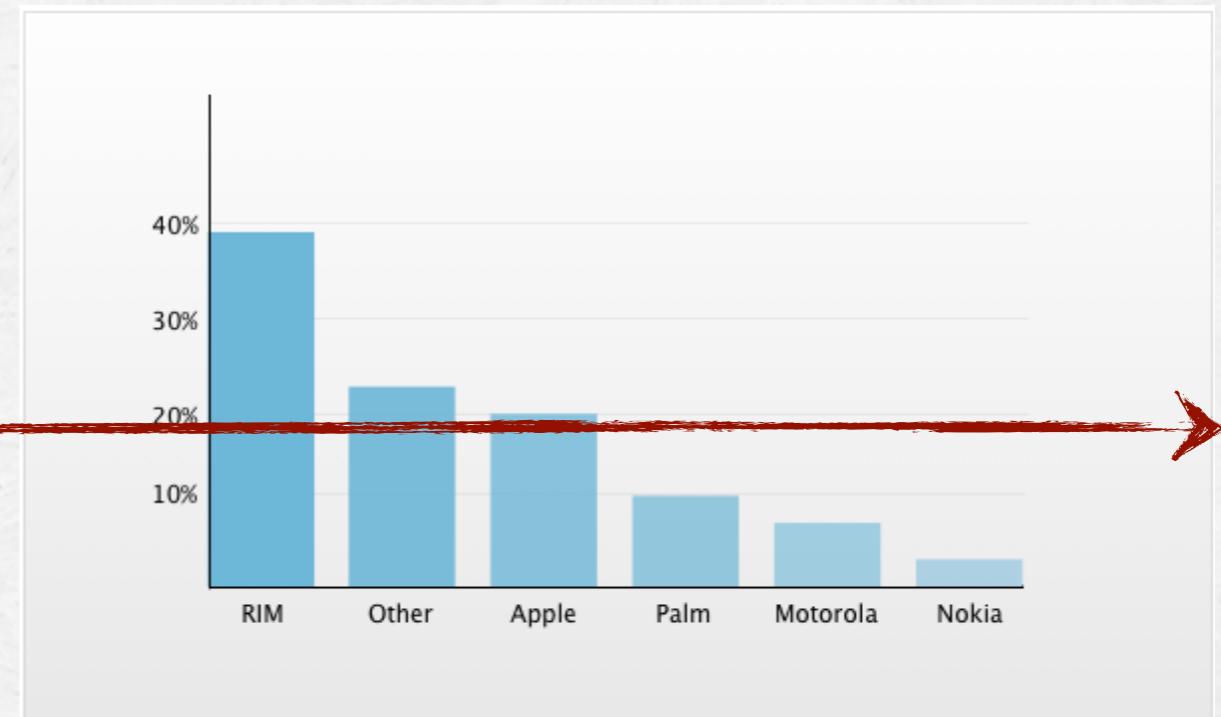


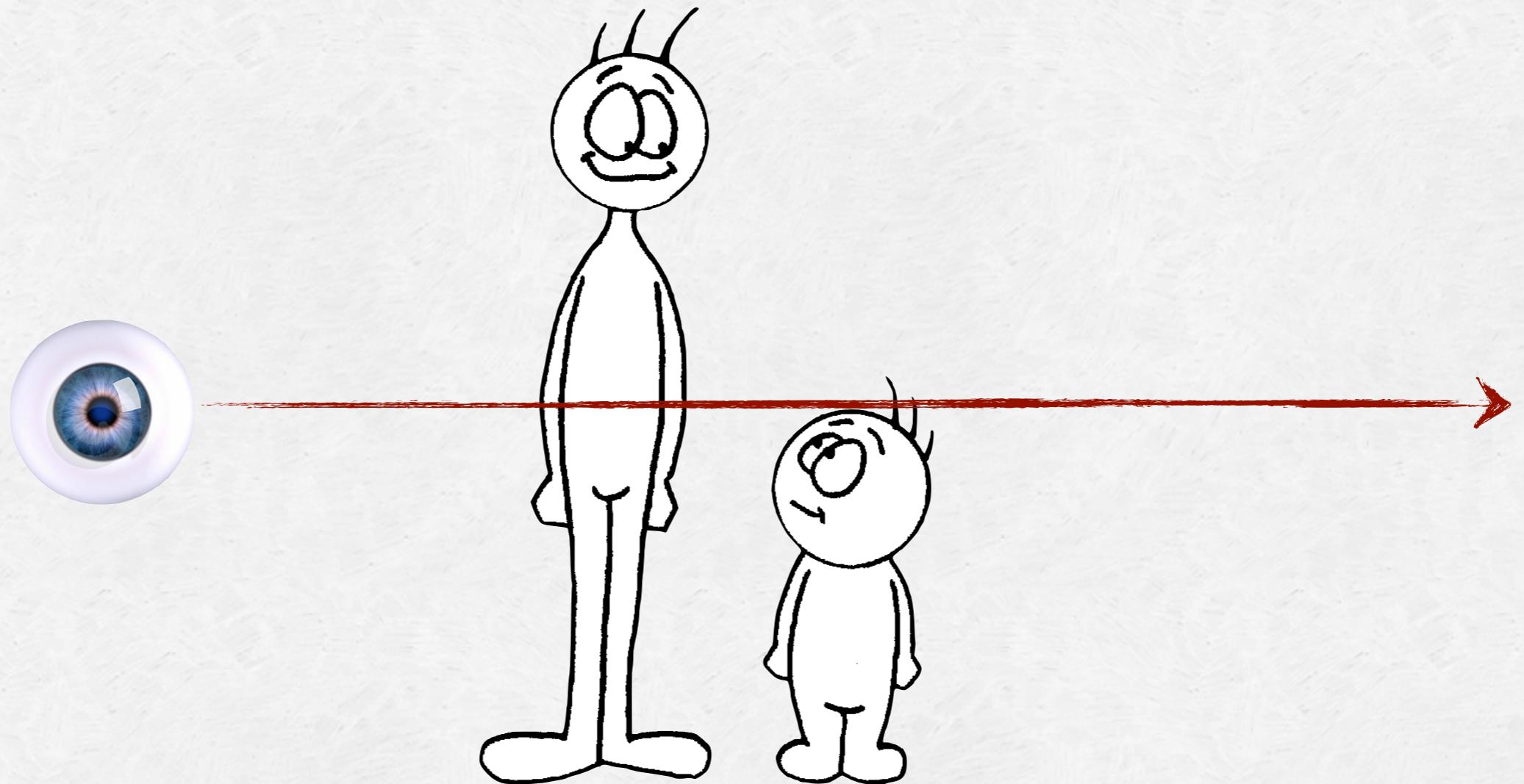
# BAD UNIT PLOT



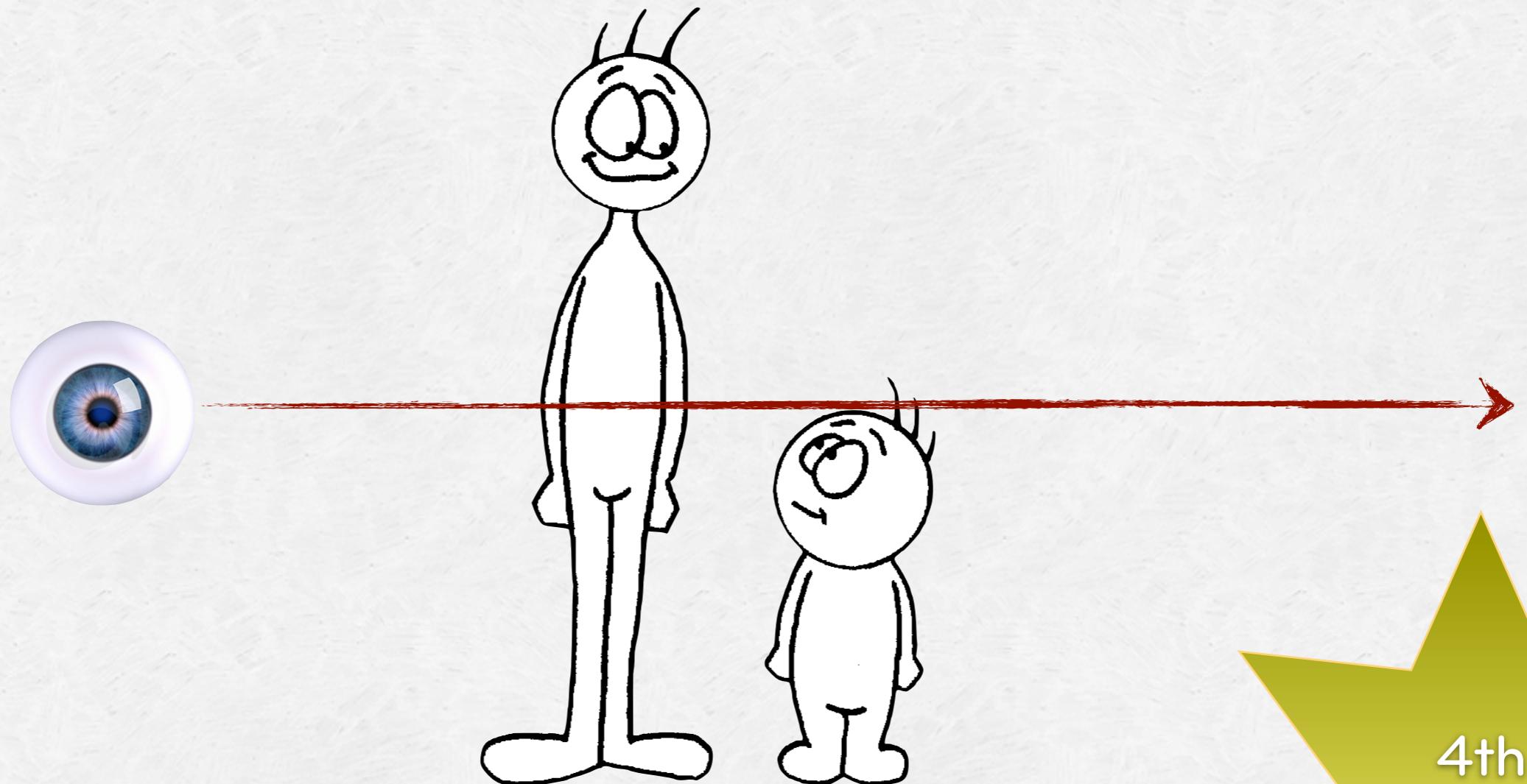
## 5. BREAKDOWN OF A VARIABLE

“Bar charts aren’t sexy, but they rely on an innate skill, following a line.”





If you had to fight one of them...



4th  
Takeaway

If you had to fight one of them...

## 6. BREAKDOWN OVER TIME

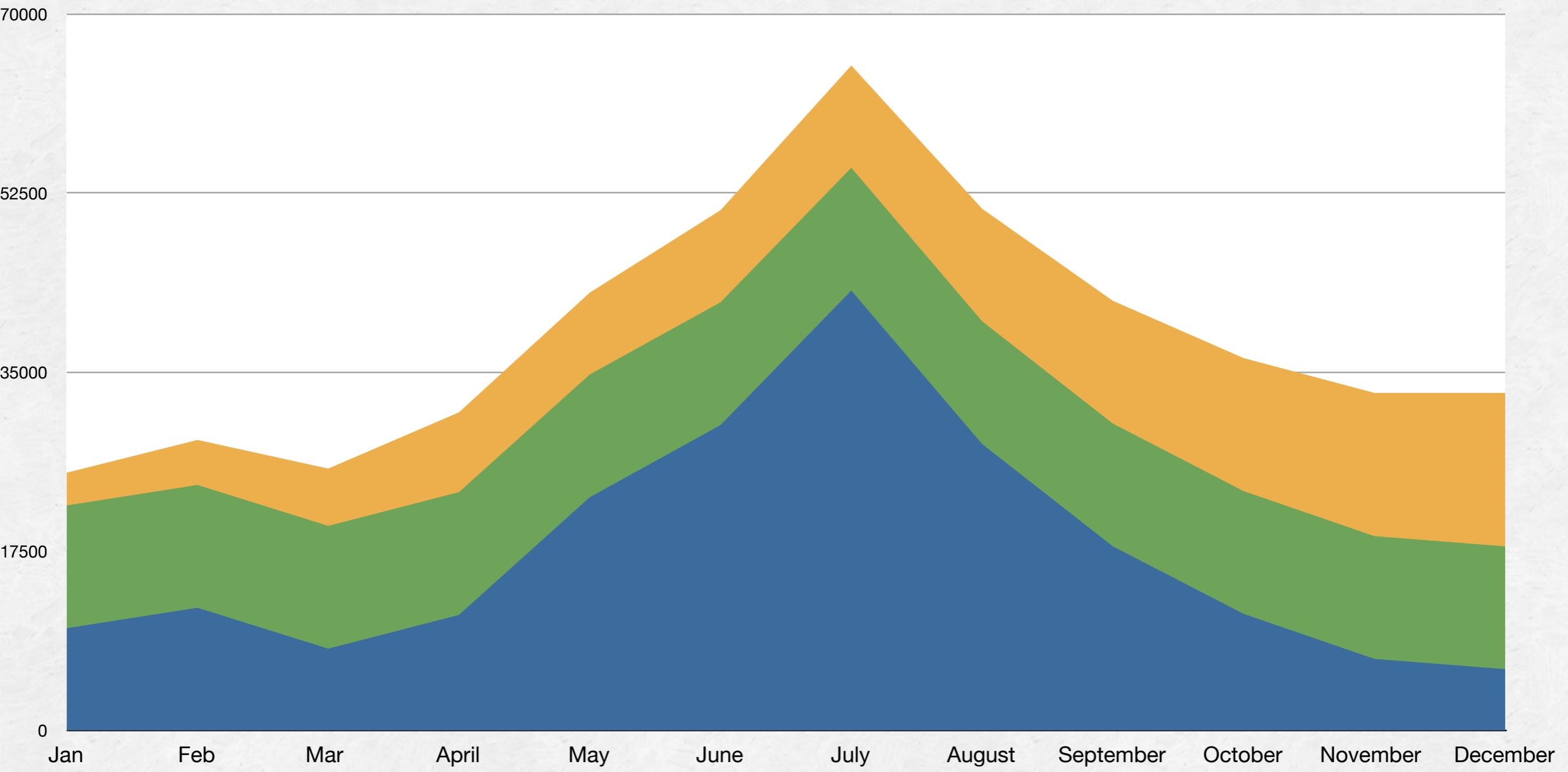
"How has the composition changed over the last year?"

Examples:

How has the browser market changed?

Has our revenue sources shifted recently?

# STACKED BAR CHART



Ireland

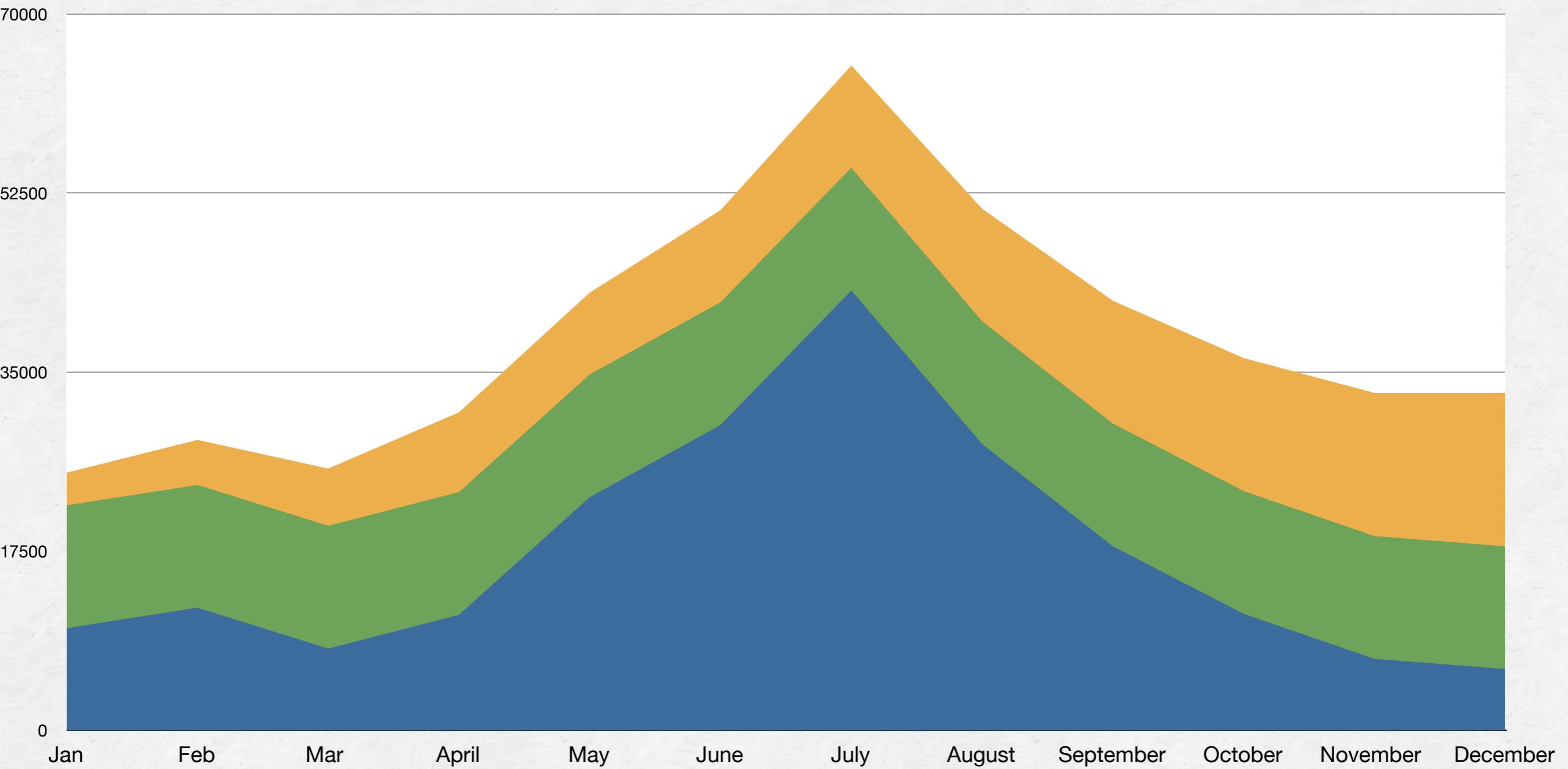


U.K.



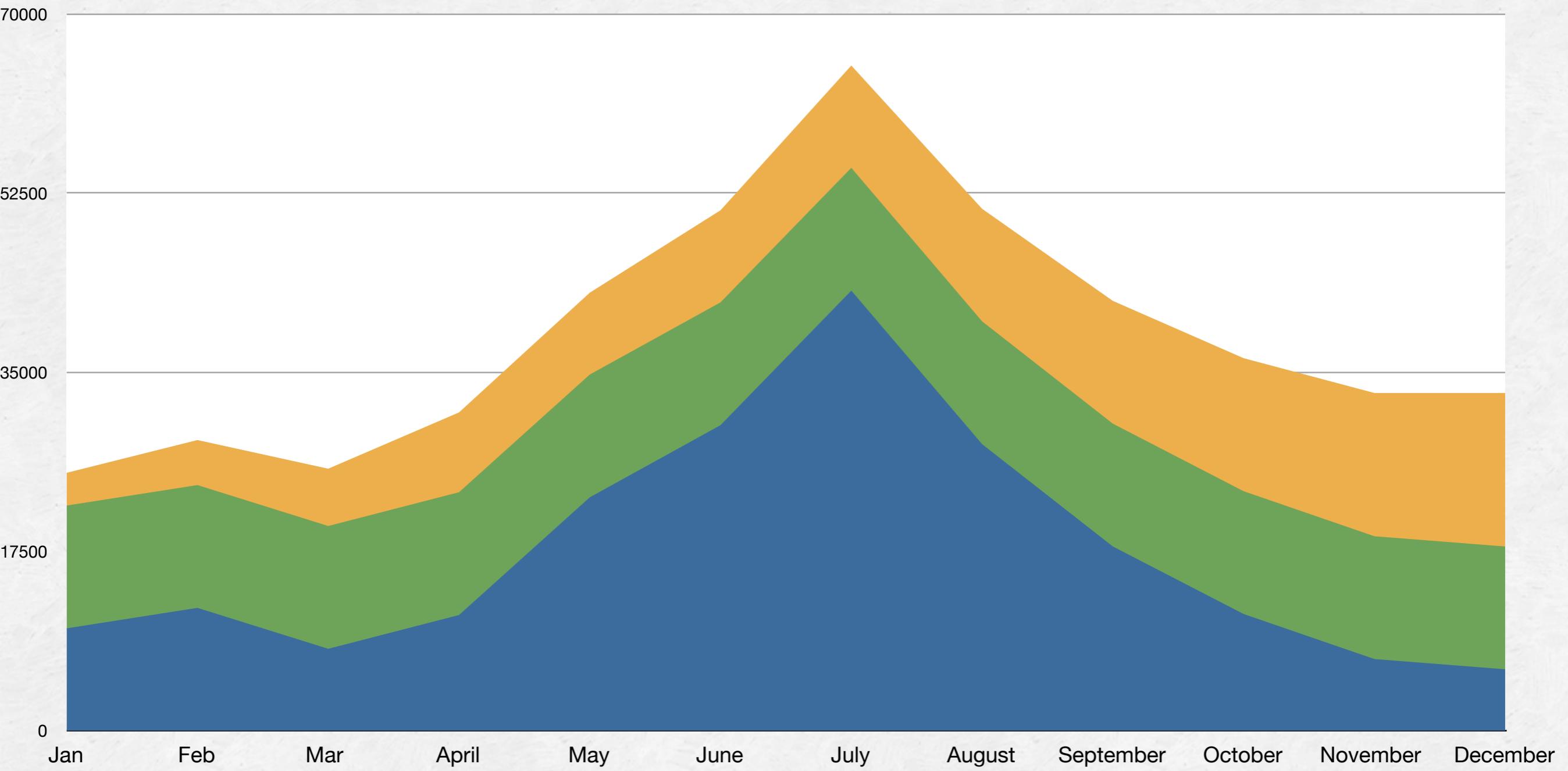
America

# STACKED BAR CHART



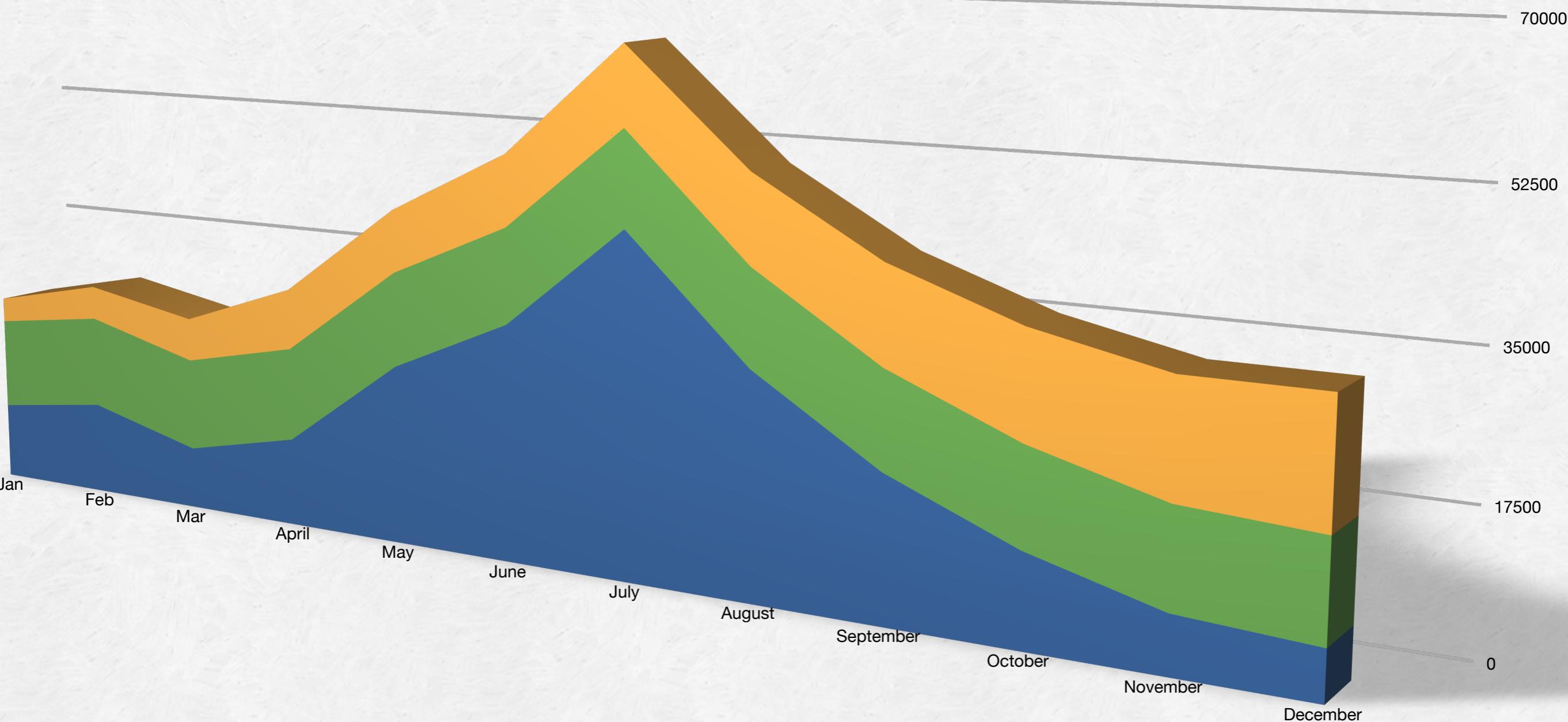
America peaked in July?

# STACKED BAR CHART



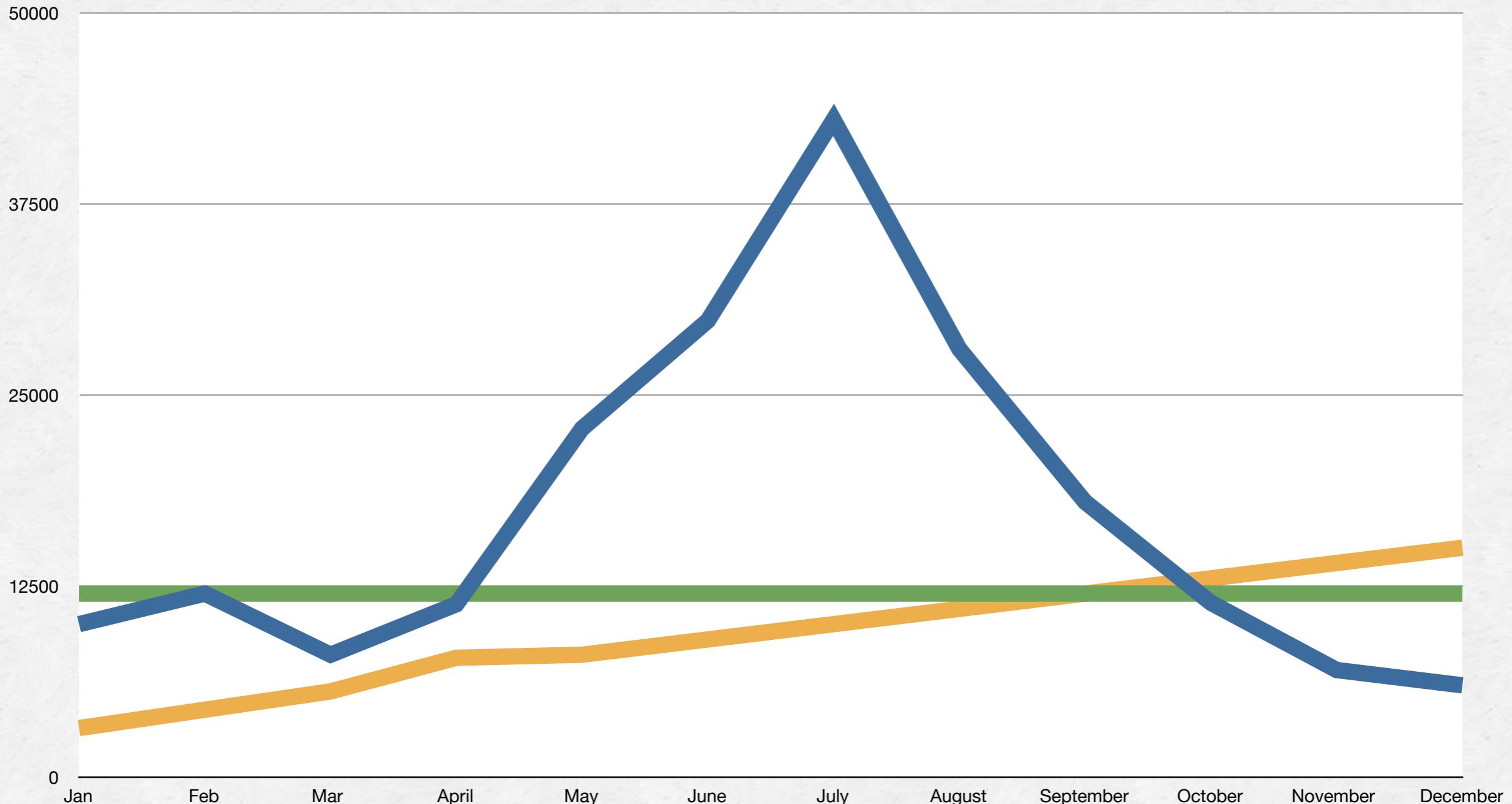
How has U.K. done?

# LYING WITH DIMENSIONS



Lots more yellow pixels here now...

# LET'S TRY A LINE CHART

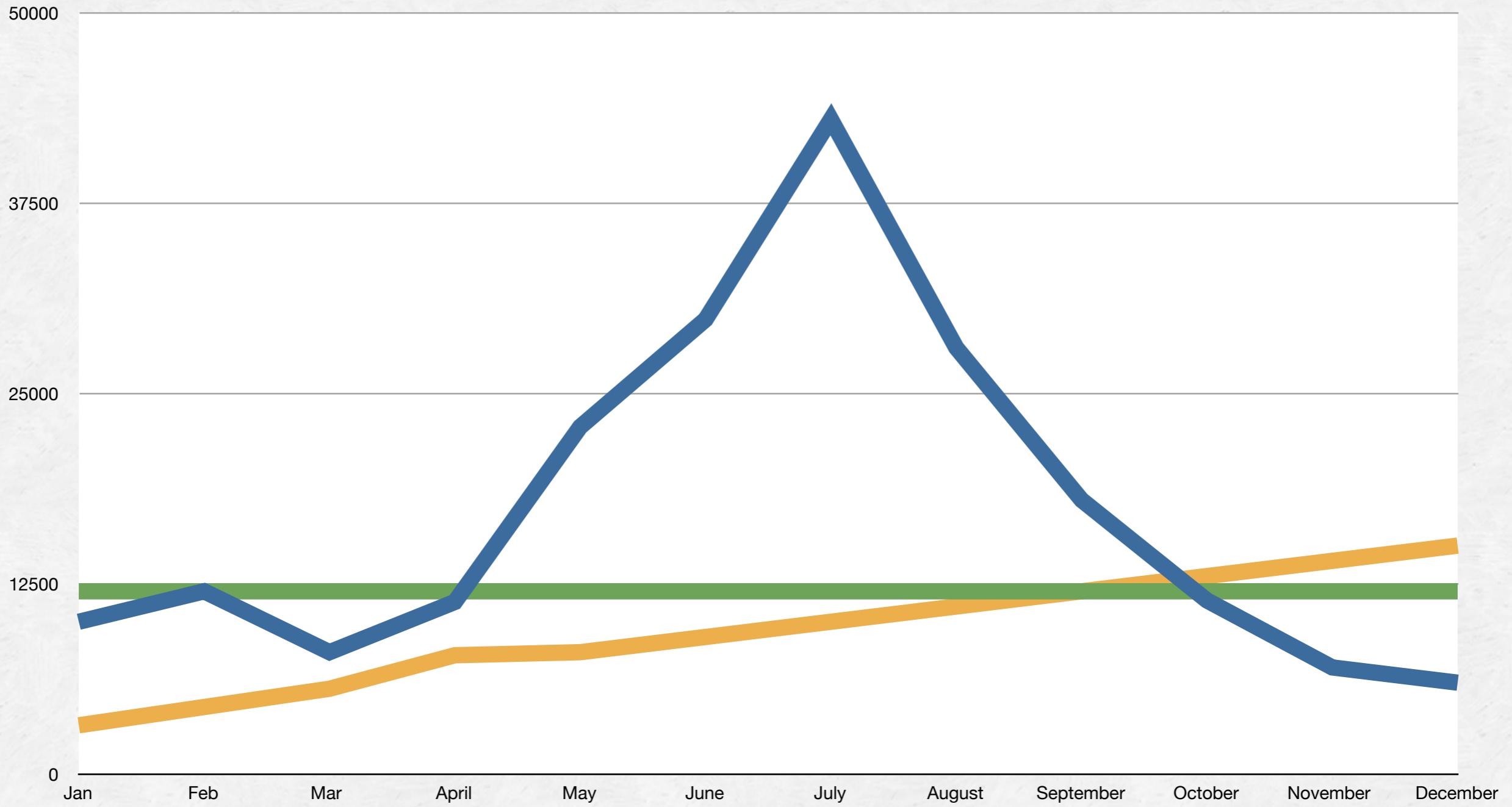


— Ireland

— U.K.

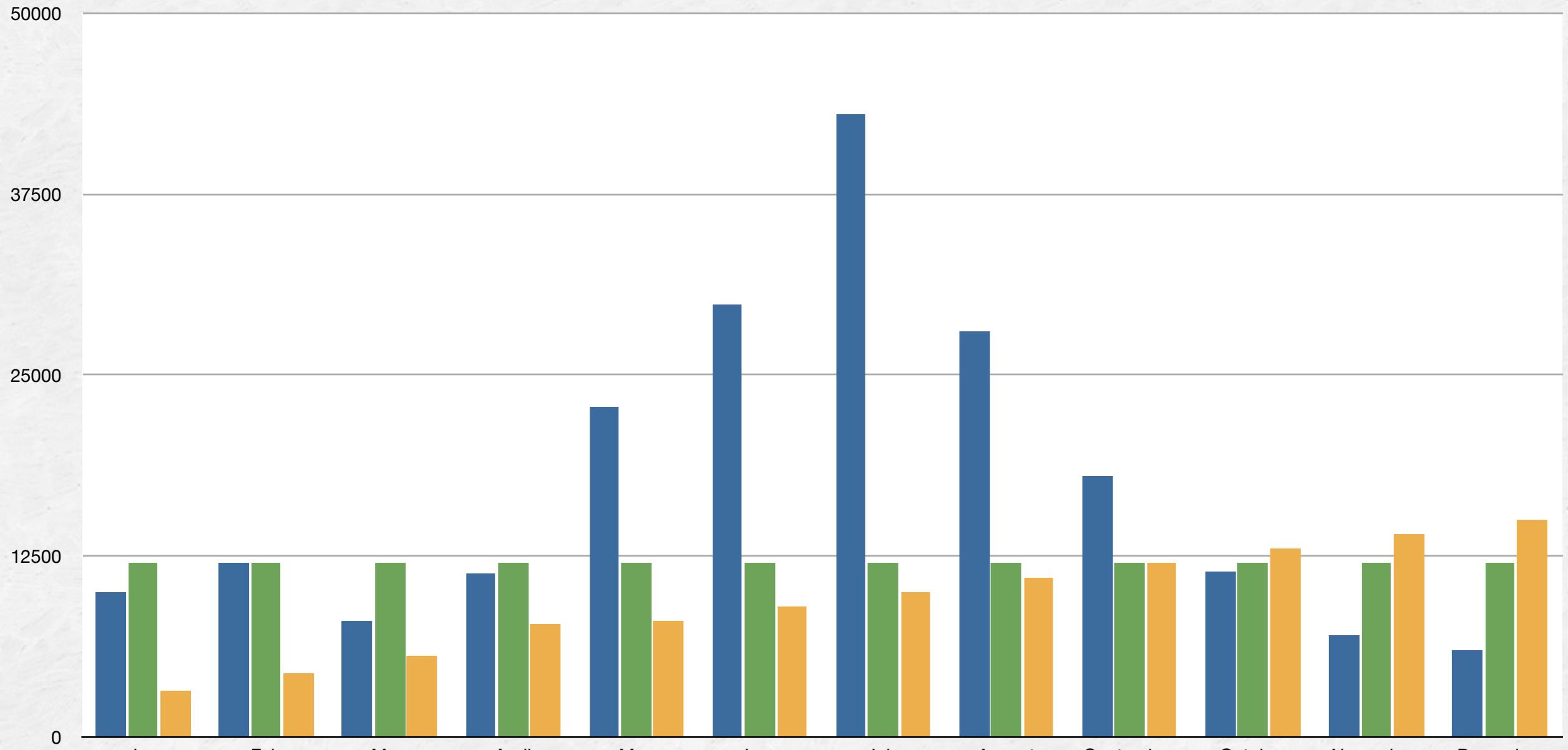
— America

# LINE CHART OF SAME DATA?



Same data. Different story.

# BAR CHARTS AGAIN?



Ireland

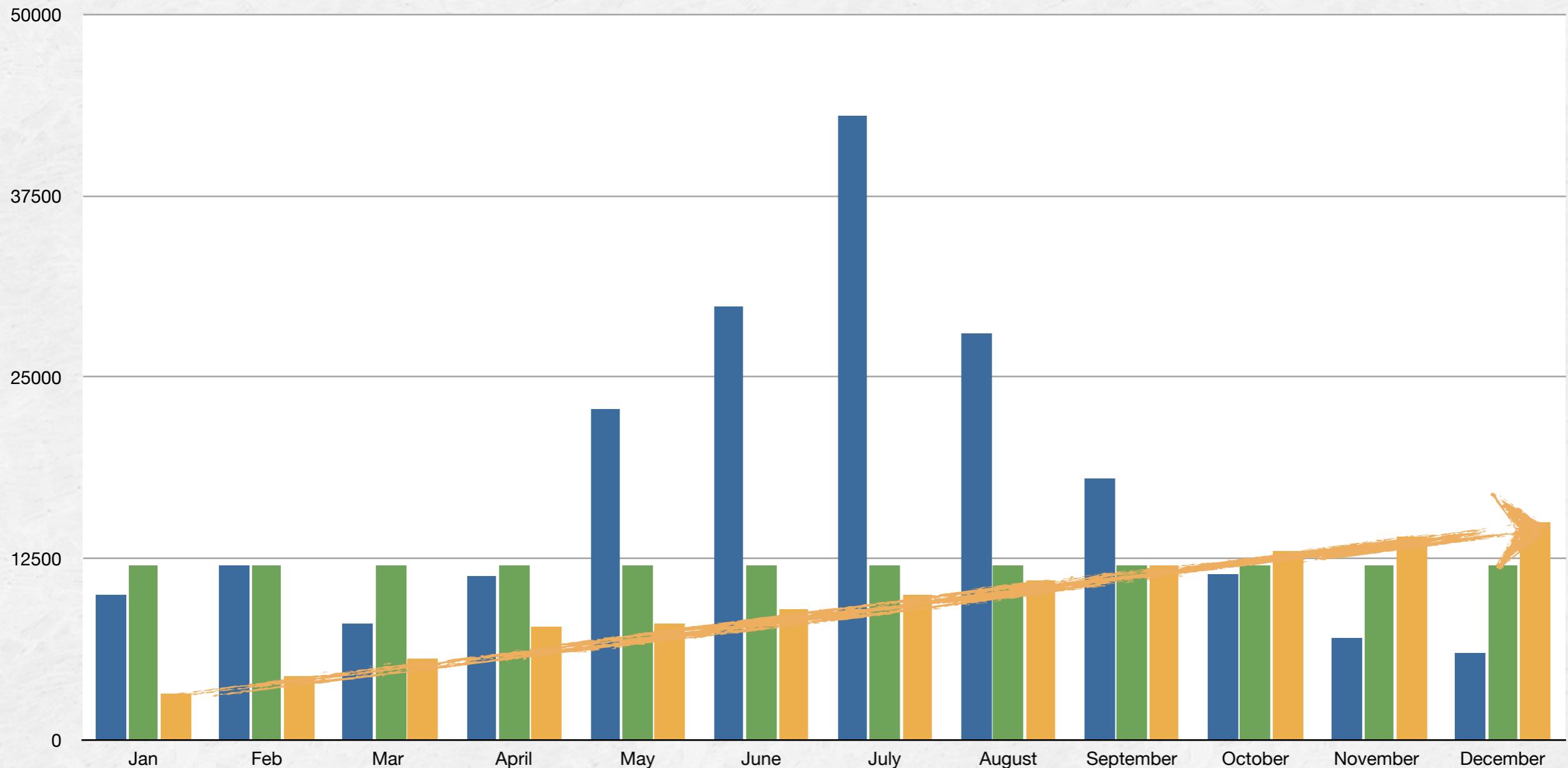


U.K.

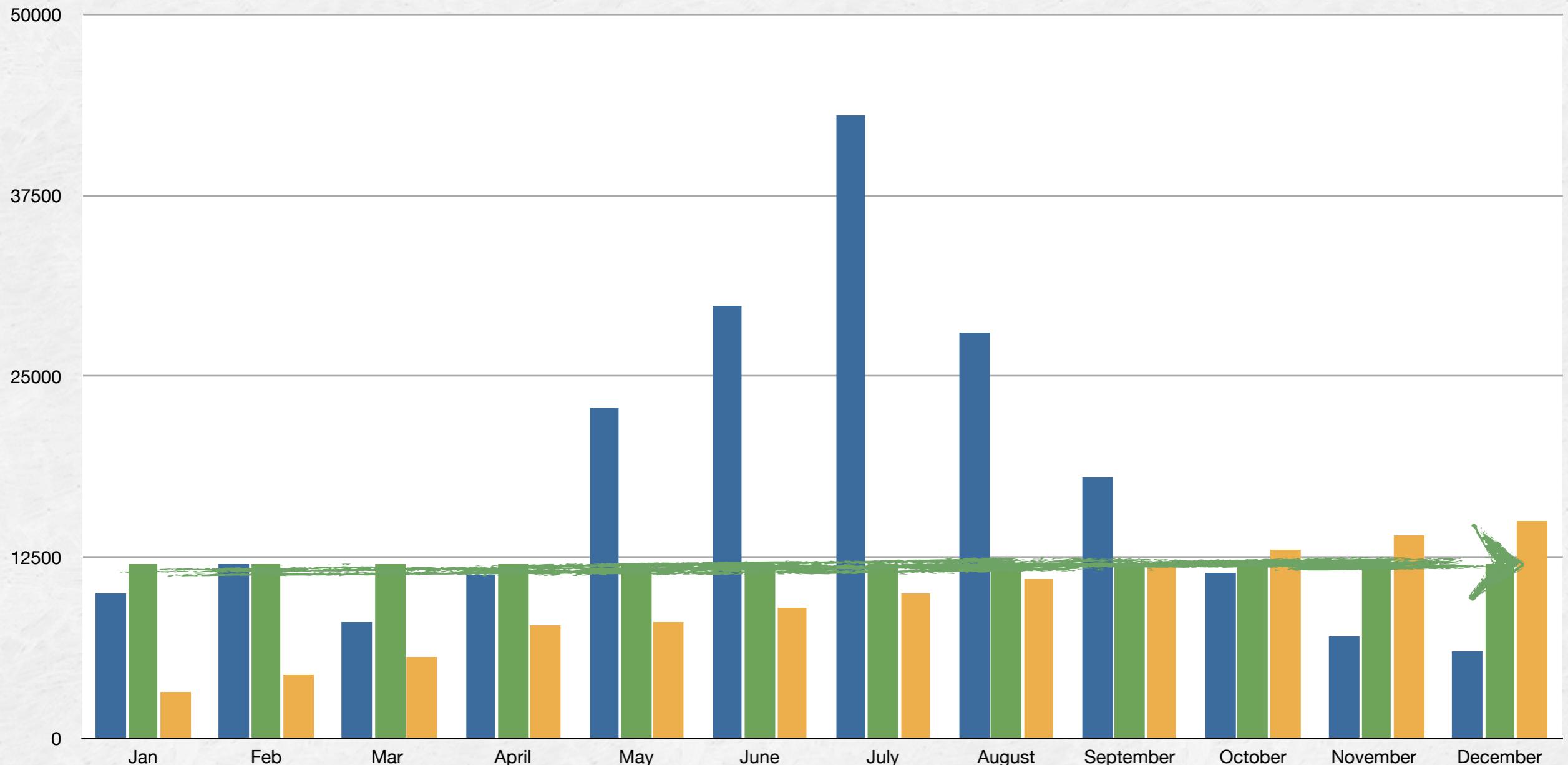


America

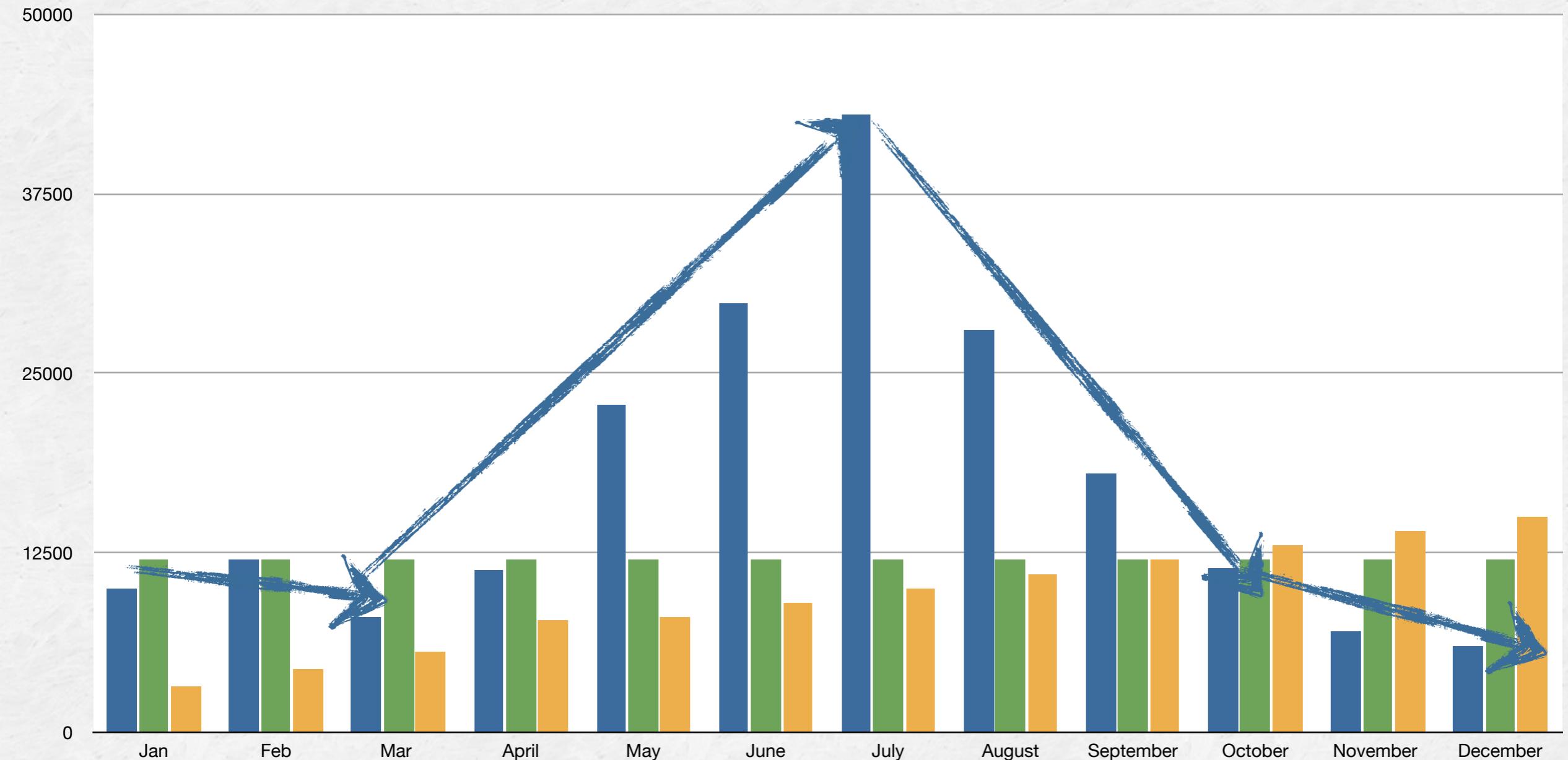
# BAR CHARTS AGAIN?



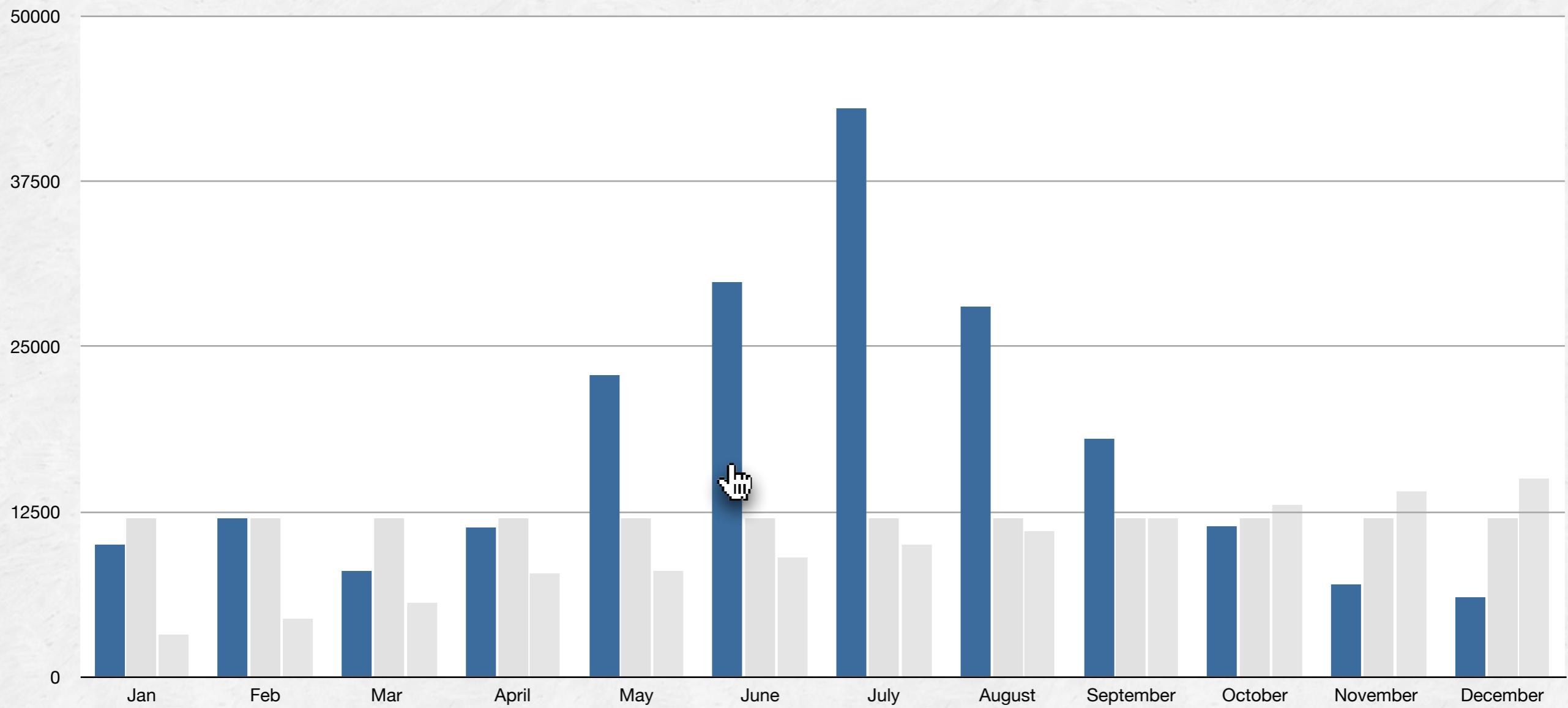
# BAR CHARTS AGAIN?



# BAR CHARTS AGAIN?

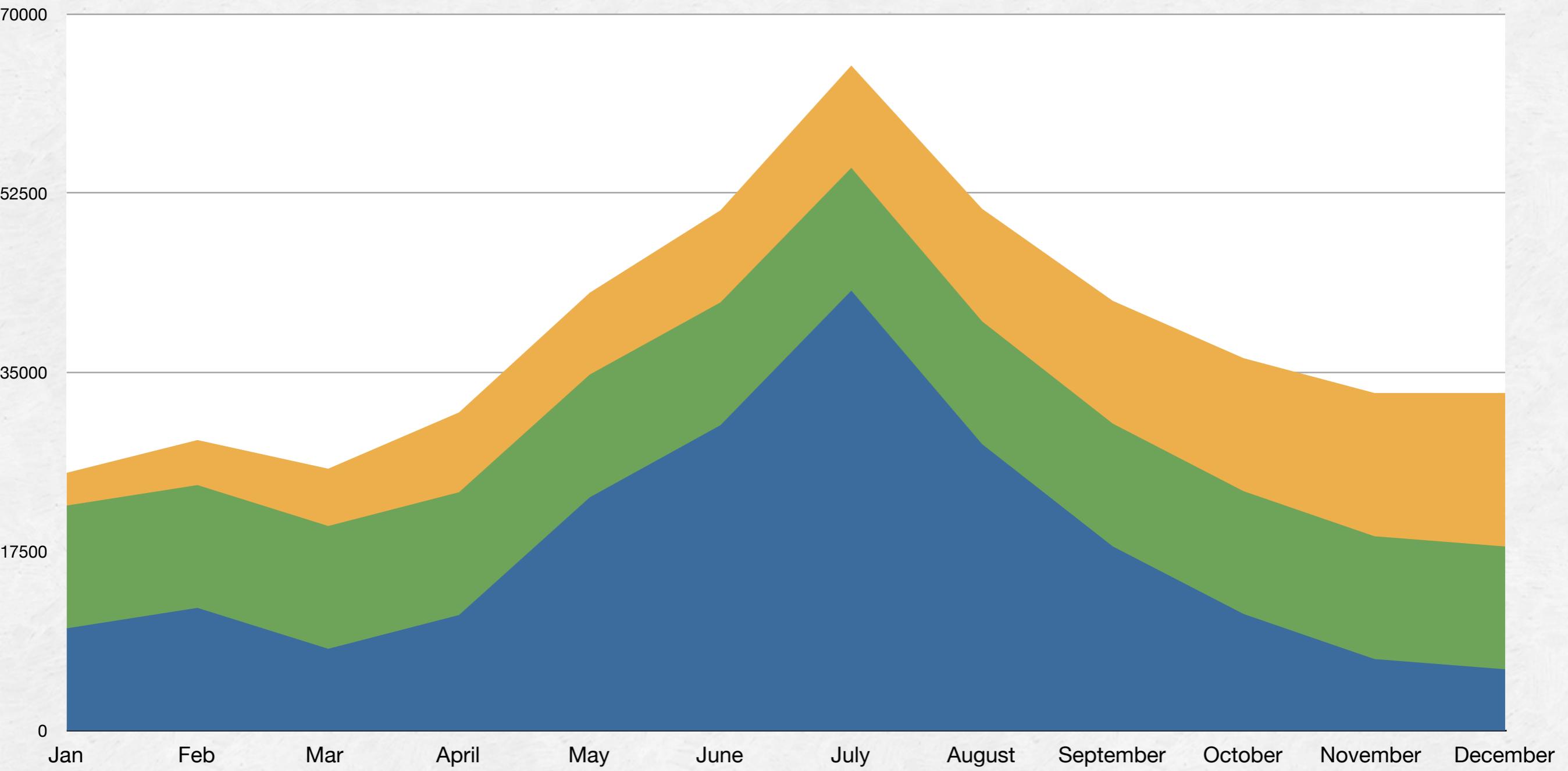


# INTERACTIVE, REMEMBER?



You can adapt based on Interactions

# STACKED BAR CHART

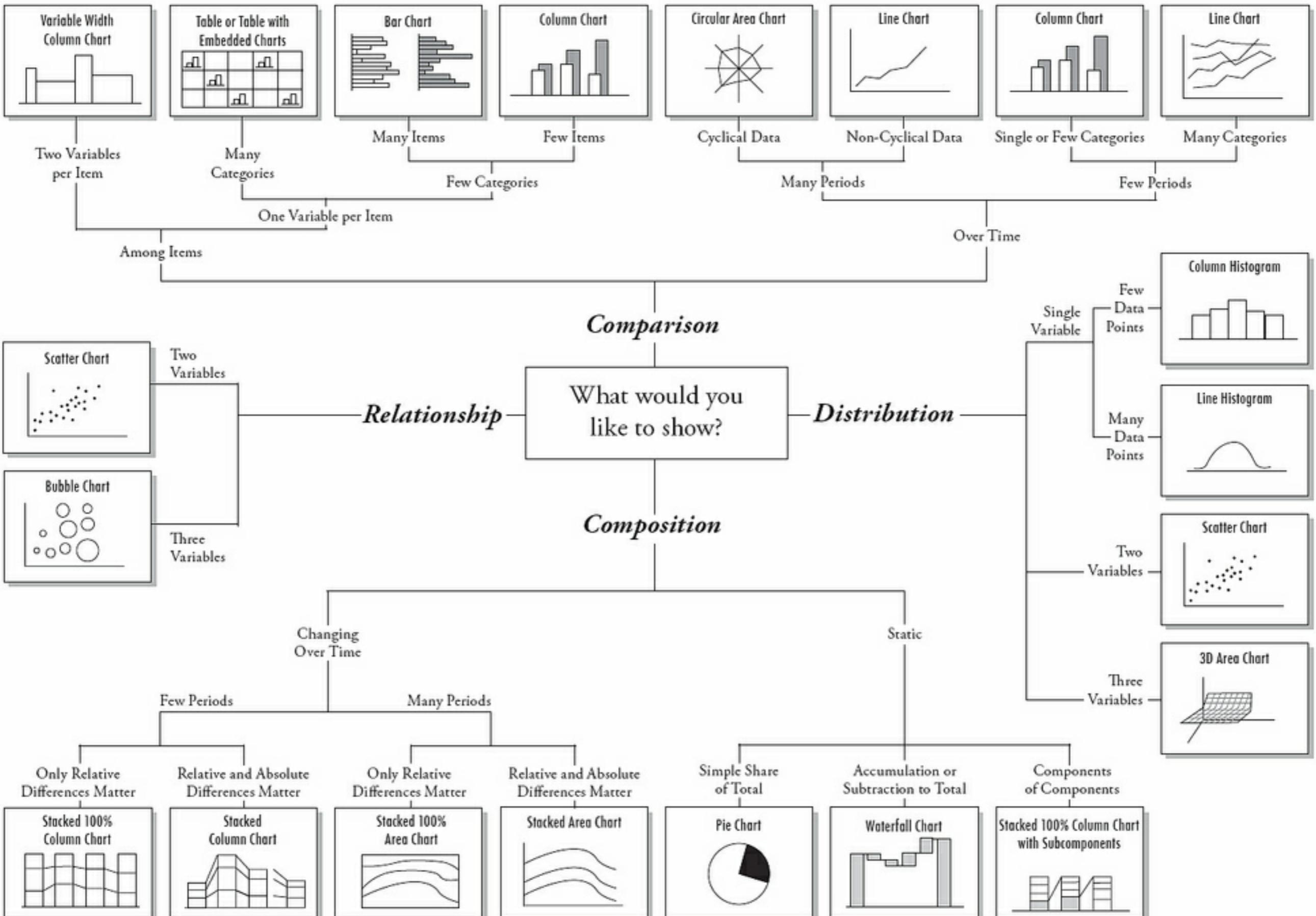


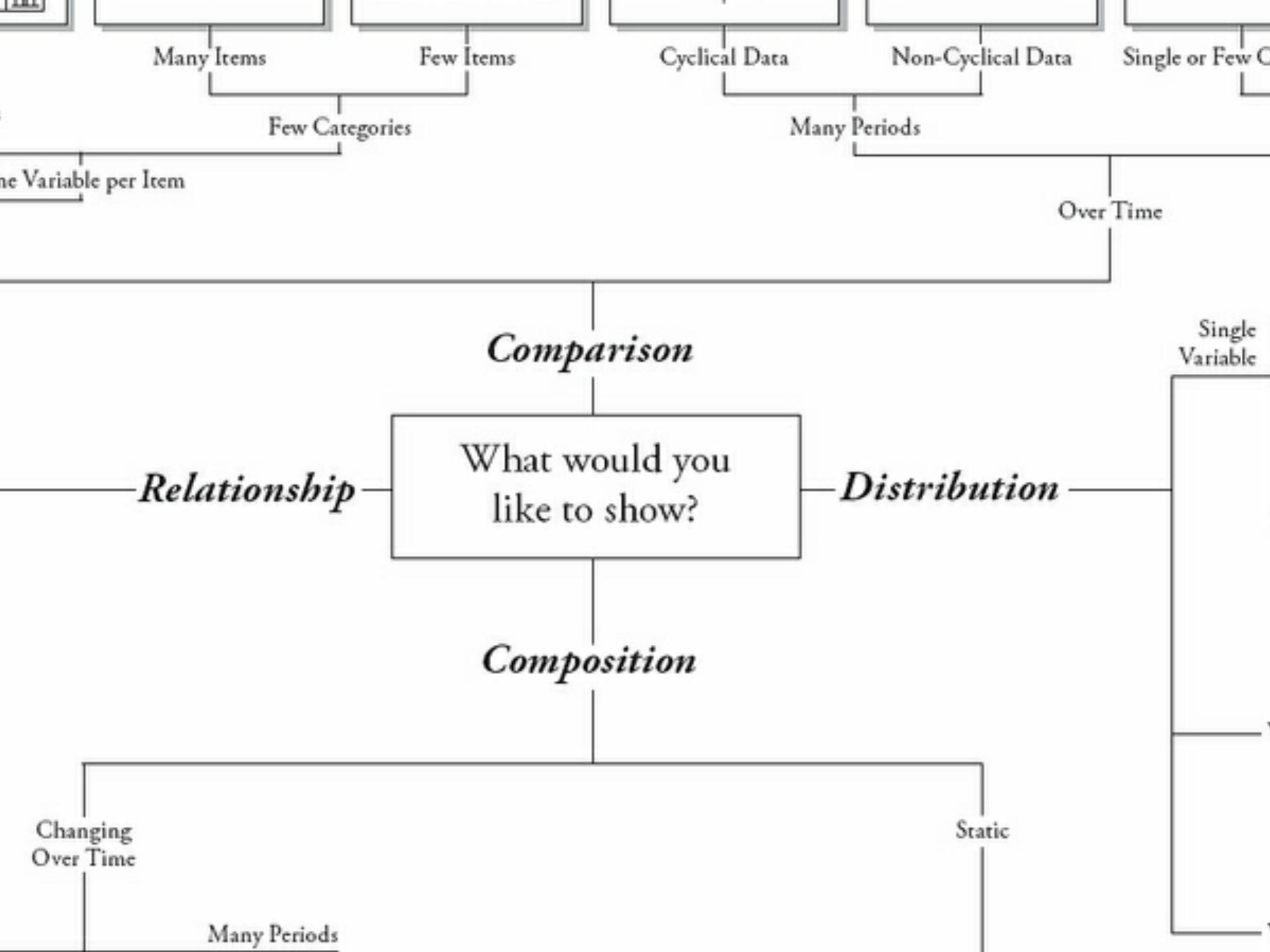
Why is it so hard to follow the U.K here?



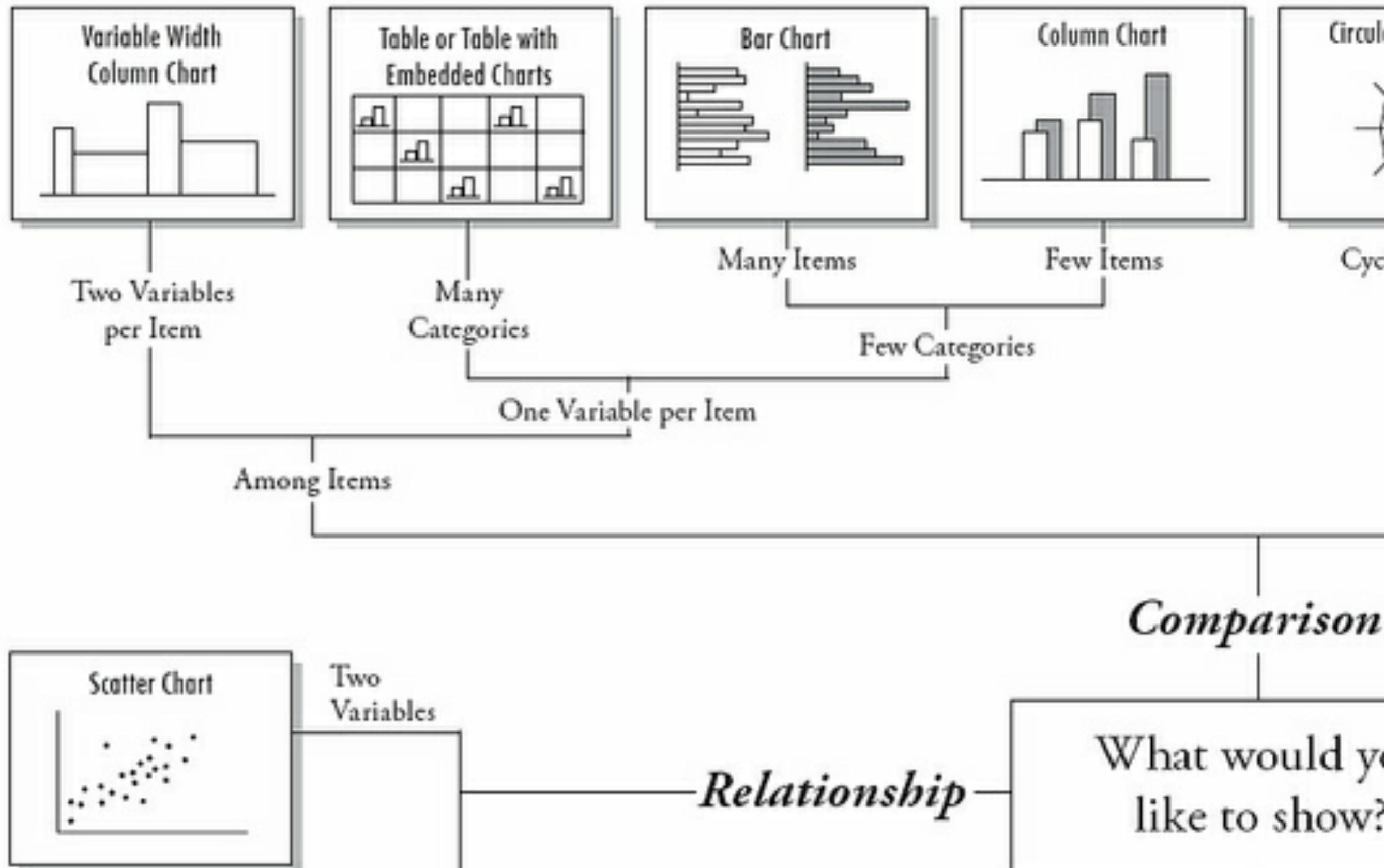
If it was easy, we'd all be great at billiards

# Chart Suggestions—A Thought-Starter

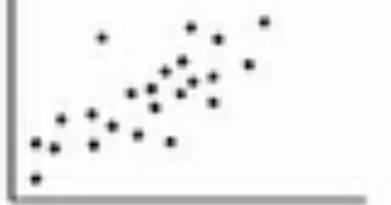




# Chart Suggestions—A Guide



Scatter Chart



Two Variables

Bubble Chart



Three Variables

*Relationship*

What would you like to show?

*Composition*

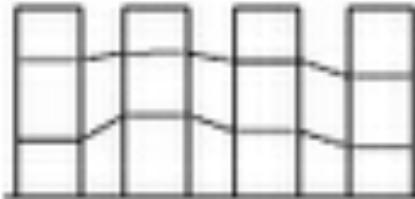
Changing Over Time

Few Periods

Many Periods

Only Relative Differences Matter

Stacked 100% Column Chart



Relative and Absolute Differences Matter

Stacked Column Chart



Only Relative Differences Matter

Stacked 100% Area Chart



Relative and Absolute Differences Matter

Stacked Area Chart



Simple S of Tot

Pie Ch



TIME REMAINING

INTRO

KNOW YOUR AUDIENCE

KNOW YOUR DOMAIN

KNOW YOUR DATA

**KNOW YOUR VISUALS**

KNOW YOUR STYLE

CLOSING POINTS

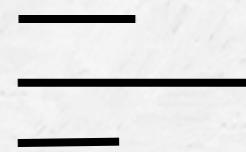
FIN

TOPIC

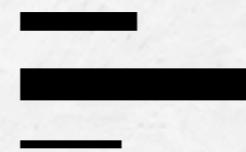
Visuals communicate 2 things.

Category

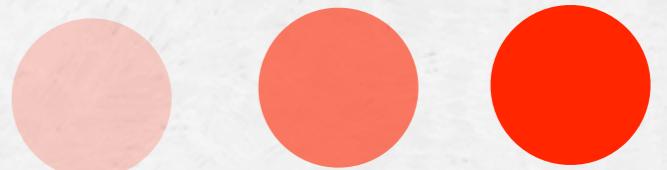
Quantity



Line length



Line width



Colour intensity

## WAYS TO VISUALISE QUANTITY



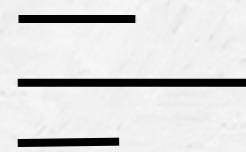
Size



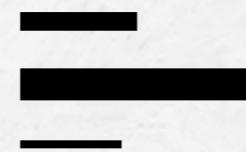
Quantity



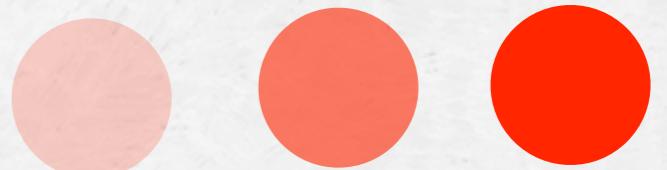
Speed



Line length



Line width

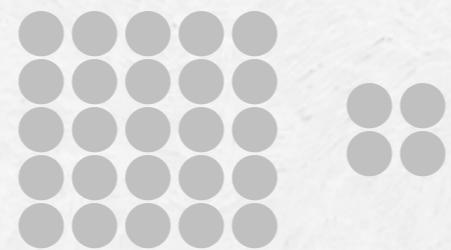


Colour intensity

## WAYS TO VISUALISE QUANTITY

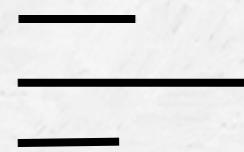


Size

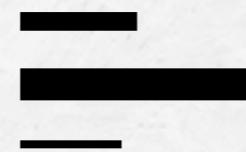


Quantity

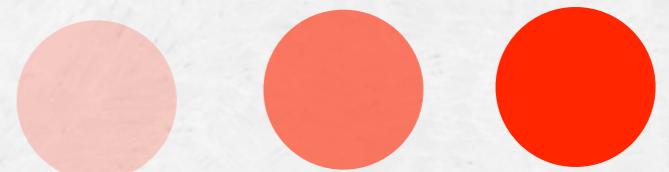
Speed



Line length



Line width



Colour intensity

## WAYS TO VISUALISE QUANTITY

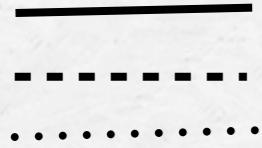


Size



Quantity





*Line type*



*Colour*



*shape*



*Location*

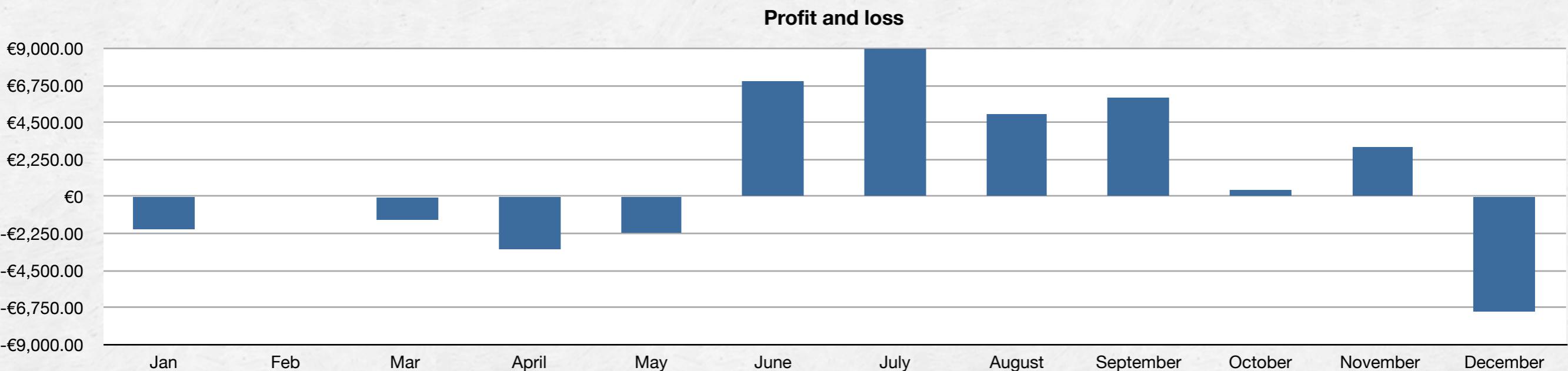
## HOW TO VISUALISE CATEGORY

# HOW TO USE ALL THIS?

You've just taken over a hotel. You're handed the accounts. Excel hell. Where do we start?

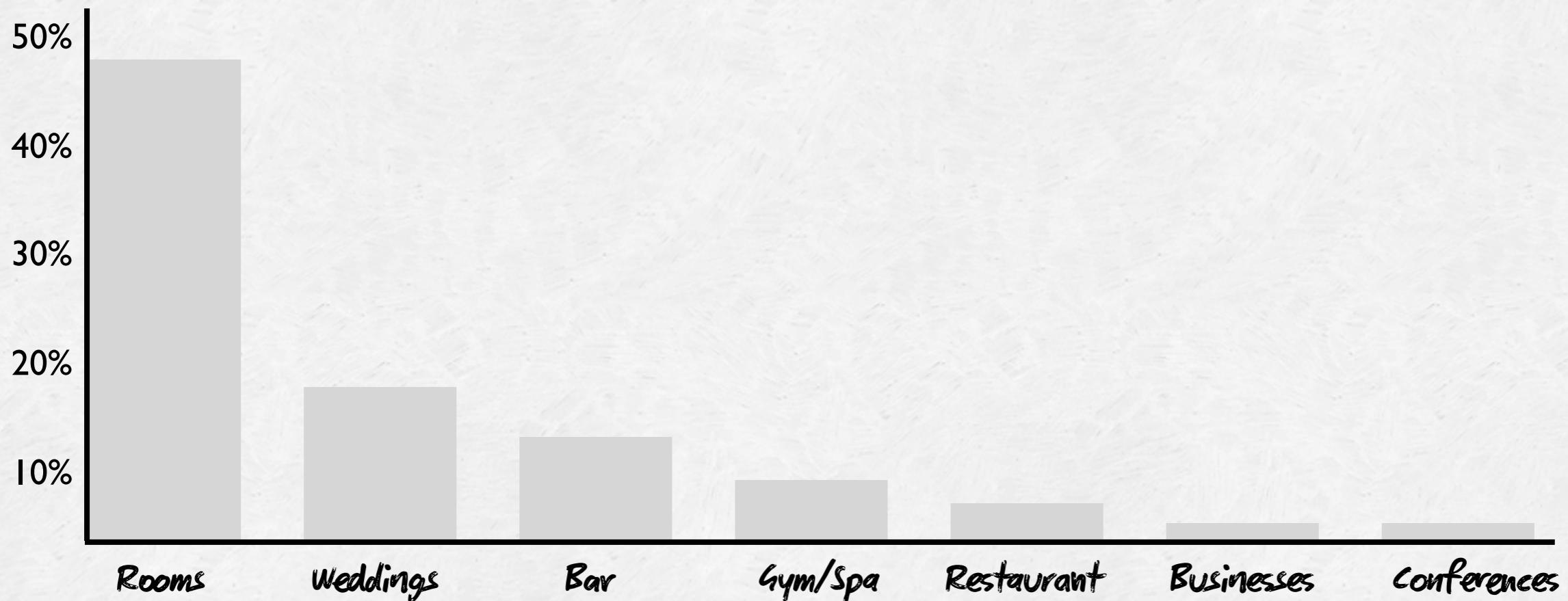
# Q: Are we making any money?

Profit is the delta between costs and revenue. Let's see that for the year.



# Q: What makes us money?

Let's compare the percentage of revenue generated by each category.



# Q: What sort of prices do we charge per room?

Let's look at the price range the median value



# Design to support analyst queries...

MIDWEST HOTELZ

REPORT	TYPE	ROOM TYPE	PERIOD	GUEST TYPE
REVENUE ▼	ROOMS & EXTRAS	KING SUITES	LAST YEAR	ALL GUESTS
<ul style="list-style-type: none"><li>PROFIT</li><li>LOYALTY</li><li>INCIDENTALS</li><li>GUEST REPORT</li><li>WEDDINGS</li><li>CONFERENCES</li></ul>				

Another example.  
What the hell is going on in Europe?

# It's All Connected: A Spectator's Guide to the Euro Crisis

Charting the web of debt exposure among sagging economies.

## HOW TO READ THIS CHART

Arrows show imbalances of debt exposure between countries. Arrows point from debtors to their bank creditors; arrow widths are proportional to the balance of money owed. (Figures, released last week, are from June 2011, in billions of dollars.)

For example, French borrowers owe Italian banks \$50.6 billion; Italian borrowers owe French banks \$416.4 billion. The difference — their imbalance — shows France's banking system more exposed to Italian debtors by about \$365.8 billion.

There is no complete accounting of debt between countries. The Bank for International Settlements compiles the most detailed data, listing amounts that banks based in one country are exposed to by debtors in other countries, both government and private.

**THE COLOR OF TROUBLE**  
The risk to countries' debts and economies is indicated by color:  
More worrisome →

**COMPARISON OF ECONOMIES** Circle sizes indicate the scale of each country's gross domestic product, in dollars.  
G.D.P. \$1.4 TRILLION  
56%  
Spain

THE global financial system is highly interconnected. So problems in one part of the world can reverberate almost everywhere else — risking a cascade of default, contagion, contracting credit and collapsing economic activity. Exhibit A now is Europe.

European Union leaders are meeting this week to at last deal with a debt crisis rattling investors worldwide who once thought lending to euro zone countries was virtually risk-free. The graphic here helps you see the intertwined complexities.

## 1 It Starts With The Euro ...

In 1999, most countries in the European Union adopted the euro as a common currency. This union allowed poorer countries like Portugal, Italy, Ireland, Spain and Greece to borrow money at the same low interest rates as rich and financially prudent Germany, even though their inflation rates were higher. That gave them a strong incentive to borrow.

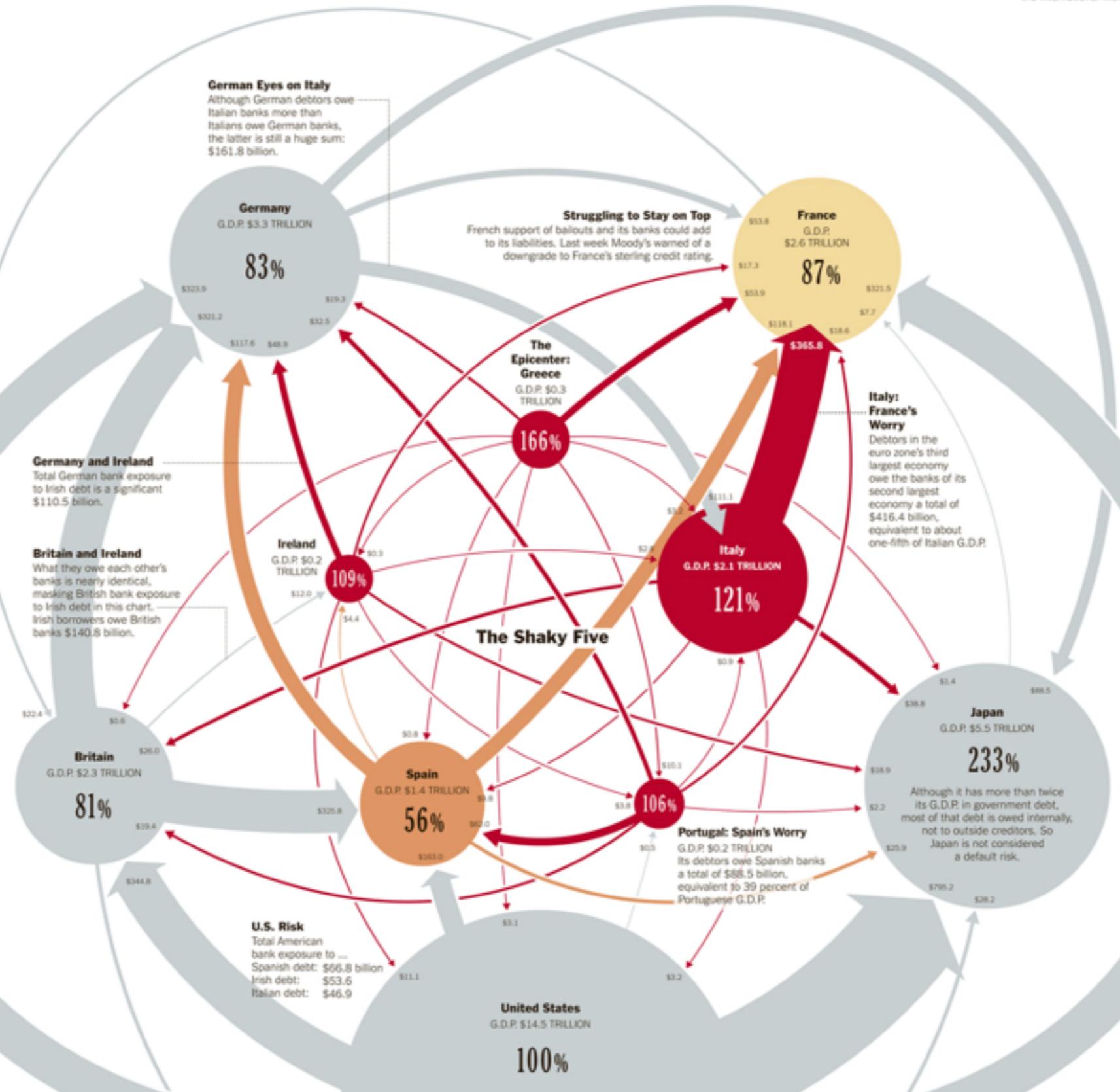
## 2 ... And Goes Bad In Greece ...

Greece financed a large public-welfare state and built up huge debt for its size that it has scant hope of repaying now. In 2010, European financial institutions began bailing out Greece (later Ireland and Portugal, too); lenders were prodded to agree to modest, voluntary debt write-downs, or "haircuts."

But Greece still needs money. And its credit bill grows ever larger as lenders charge more and demand government cutbacks, which in turn have provoked civil unrest. After years of propping up the spendthrift Greeks, the Germans are fed up.

The problem is, a chaotic Greek default could hurt all European banks and pension funds that have extended Greece credit down the years, and maybe cause a wider bank panic. So bailouts continue — for now, at least:

**BEST CASE** Bailouts in the form of new European credit eventually work. Greece pays down its hefty debts with a combination of growth and continued domestic austerity for years to come.



## 5 ... And Reach American Shores ...

American lenders and money-market funds are already moving their money out of European banks, which are balky at lending to one another, writes the economist Laurence Kotlikoff. "This is exactly what happened before the bankruptcy of Lehman Brothers Holdings Inc. in 2008," he adds.

American banks are heavily exposed to Spain, Ireland and Italy. (American banks' exposure to Greece is smaller and less direct.) On top of this, American exports to the European Union — collectively the biggest American trading partner — could suffer if the crisis slowed European growth and caused the euro to depreciate against the dollar.

## 6 ... Unless Bailouts Are Big Enough ...

The troubled euro zone could, by some estimates, require about \$1.3 trillion to \$2.6 trillion in bailouts — an amount perhaps bigger than the Spanish G.D.P. or more than half the size of the German economy.

The bailout fund set up last year by euro zone countries goes by the ungainly title of European Financial Stability Facility. The fund has only about \$600 billion on hand. Here are total European bank exposures to the five most distressed economies, compared with the size of each economy:

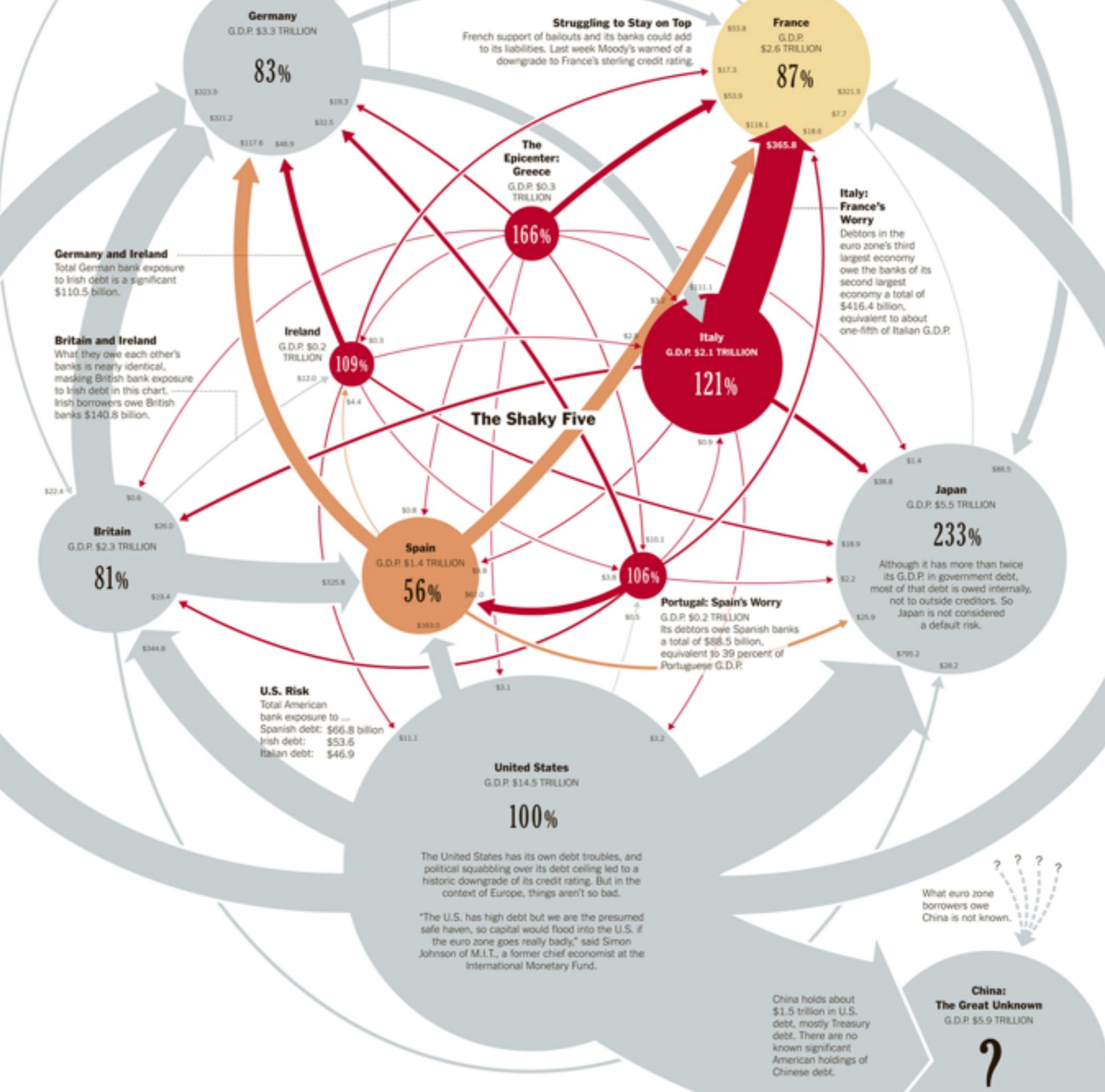
	EQUIVALENT PERCENT OF EACH COUNTRY'S G.D.P.
Italy	\$837.5 BILLION 41%
Spain	\$643.2 46
Ireland	\$380.1 184
Portugal	\$196.7 86
Greece	\$120.8 40
<b>TOTAL</b>	<b>\$2.178 TRILLION</b>

## 7 ... One of Many Crisis Unknowns

Bank secrecy, government secrecy, a paucity of global financial statistics: all contribute to large information voids that leave experts uncertain. Here is a sampling.

**WHO'S EXPOSED TO BAD DEBT?** Some banks are more forthcoming than others — there is no consistent disclosure. American money market funds are thought to have significant investments in European banks.

So-called stress tests of big banks earlier this year are now widely believed to have understated the level of bank risk. Meanwhile, banks say they have been struggling to lessen



writes the economist Laurence Kotlikoff. "This is exactly what happened before the bankruptcy of Lehman Brothers Holdings Inc. in 2008," he adds.

American banks are heavily exposed to Spain, Ireland and Italy. (American banks' exposure to Greece is smaller and less direct.) On top of this, American exports to the European Union — collectively the biggest American trading partner — could suffer if the crisis slowed European growth and caused the euro to depreciate against the dollar.

... Unless Bailout  
Are Big Enough .

The troubled euro zone could, by some estimates, require about \$1.3 trillion to \$2.06 trillion in bailouts — an amount perhaps bigger than the Spanish G.D.P. or more than half the size of the German economy.

The bailout fund set up last year by euro zone countries goes by the ungainly title of European Financial Stability Facility. The fund has only about \$600 billion on hand. Here are total European bank exposures to the five most distressed economies, according to the Bank for International Settlements, compared with the size of each economy:

	EQUIVALENT PERCENT OF EACH COUNTRY'S G.D.P.	
<b>Italy</b>	\$837.5 BILLION	41%
<b>Spain</b>	\$643.2	46
<b>Ireland</b>	\$380.1	184
<b>Portugal</b>	\$195.7	86
<b>Greece</b>	\$120.8	40
<b>TOTAL</b>	<b>\$2,179 BILLION</b>	

... One of Many  
Crisis Unknowns

Bank secrecy, government secrecy, paucity of global financial statistics: all contribute to large information voids that leave experts uncertain. Here is one:

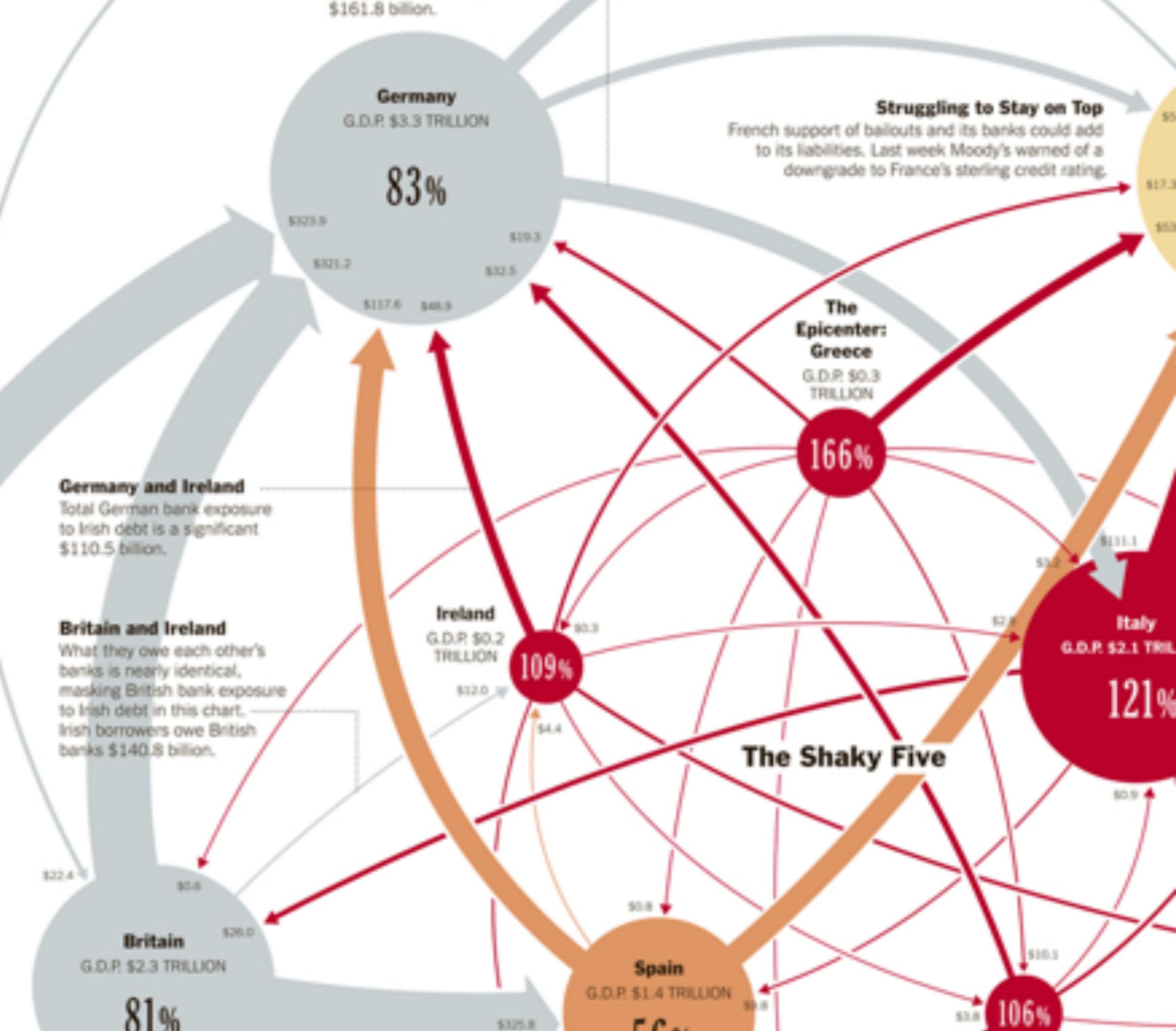
**WHO'S EXPOSED TO BAD DEBT?** Some banks are more forthcoming than others — there is no consistent disclosure. American money market funds are thought to have significant investments in Enron bonds.

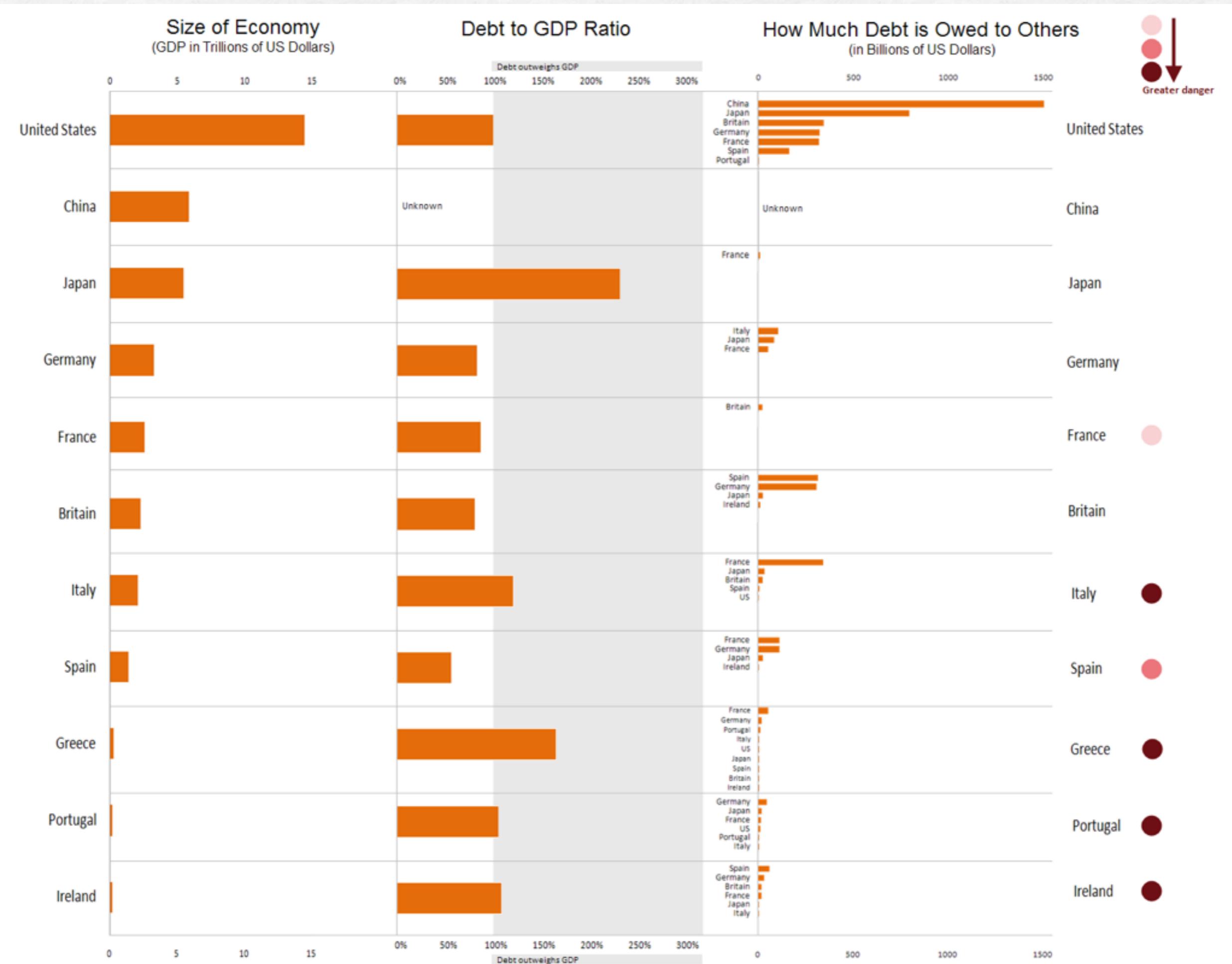
So-called stress tests of big banks earlier this year are now widely believed to have understated the level of bank risk. Meanwhile, banks say they have been struggling to lessen their exposure to bad debt.

**WHO INSURED BAD DEBT?** Banks and hedge funds sell insurance against investor losses from default by their borrowers. These "bets" that losses won't occur are called credit default swaps.

With defaults in Greece and elsewhere a real possibility, issuers of these swaps could be on the hook for losses that once seemed unlikely. How those billions would be covered is unknown; who, precisely, insured  
Canada's debt is also unknown.

**WHERE ARE THESE ECONOMIES HEADED?**  
Signs are not good. Some economists argue that government austerity





### Size of Economy (GDP in Trillions of US Dollars)

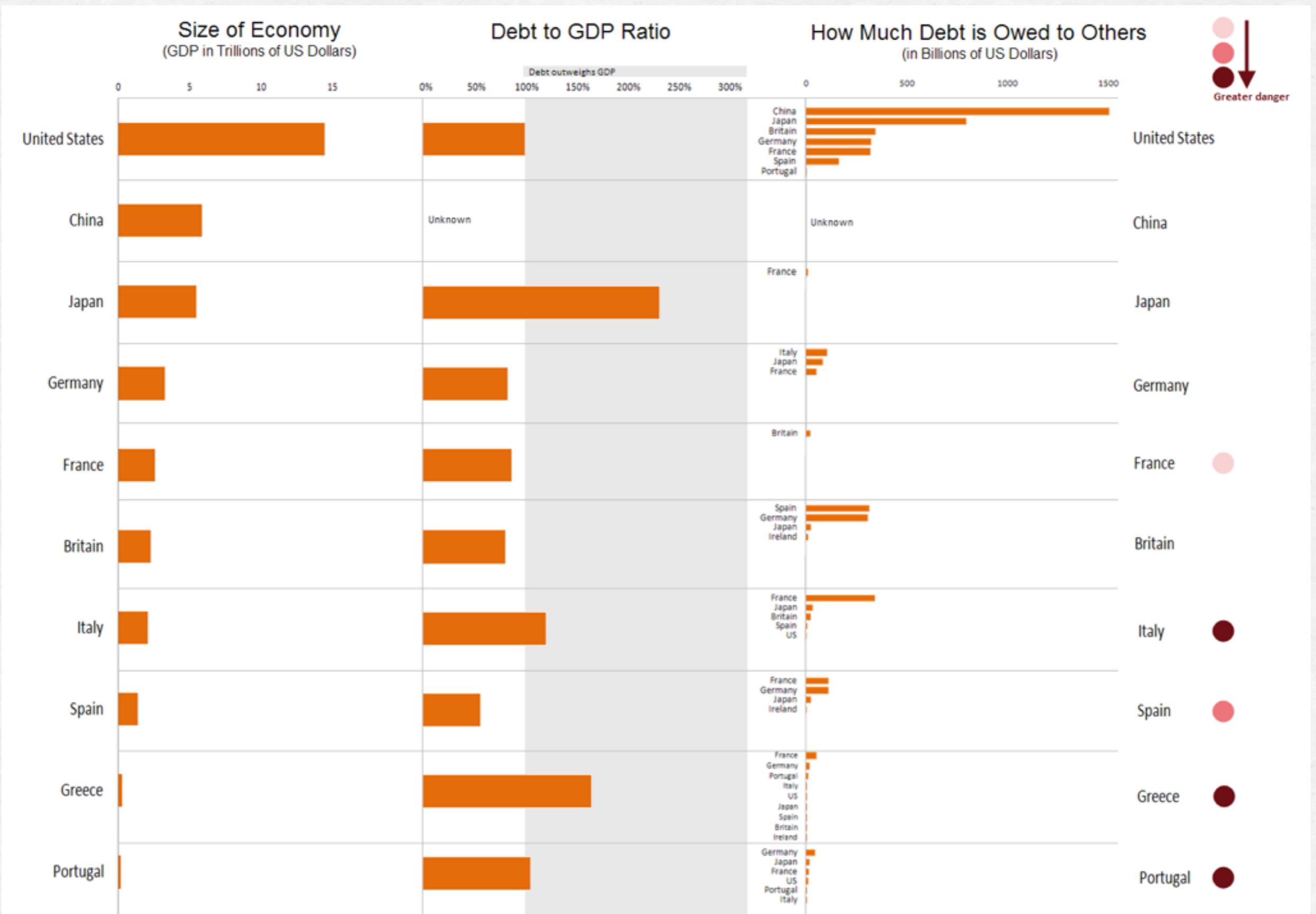


### Debt to GDP Ratio



### How Much Debt is Owed to Others (in Billions of US Dollars)





Credit: S. Few & Tom Watkins

TIME REMAINING

INTRO

KNOW YOUR AUDIENCE

KNOW YOUR DOMAIN

KNOW YOUR DATA

KNOW YOUR VISUALS

KNOW YOUR STYLE

CLOSING POINTS

FIN

TOPIC

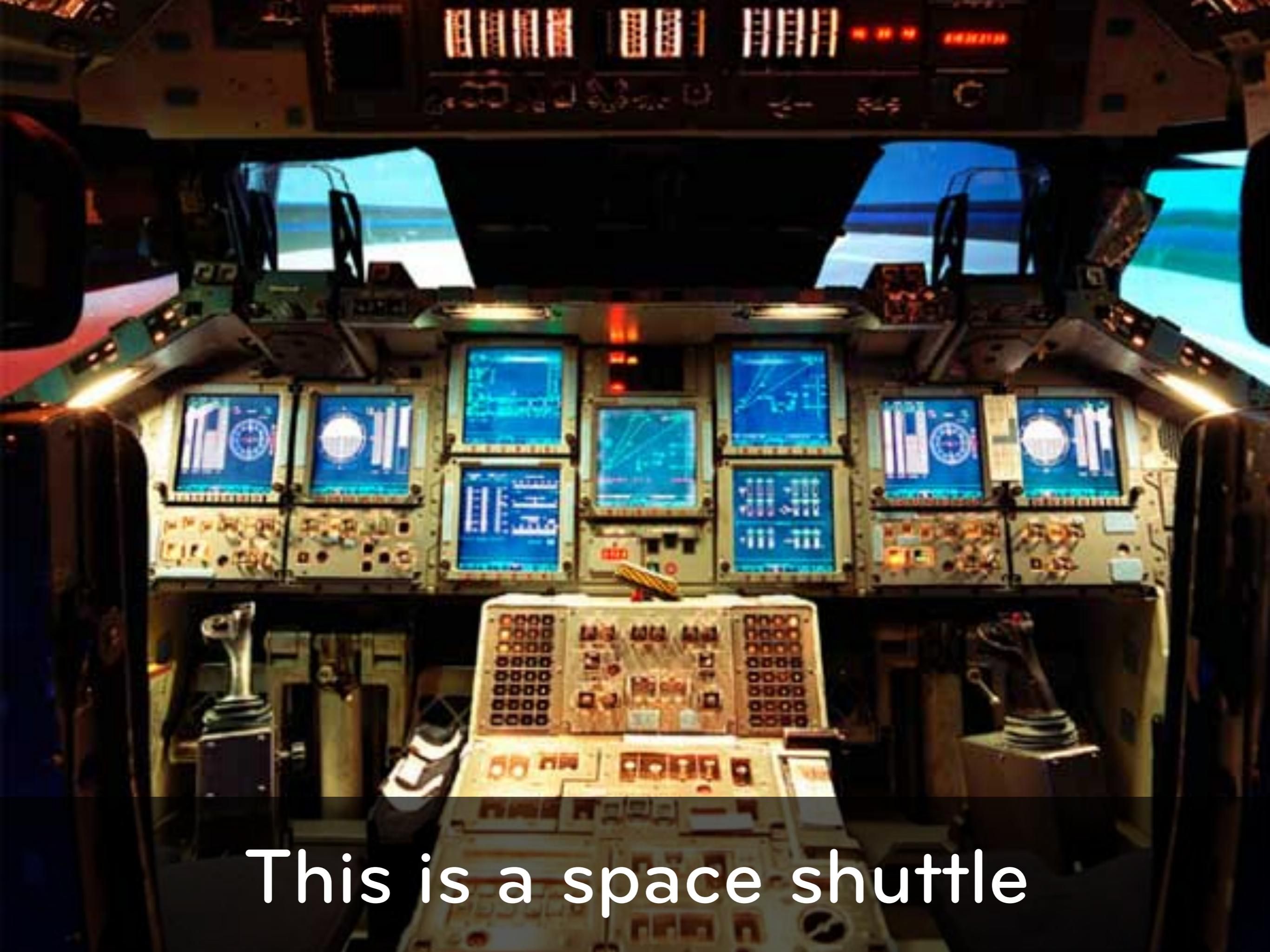
A WORD ON CONTEXT



This is a car.



This is a Nuclear power station.



This is a space shuttle



This is none of those things...

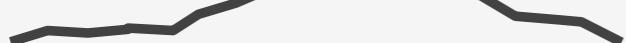


Chances are this is where your user is

The point is, we're not  
always fighting for  
attention.

# Sales Report Jan 2012

**ORDERS**      **CHANGE**  
12,247      ▲ 0.32%

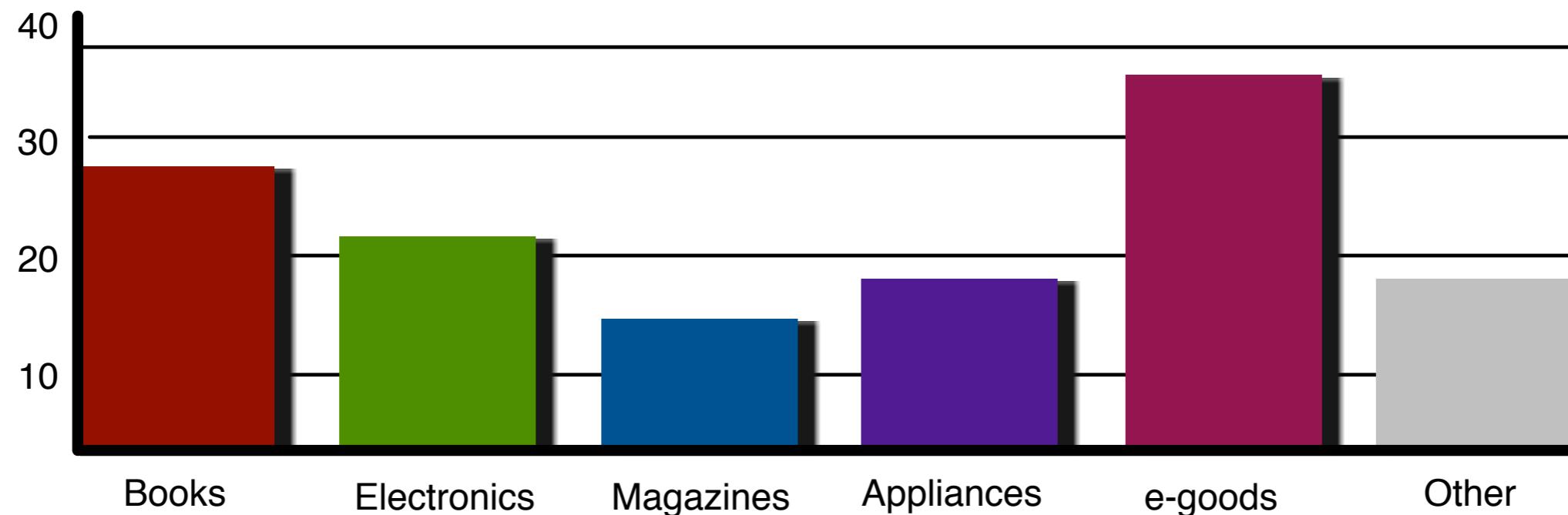


**ACCOUNTS**      **CHANGE**  
7,343      ▲ 4.32%



- SITE LIVE
- PAYMENT LIVE
- FULFILLMENT ON

## Revenue per product

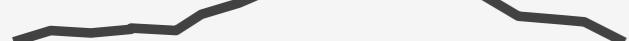


## Top products

Product	Orders	\$ Revenue
---------	--------	------------

# Sales Report Jan 2012

**ORDERS**      **CHANGE**  
12,247      ▲ 0.32%

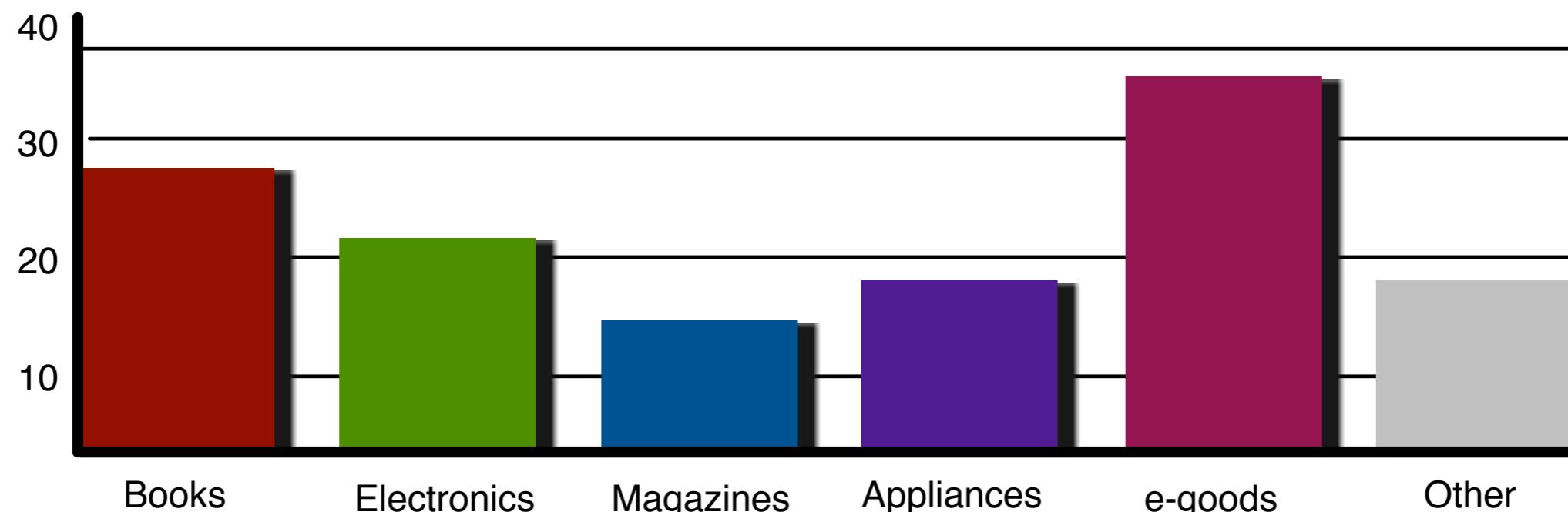


**ACCOUNTS**      **CHANGE**  
7,343      ▲ 4.32%



- SITE LIVE
- PAYMENT LIVE
- FULFILLMENT ON

## Revenue per product



Let's use this strawman

Let's take 3 points from Tufte



Chart junk: the stuff that doesn't change  
when the data changes



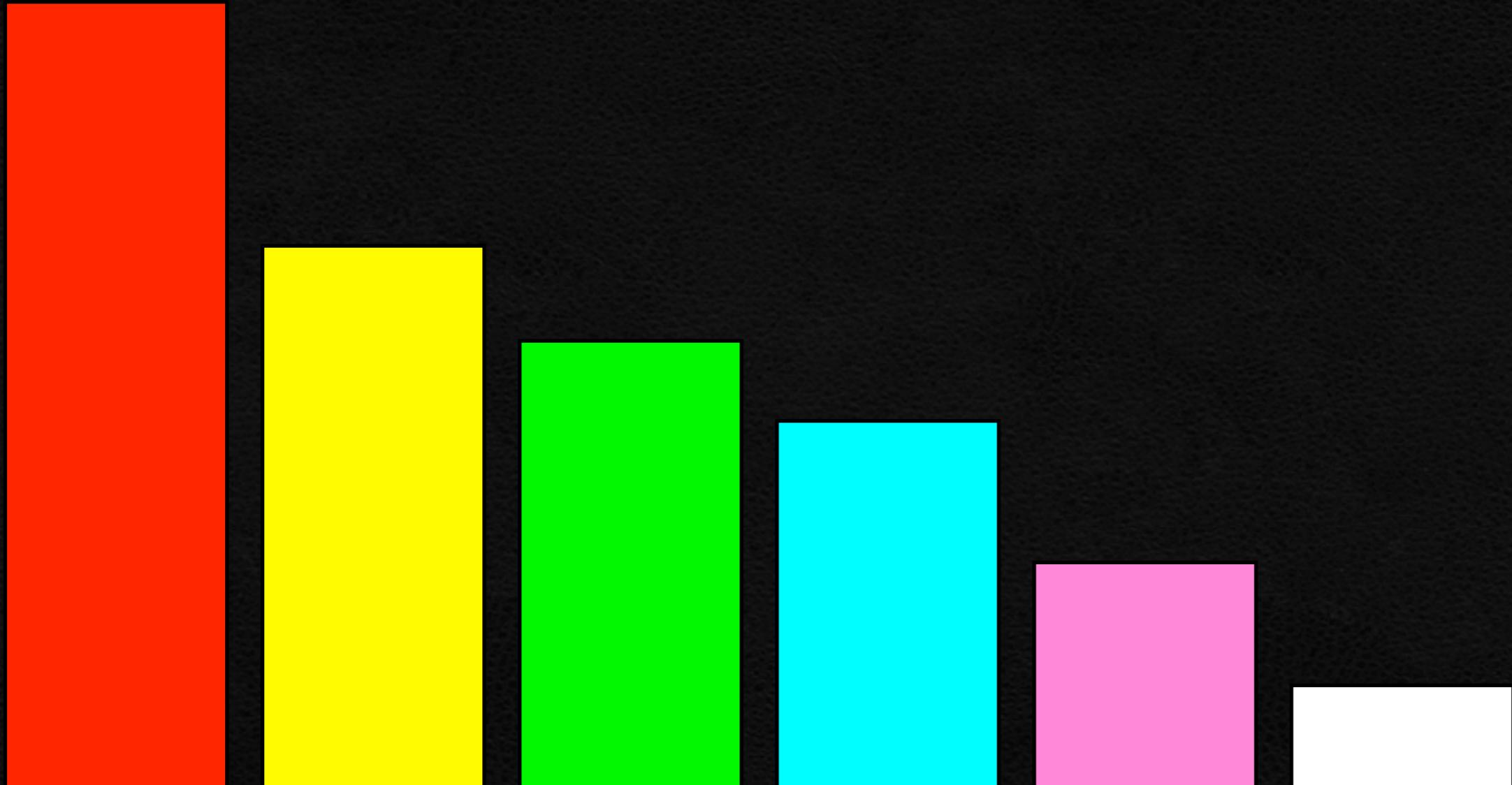
Data Ink Ratio: what percentage of your ink shows data



Smallest Effective Difference: the least you can do to highlight

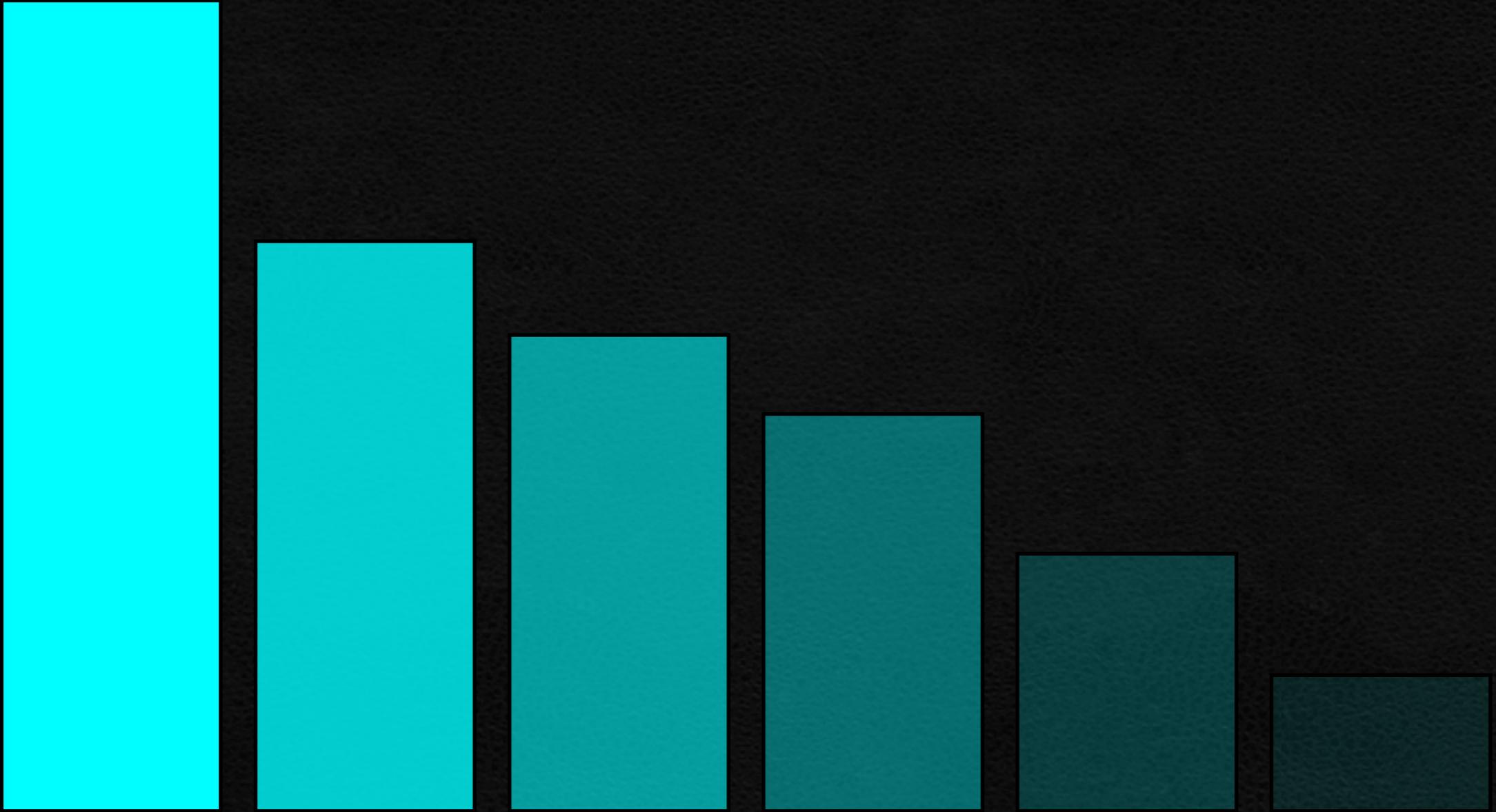


# Smallest Effective Difference: the least you can do to highlight



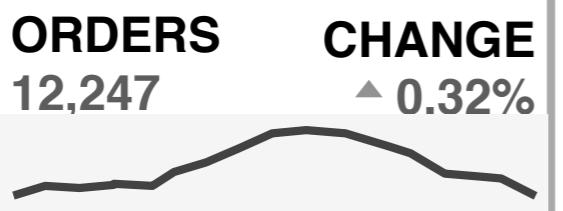
These colours would get very loud. Unnecessarily so.

# Smallest Effective Difference: the least you can do to highlight



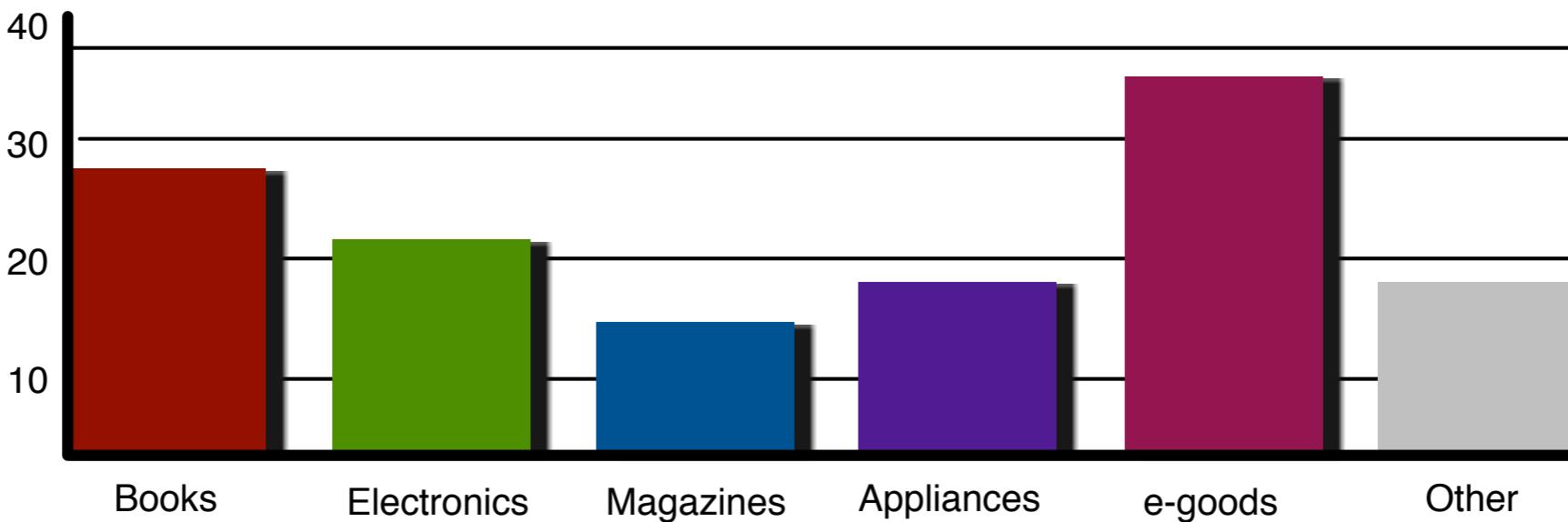
These are far quieter.

# Sales Report Jan 2012



- SITE LIVE
- PAYMENT LIVE
- FULFILLMENT ON

## Revenue per product



## Top products

Product	Orders	\$ Revenue
The girl with the dragon tattoo	11	88.50

Gradients, shadows, colors, gridlines. All non-content

# Sales Report Jan 2012

**ORDERS**  
12,247

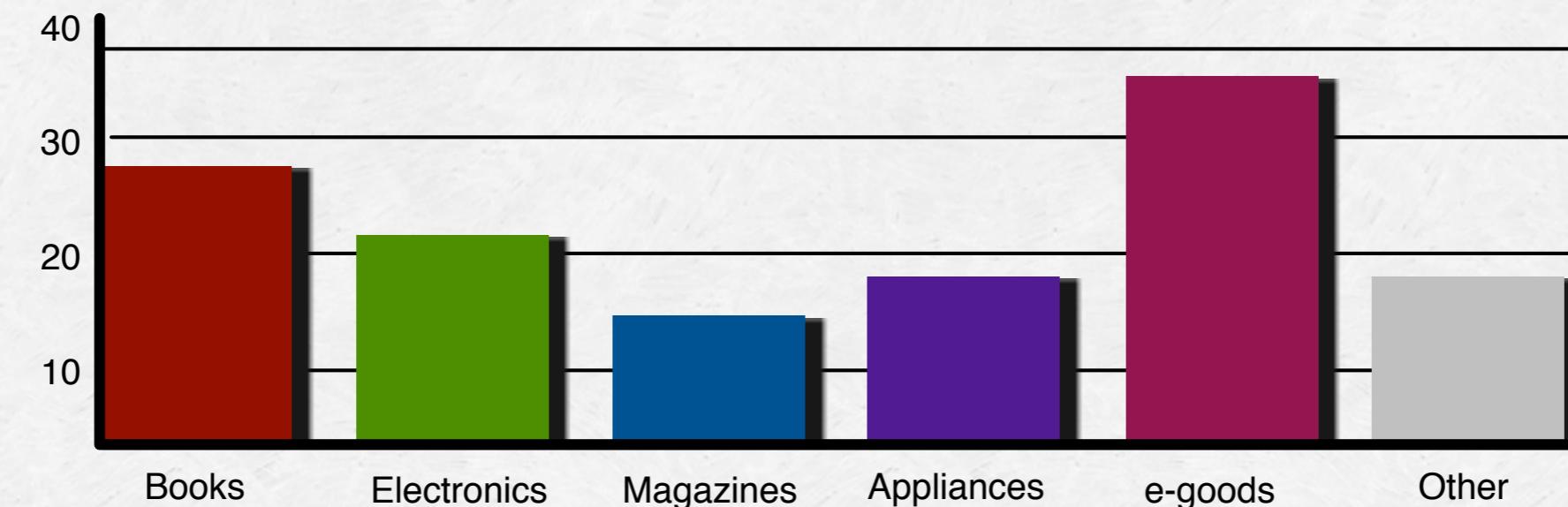
**CHANGE**  
0.32%

**ACCOUNTS**  
7,343

**CHANGE**  
4.32%

- SITE LIVE
- PAYMENT LIVE
- FULFILLMENT ON

## Revenue per product



## Top products

Product

The girl with the dragon tattoo

Orders \$ Revenue

11 88.50

Let's kill the gradients

# Sales Report Jan 2012

**ORDERS**  
12,247

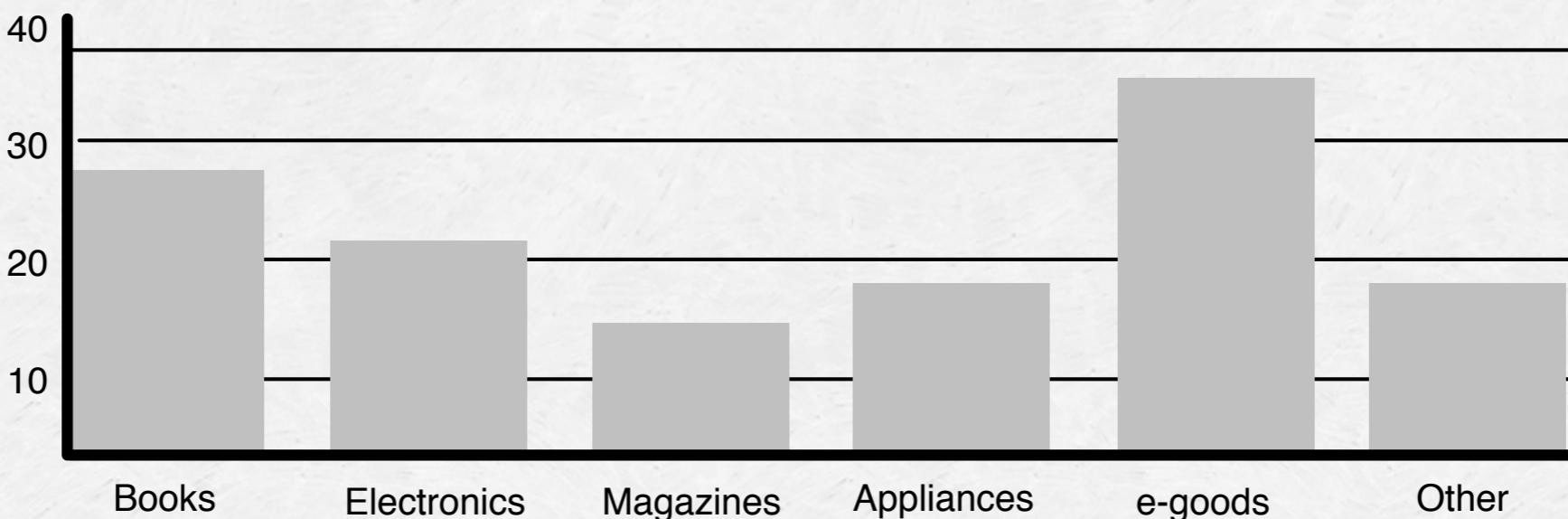
**CHANGE**  
0.32%

**ACCOUNTS**  
7,343

**CHANGE**  
4.32%

- SITE LIVE
- PAYMENT LIVE
- FULFILLMENT ON

## Revenue per product



## Top products

Product	Orders	\$ Revenue
The girl with the dragon tattoo	11	88.50

Let's kill the colours



HTML has a  
<strong>tag but no  
<weak> tag.

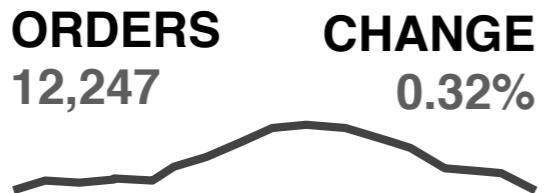
As a result, we  
forget to think  
about what's **less**  
**important** on the  
screen.

— Ryan Singer

# Sales Report Jan 2012

**ORDERS**  
12,247

**CHANGE**  
0.32%



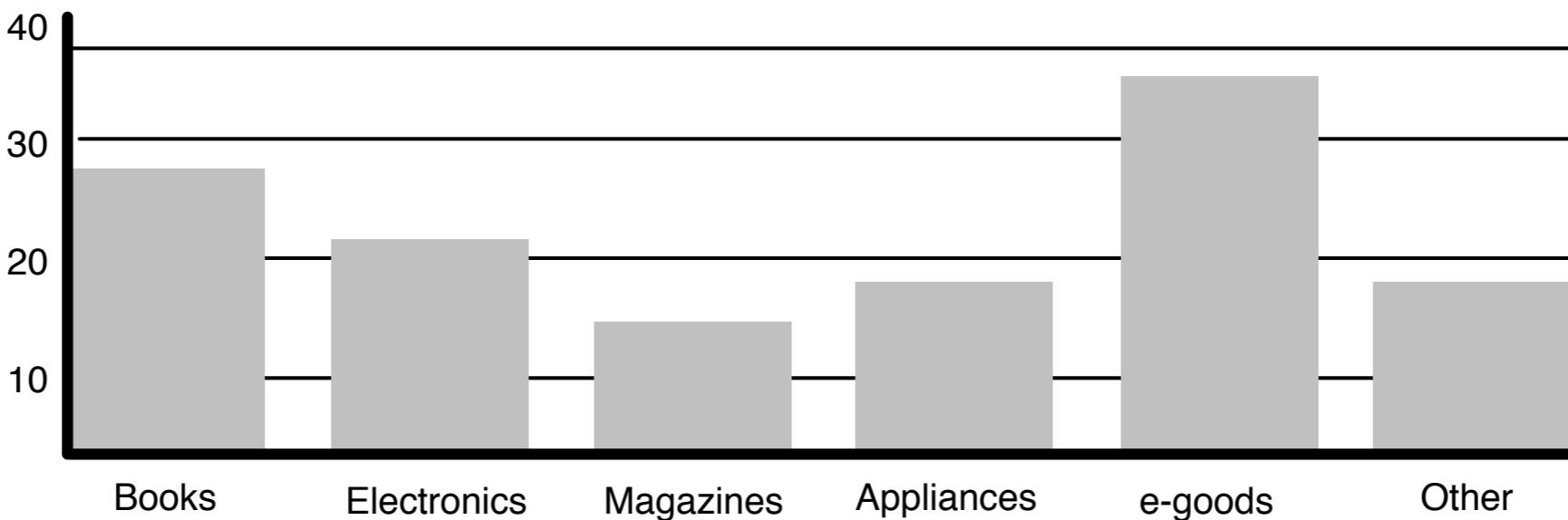
**ACCOUNTS**  
7,343

**CHANGE**  
4.32%



- SITE LIVE
- PAYMENT LIVE
- FULFILLMENT ON

## Revenue per product



## Top products

### Product

The girl with the dragon tattoo

### Orders \$ Revenue

11 88.50

Let's adjust the shading.

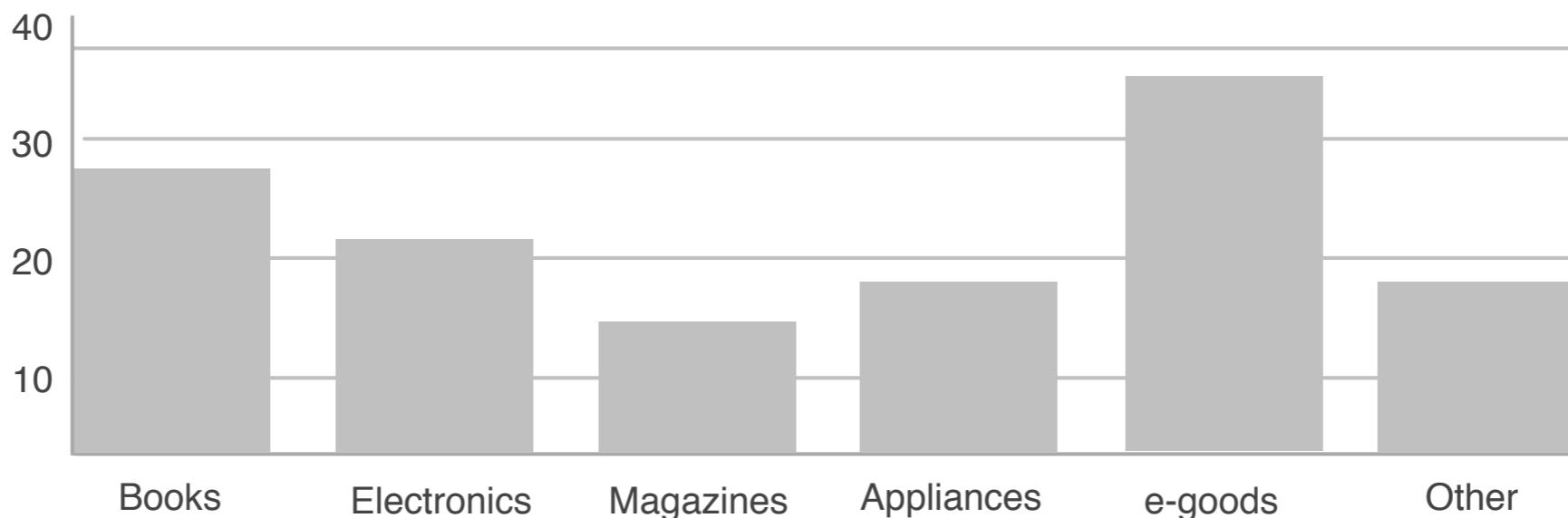
# Sales Report Jan 2012

ORDERS  
12,247      CHANGE  
0.32%

ACCOUNTS  
7,343      CHANGE  
4.32%

- SITE LIVE
- PAYMENT LIVE
- FULFILLMENT ON

## Revenue per product



## Top products

### Product

The girl with the dragon tattoo

### Orders \$ Revenue

11 88.50

Let's add the necessary differences

# Sales Report Jan 2012

**ORDERS**  
**12,247**

**CHANGE**  
**0.32%**



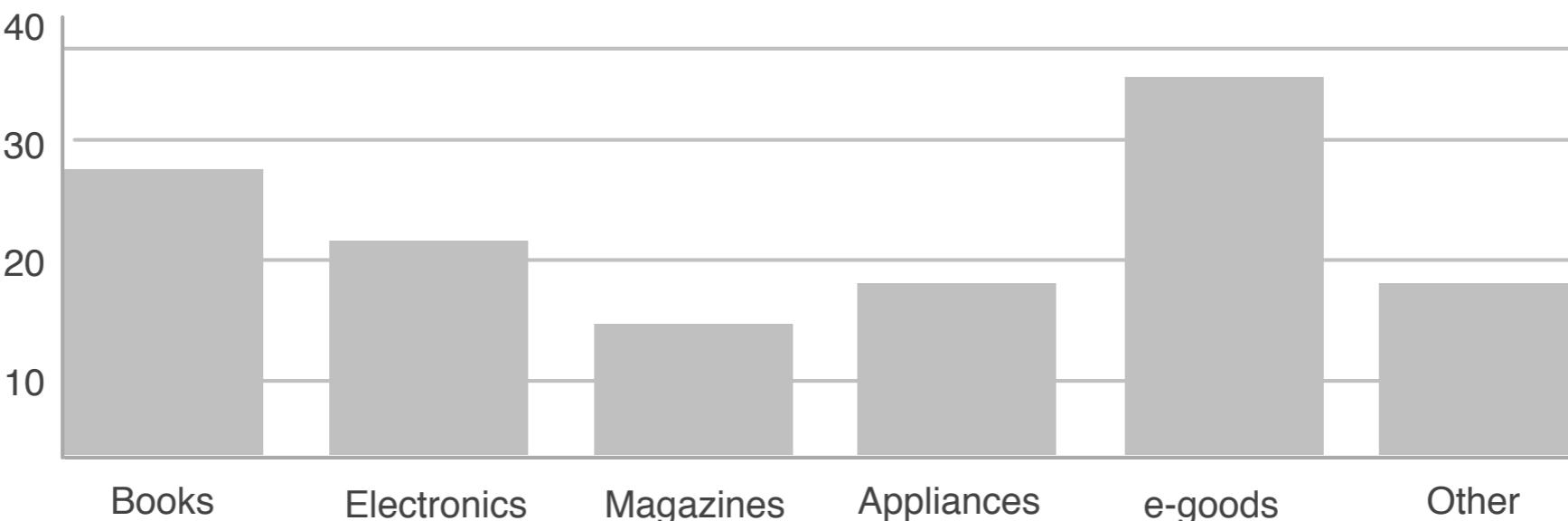
**ACCOUNTS**  
**7,343**

**CHANGE**  
**4.32%**



- SITE LIVE
- PAYMENT LIVE
- FULFILLMENT ON

## Revenue per product



## Top products

**Product**

**Orders**   **\$ Revenue**

The girl with the dragon tattoo

11

88.50

From here we could begin to style

# Sales Report Jan 2012

ORDERS  
12,247      CHANGE  
0.32%

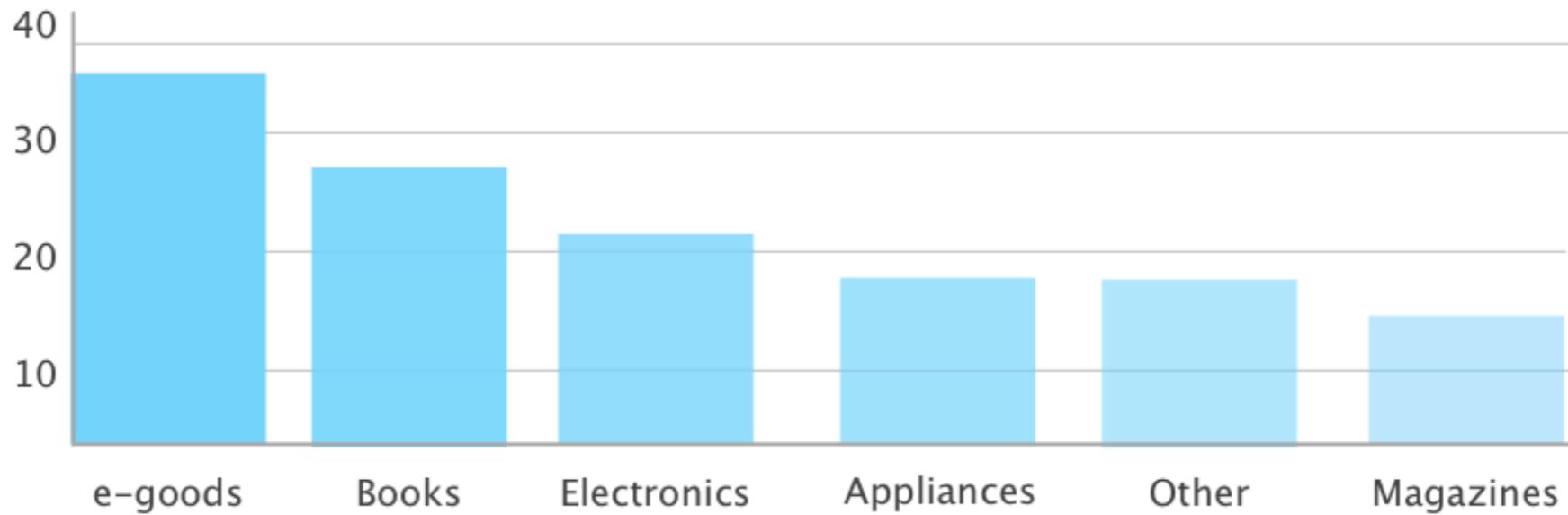


ACCOUNTS  
7,343      CHANGE  
4.32%



- SITE LIVE
- PAYMENT LIVE
- FULFILLMENT ON

## Revenue per product



## Top products

Product

The girl with the dragon tattoo

Orders \$ Revenue

11 88.50

This isn't about visual design

# SALES REPORT MAY 2012

ORDERS

12,247 ▲ 0.4%

ACCOUNTS

2,323 ▼ 1.4%

SITE



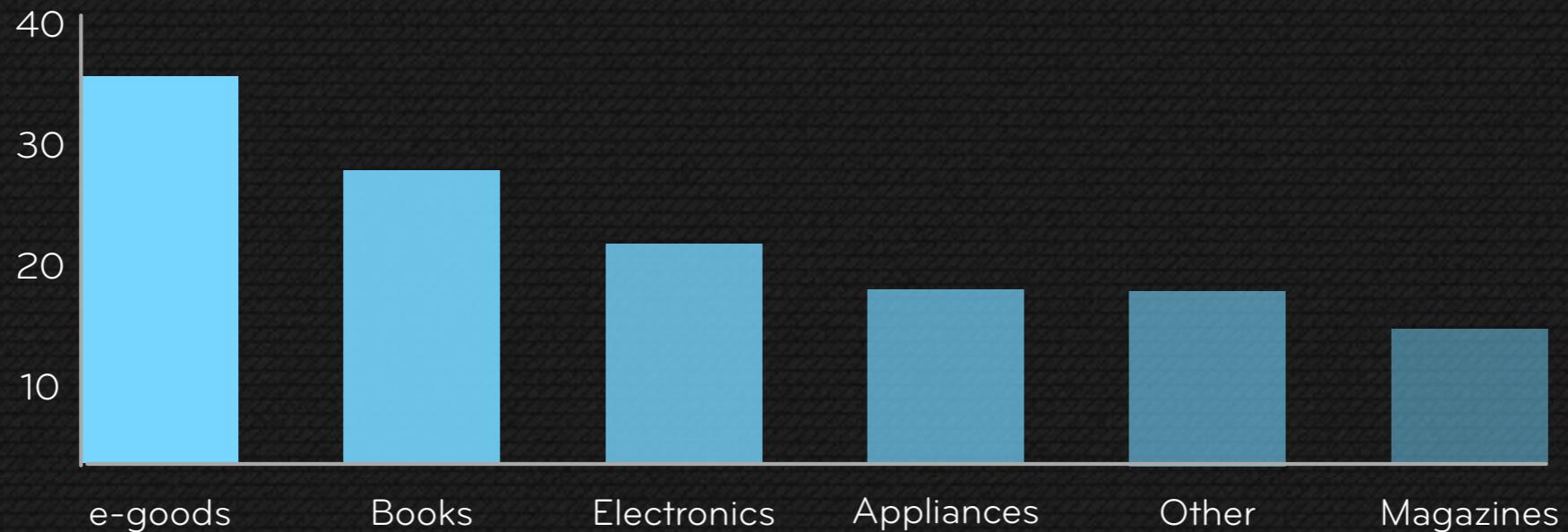
PAYMENT



FULFILLMENT



## Revenue per product



## Top products

Product	Orders	\$ Revenue
The girl with the dragon tattoo	11	88.50

# SALES REPORT MAY 2012

ORDERS

12,247 △ 0.4%

ACCOUNTS

2,323 ▽ 1.4%

PA

FULFIL

Revenue per product

40



# 4 Points on Visual Design

1. Remove Chart Junk
2. Maximise your data ink ratio
3. Use the “least effective difference” to highlight
4. Remember to quieten down less important parts.

# 4 Points on Visual Design

1. Remove Chart Junk
2. Maximise your data ink ratio
3. Use the “least effective difference” to highlight
4. Remember to quieten down less important parts.



6th  
Takeaway

TIME REMAINING

INTRO

KNOW YOUR AUDIENCE

KNOW YOUR DOMAIN

KNOW YOUR DATA

KNOW YOUR VISUALS

KNOW YOUR STYLE

CLOSING POINTS

FIN

TOPIC

## 1. VISUALS SHOULD SAY SOMETHING

The worst visualisations are the ones you look at just think “Heh.”



Looks great, but makes very little sense.

## 2. DASHBOARDS & VISUALS EVOLVE

Revisit them as your data increases

# VANITY DASHBOARDS

SuperDash | Mozilla Firefox (X)

Back Forward Stop <https://www.superdashboard.com/index.cgi?user=des> how to get some users

## Your Business dash

destroynor | Settings | Logout

Overall

Bad Good



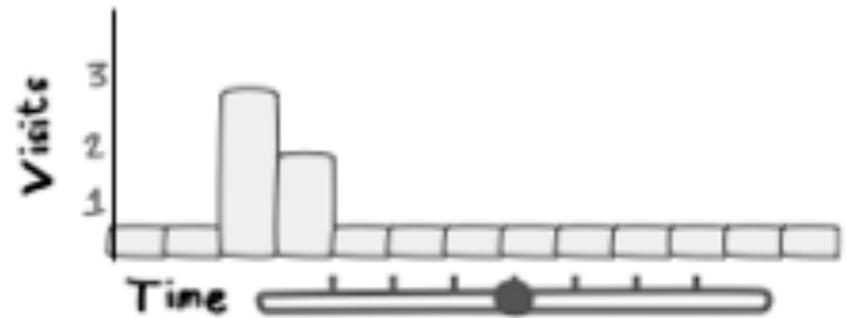
Cashflow



Buzz

Visits

Time



---

### Today at a glance

5 Visitors today

11 This week

32 All time



Employees

Non-employees

# START WITH THE BASICS

The screenshot shows a web browser window with the URL <http://www.contrast.ie/>. The page displays basic statistics: 184 total users, 1,042 images uploaded, and 723 comments. Below this, a table tracks events over four dates: Mar 10, Mar 9, Mar 8, and Mar 7. The events listed are New users signed up, Users upgraded from trial, New trials, Comments posted, and Images uploaded.

Event	Mar 10	Mar 9	Mar 8	Mar 7
New users signed up	11	8	5	21
Users upgraded from trial	2	4	1	5
New trials	0	1	11	15
Comments posted	11	7	2	3
Images uploaded	38	11	8	1

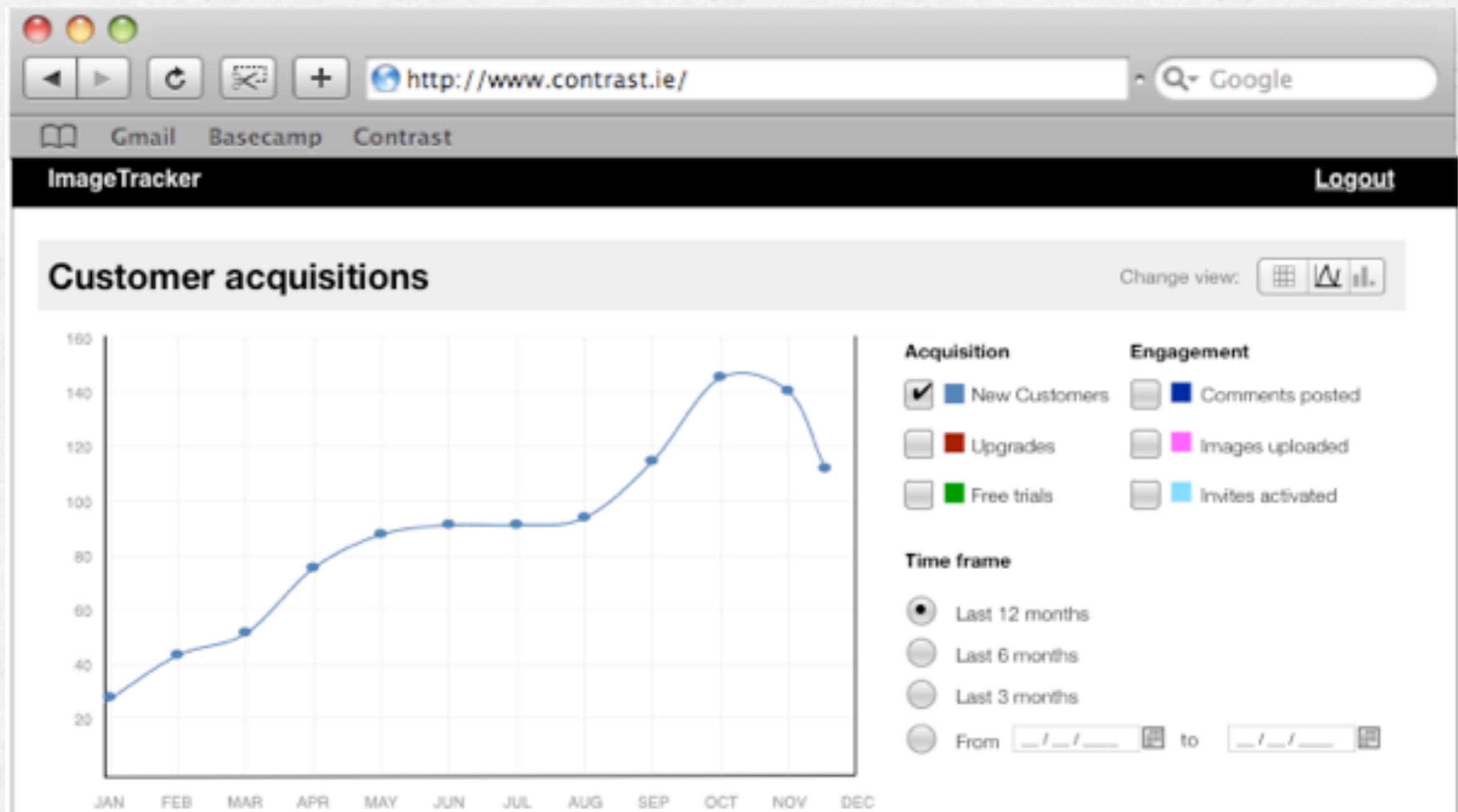
# ADD INSIGHT AS YOU NEED IT

The screenshot shows a web browser window with the following details:

- Address Bar:** http://www.contrast.ie/
- Toolbar:** Back, Forward, Stop, Refresh, New Tab.
- Google Search Bar:** Google
- Header:** Gmail, Basecamp, Contrast, ImageTracker (highlighted), Logout.
- Metrics:**
  - SIGNUPS THIS MONTH:** 307 (↓2.5%)
  - IMAGES uploaded:** 8,168 (↑5.3%)
  - COMMENTS:** 4,121 (↑11.2%)
  - TRIAL CONVERSION RATE:** 12.32% (↑1.4%)
- Engagement metrics:** A table showing mean values for users per account, images per user, and average time between visits across August, July, June, and May.
- User metrics:** A section at the bottom.

Metrics (mean)	Aug	Jul	Jun	May
Mean users per account	5	4	4	3
Mean images per user	11	8	4	4
Avg time between visits (days)	2.3	3.8	5.6	7.4

# ADD A YEARLY VIEW, AFTER A YEAR



# INCLUDE INSIGHTS & ACTIONS



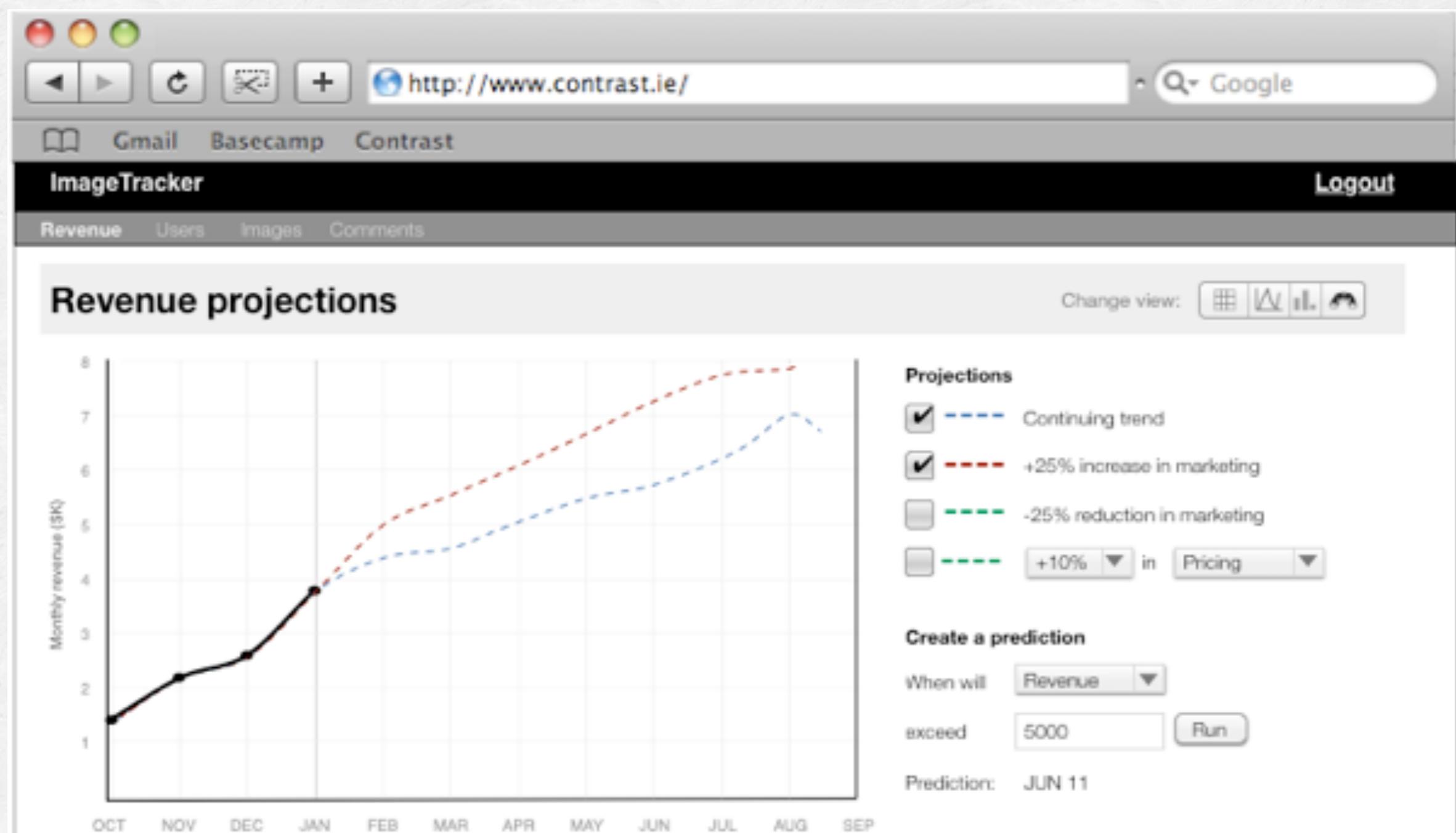
307

8 169

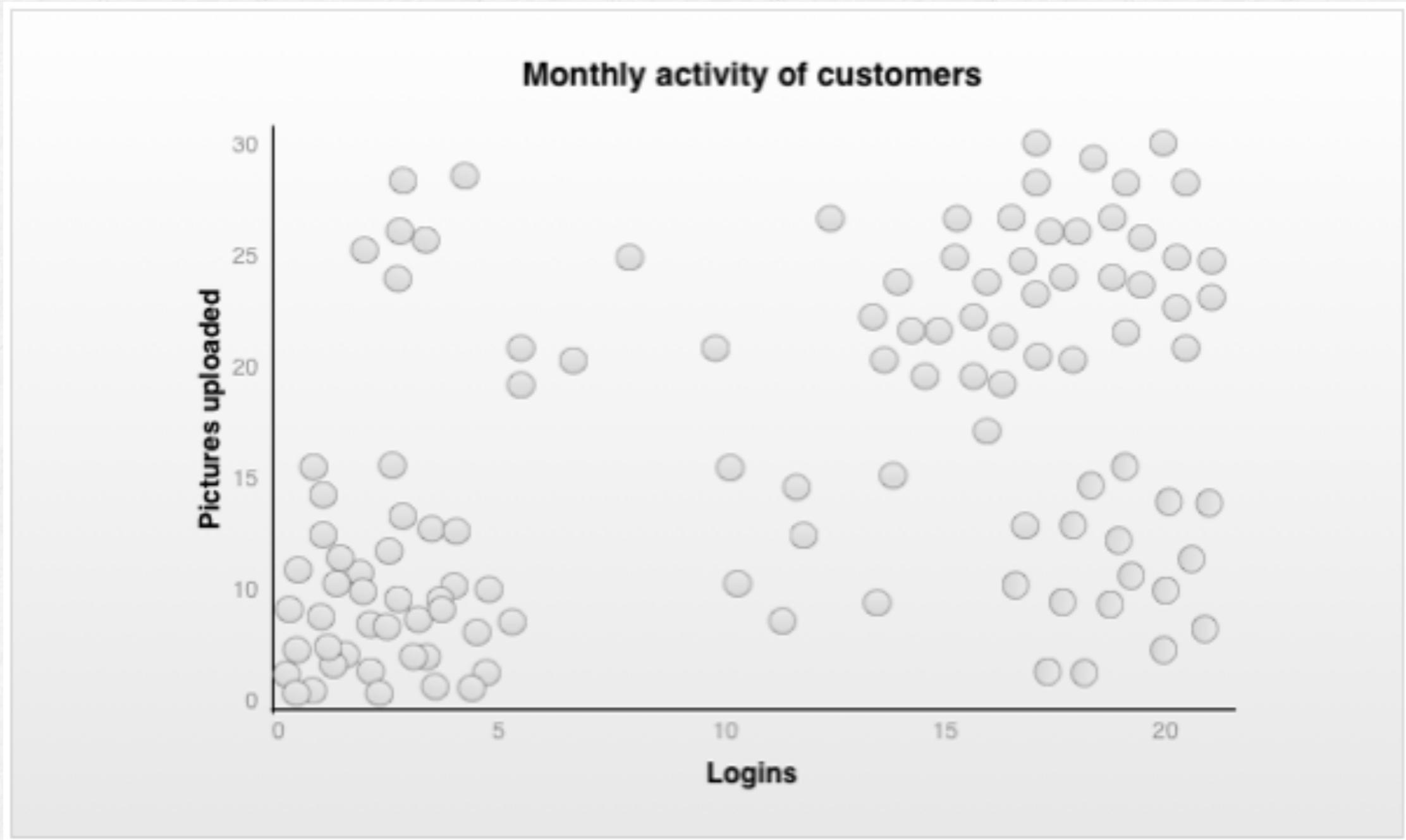
4 121

12 32%

# CONSIDER ADDING PROJECTIONS

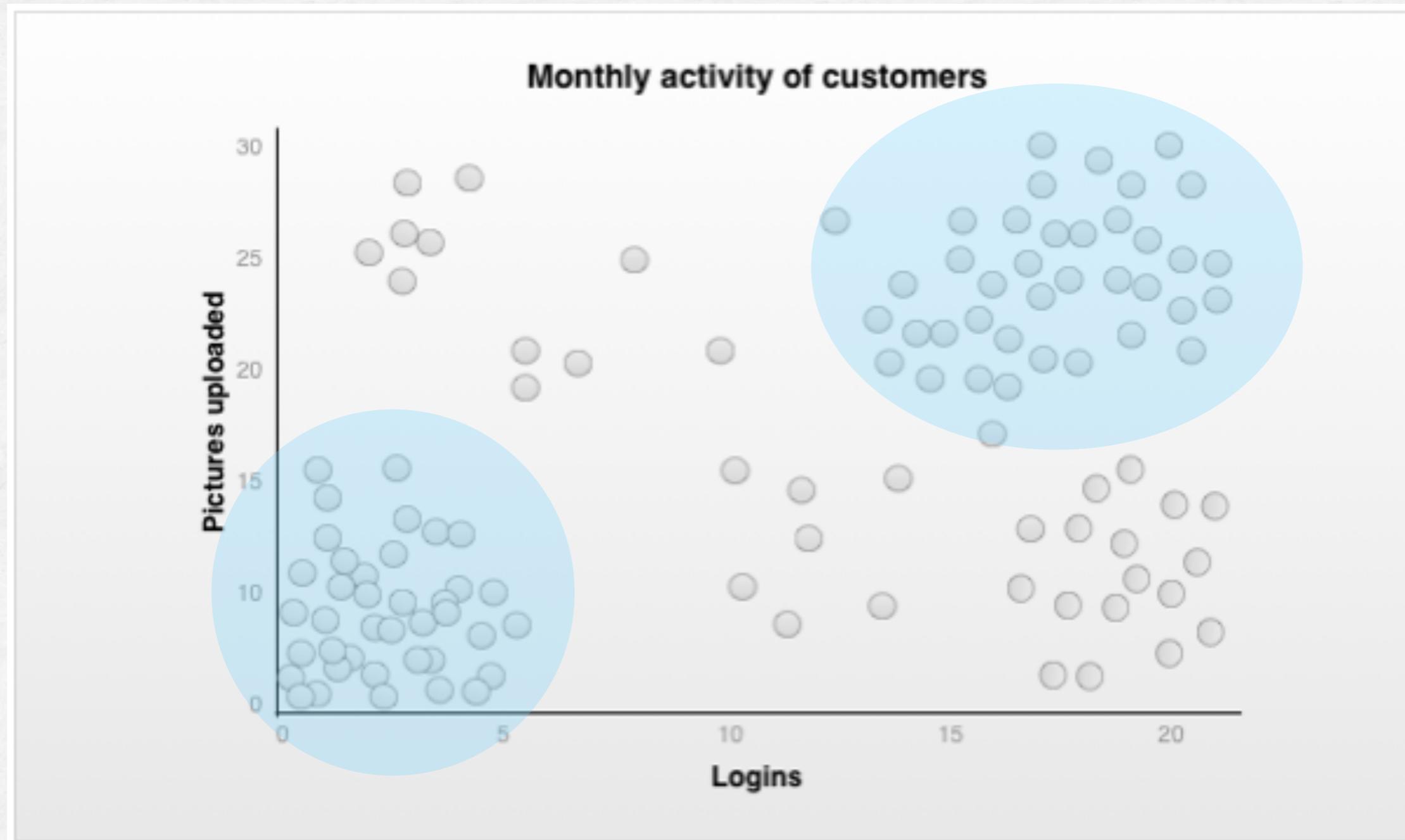


# GET INSIGHTS INTO ENGAGEMENT



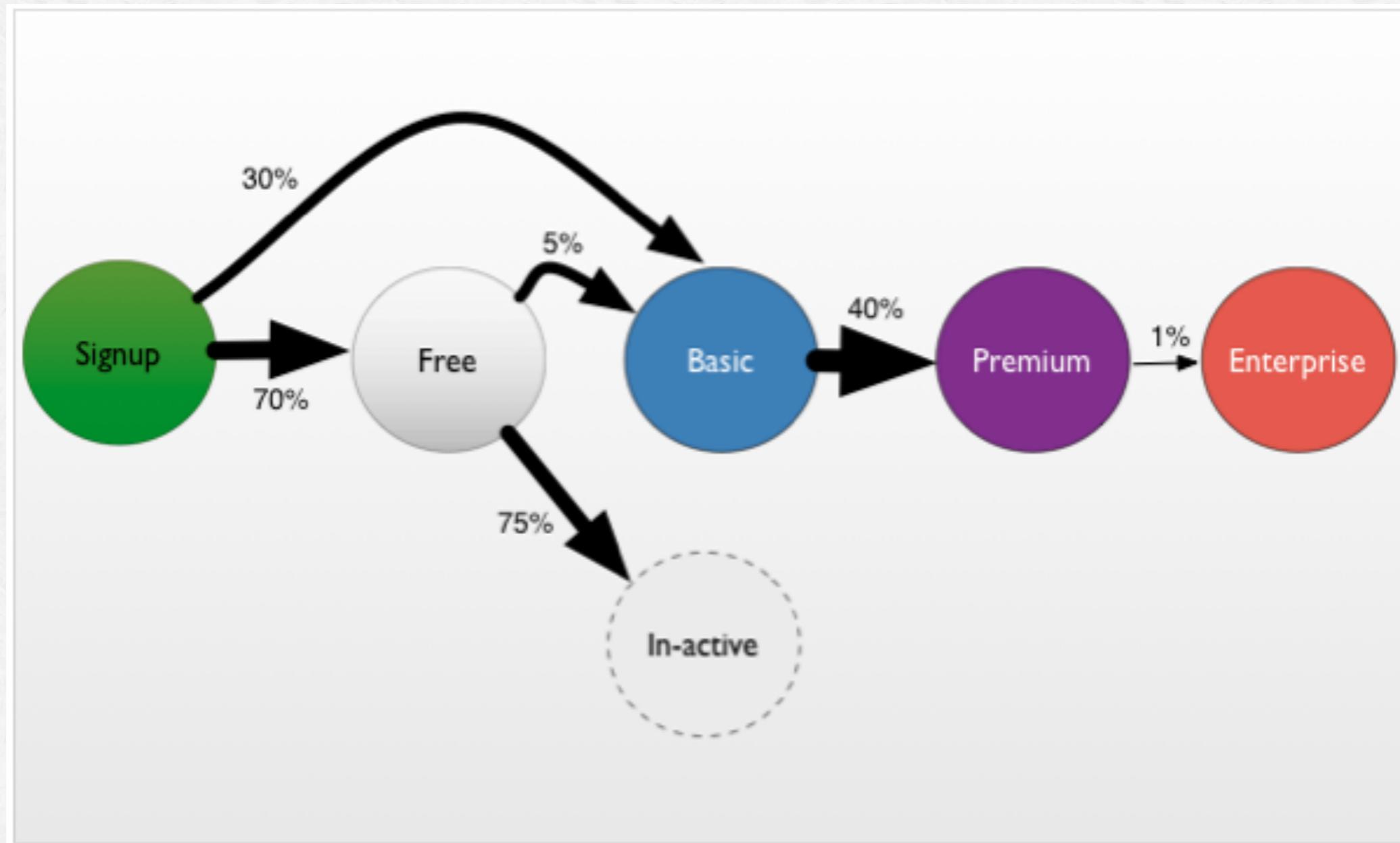
What types of users do we have?

# INSIGHTS INTO ENGAGEMENT



2 main clusters it appears.

# INSIGHTS INTO BUSINESS MODELS



How's that Freemium model working out for us?

### **3. PRESENTING AN ARGUMENT**

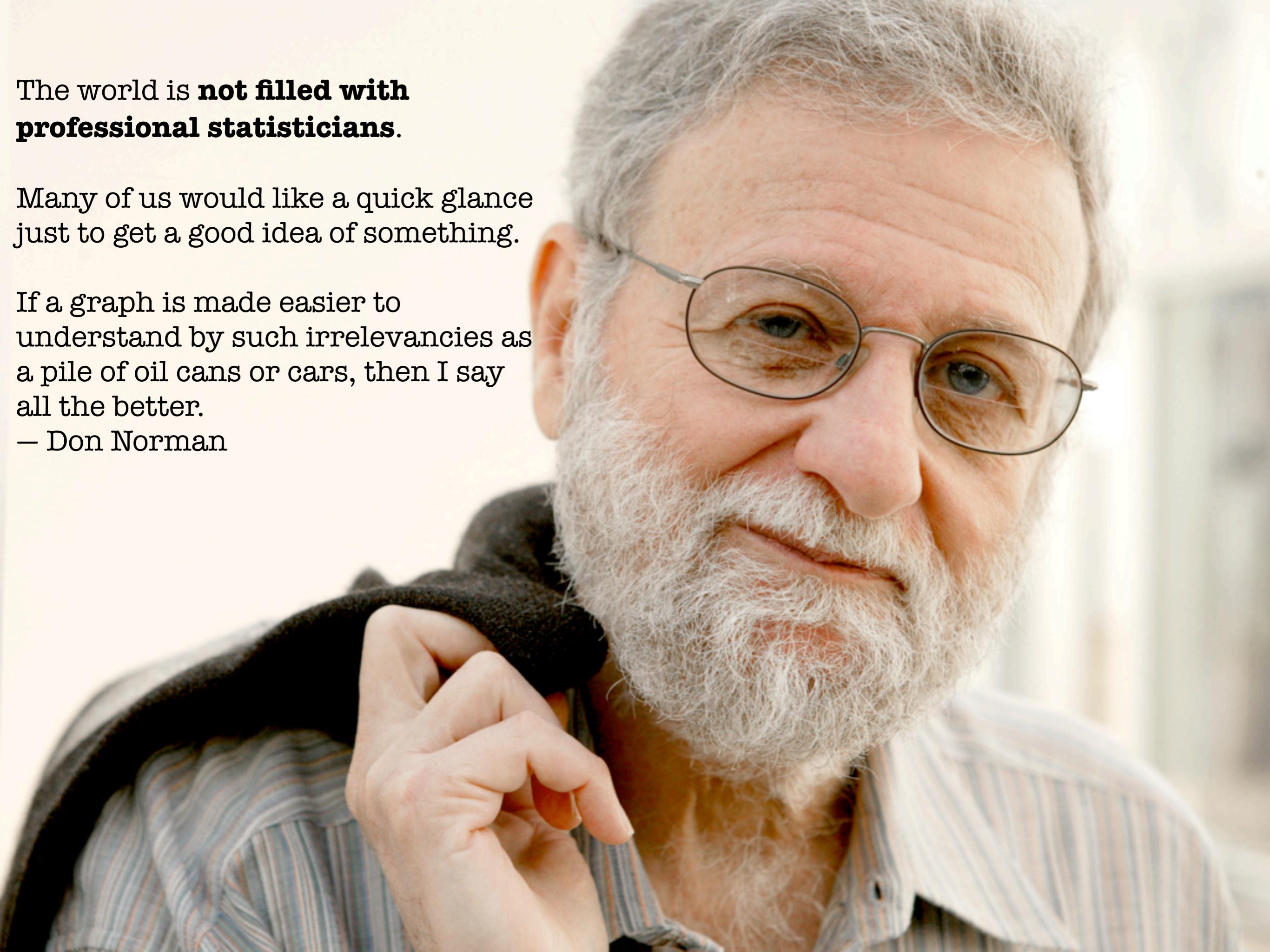
**It's okay to add visuals if your goal is more than  
the factual presentation of information**

The world is **not filled with professional statisticians.**

Many of us would like a quick glance just to get a good idea of something.

If a graph is made easier to understand by such irrelevancies as a pile of oil cans or cars, then I say all the better.

— Don Norman



15

10

5

0

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec

Get your data first.

# FRENCH FRY CONSUMPTION BY MONTH IN 2010



FRENCH FRY CONSUMPTION BY MONTH  
IN 2010



Bring the fancy shit afterwards.

A man with dark hair and a beard, wearing a dark suit jacket over a light-colored shirt, stands at a black podium. He is gesturing with his right hand while speaking. A small microphone is clipped to his jacket. The background is dark.

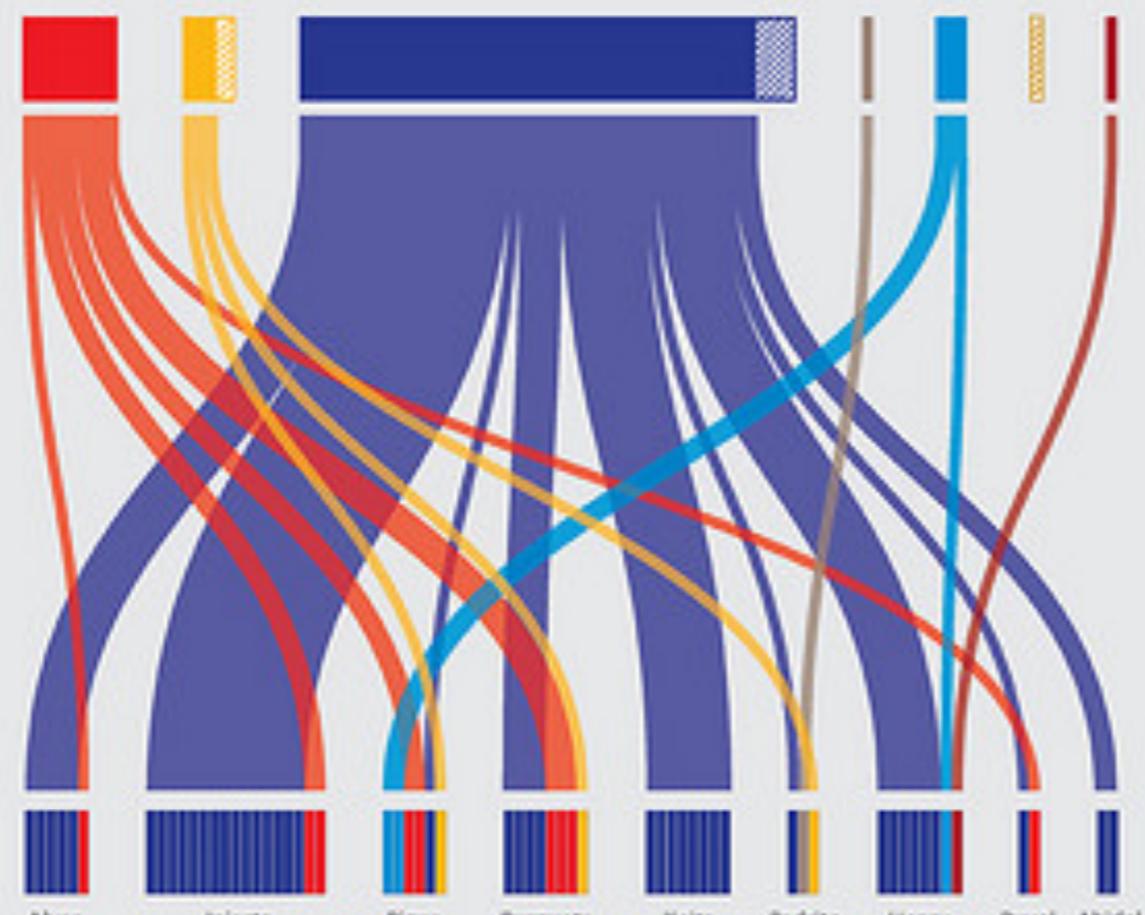
Usability is **not everything**. If usability engineers designed a nightclub, it would be clean, quiet, brightly lit, with lots of places to sit down, plenty of bartenders, menus written in 18-point sans-serif, and easy-to-find bathrooms. **But nobody would be there.** They would all be down the street at Coyote Ugly pouring beer on each other.

— Joel Spolsky

## 4. THEY'RE NOT ALL FIRST TIMERS

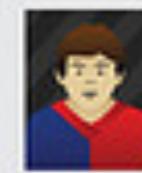
Like chess players understand chessboards,  
people can learn to understand visualisations

PASSES  
TOTAL 67



PASSES  
BY PLAYERS

PASSES  
BY TIME



**HERNÁNDEZ  
XAVI [6]**

PASSES PERFORMANCE

Passes legend

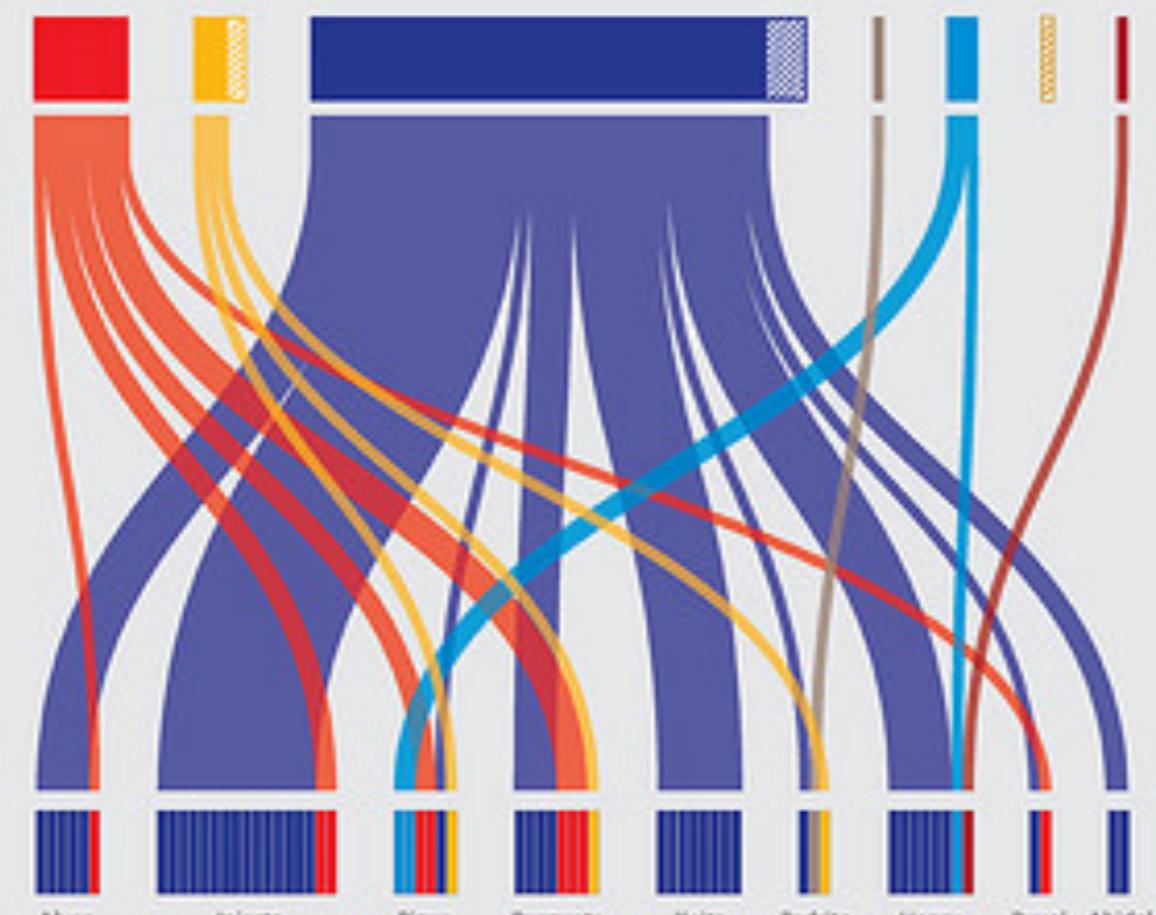
- cross
- cross corner taken
- free kick taken
- chip
- open play
- through ball
- lay off



© 2007-2009 VISup srl

This isn't immediately understandable for everyone.

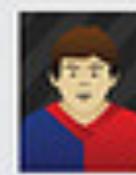
PASSES  
TOTAL 67



PASSES  
BY PLAYERS



PASSES  
BY TIME



HERNÁNDEZ  
XAVI [6]

PASSES PERFORMANCE

Passes legend

- cross
- cross corner taken
- free kick taken
- chip
- open play
- through ball
- lay off

— 1 pass — short — long

— successful — unsuccessful

For those used to it, it's perfect.

## LATEST TWEET

Is #Ronaldinho stronger than #Alonso? Let's see on #visualsport #soccer #football #championsleague <http://flic.kr/p/7d5sL1> about 1 hours ago

[twitter](#)  
[follow us](#)

## Champions League comparison 09-10 | 08-09

Choose a player

**Batista Libano Edinaldo C.**

[advanced search](#)

[random select](#)

Choose a player

**Frederic Kanouté**

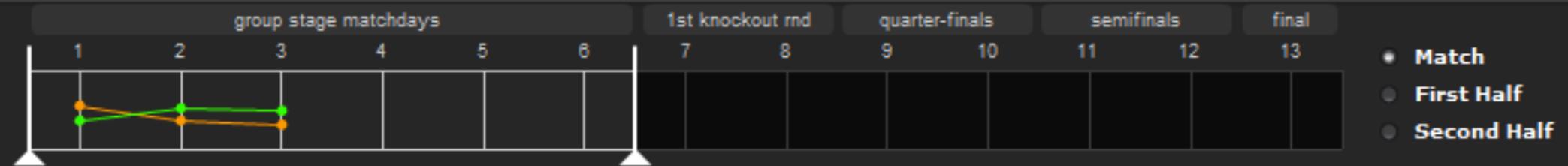
[advanced search](#)

[random select](#)

### Grafite VS Kanouté F.

From matchday 1 to matchday 6

#### TOURNAMENT TRENDS



## Grafite



**23**  
Forward  
VfL Wolfsburg

#### PITCH STATS

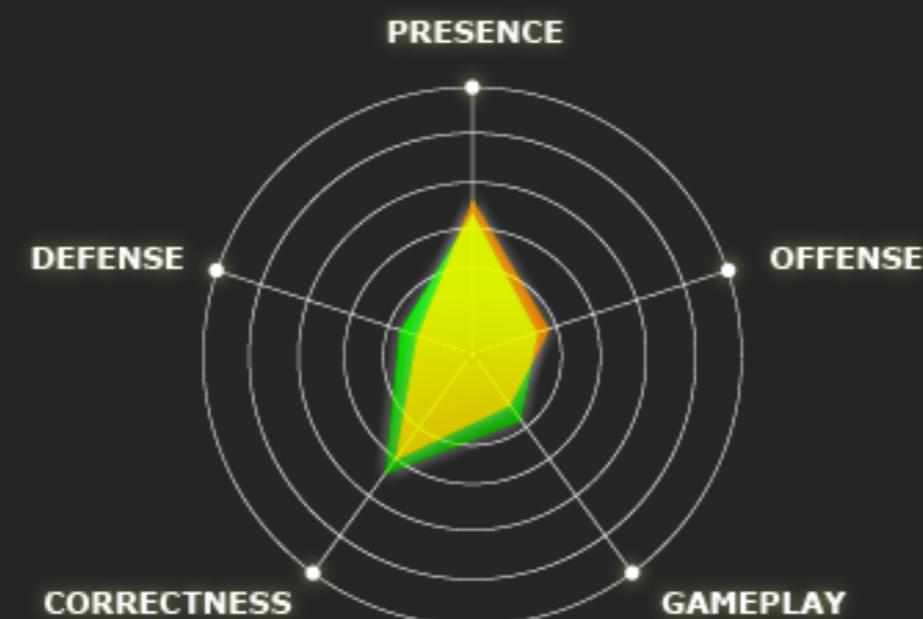
Touchmap



## PERFORMANCE COMPARISON

★★★★★

★★★★★



## Kanouté F.



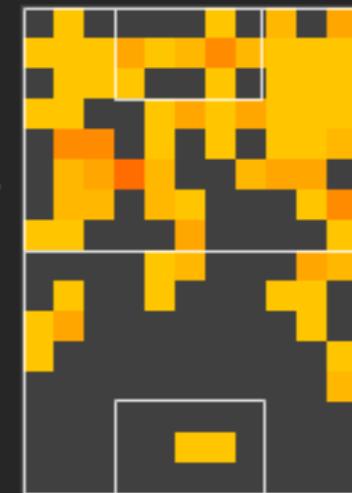
**12**  
Forward  
Siviglia

#### PITCH STATS

Touchmap



Touchmap



Played Minutes: 265  
Ball Touches: 119

CORRECTNESS

GAMEPLAY

### GENERAL STATS

General Overview

PLAYED MATCHES

GOALS

SHOTS

DUELS

FOULS suffered

FOULS committed

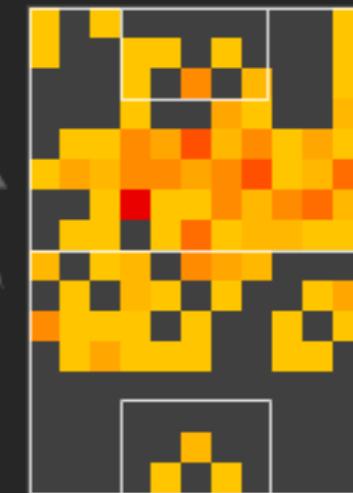
YELLOW CARDS

RED CARDS

PASSES

GOALKEEPING

Touchmap



Played Minutes: 229  
Ball Touches: 171

data source by [Opta Sportsdata](#)

[ABOUT](#) | [COPYRIGHT](#) | [TERMS OF SERVICE](#) | [PRIVACY POLICY](#) | [INVESTORS](#) | [CONTACT US](#)

## 5. IMPLEMENTATION TOOLS

HTML for the win.



# Highcharts Demo Gallery

[« Go to the Highcharts home page](#)

Default

Grid

Skies

Gray

Dark blue

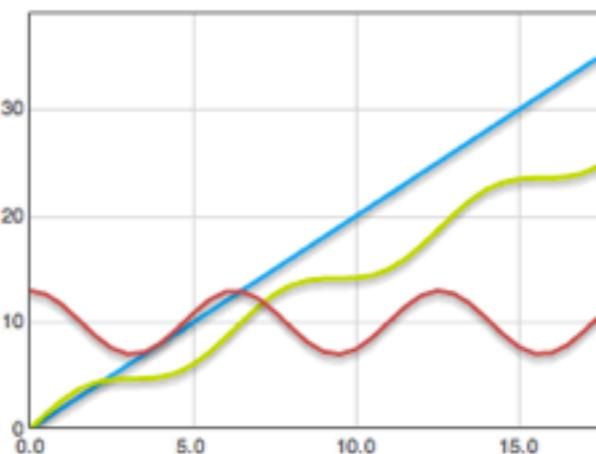
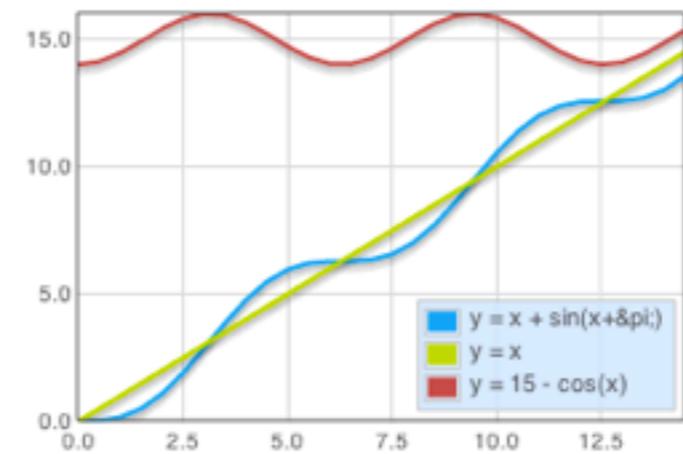
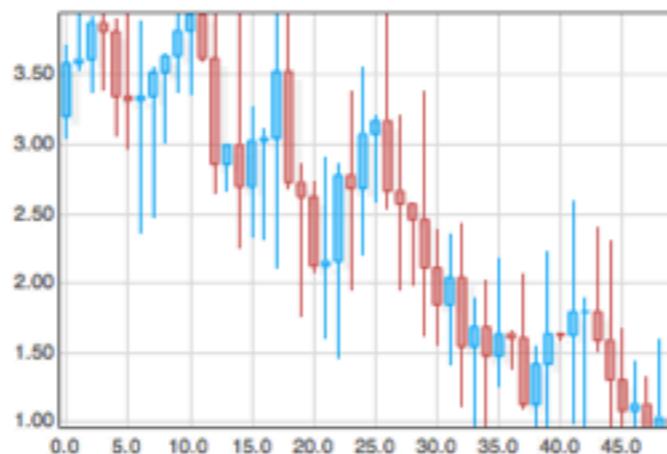
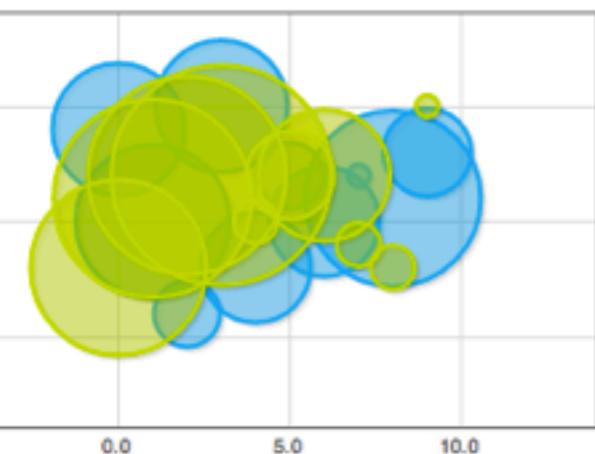
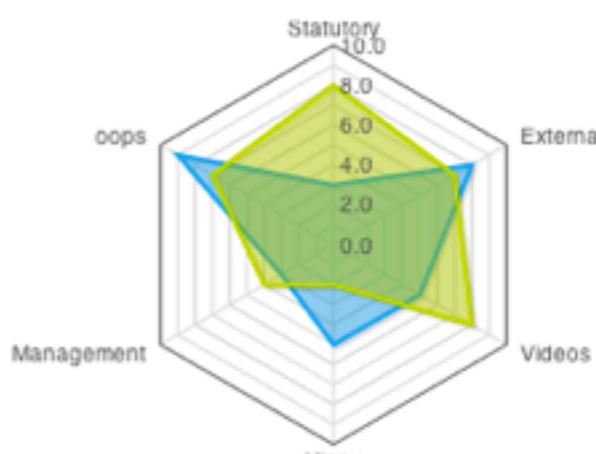
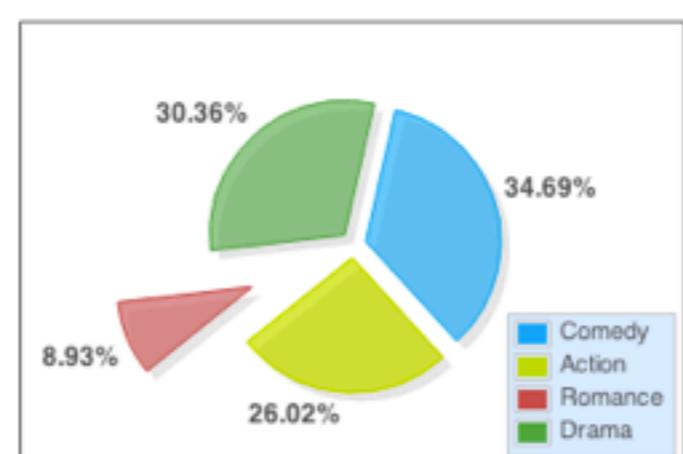
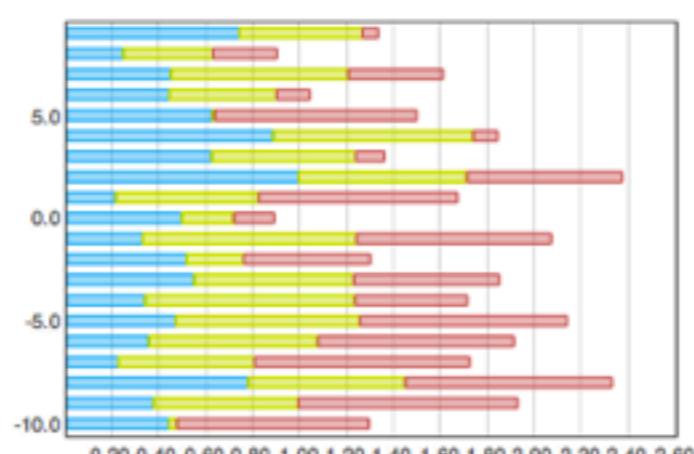
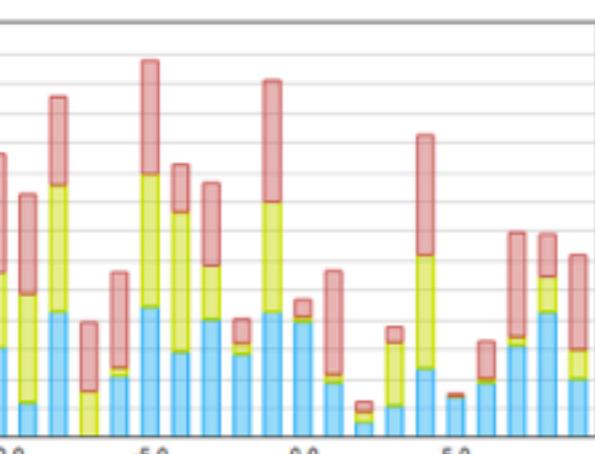
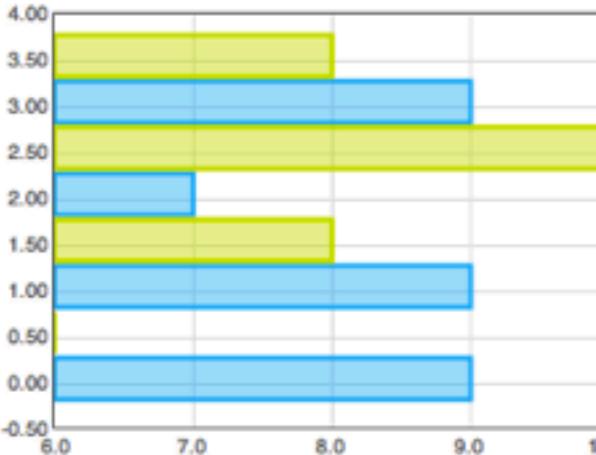
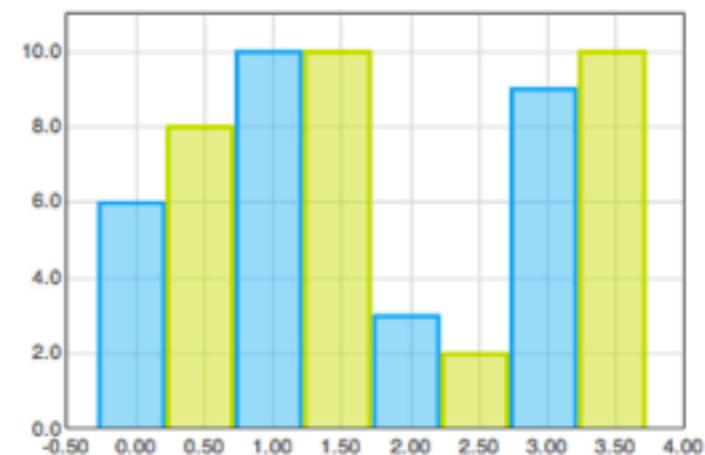
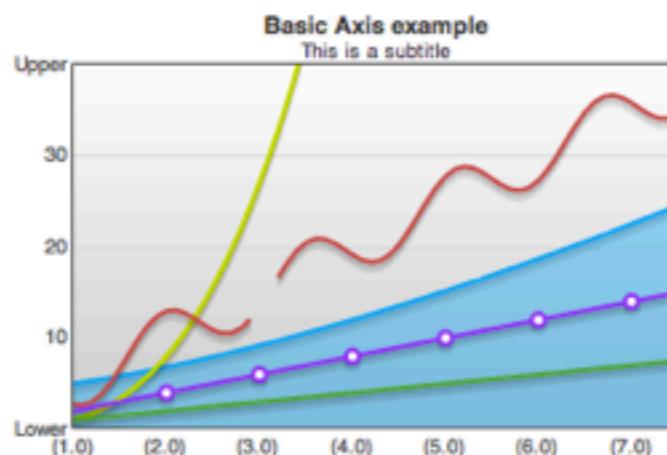
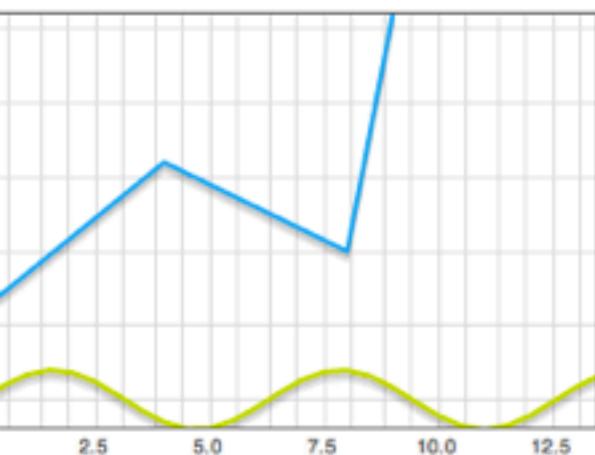
Dark green

## Average Monthly Temperature and Rainfall in Tokyo

Source: WorldClimate.com



Highcharts is excellent and worth the money



Mouse Zoom

Mouse Drag

Time

Negative Values

Fotr2 is new, but popular

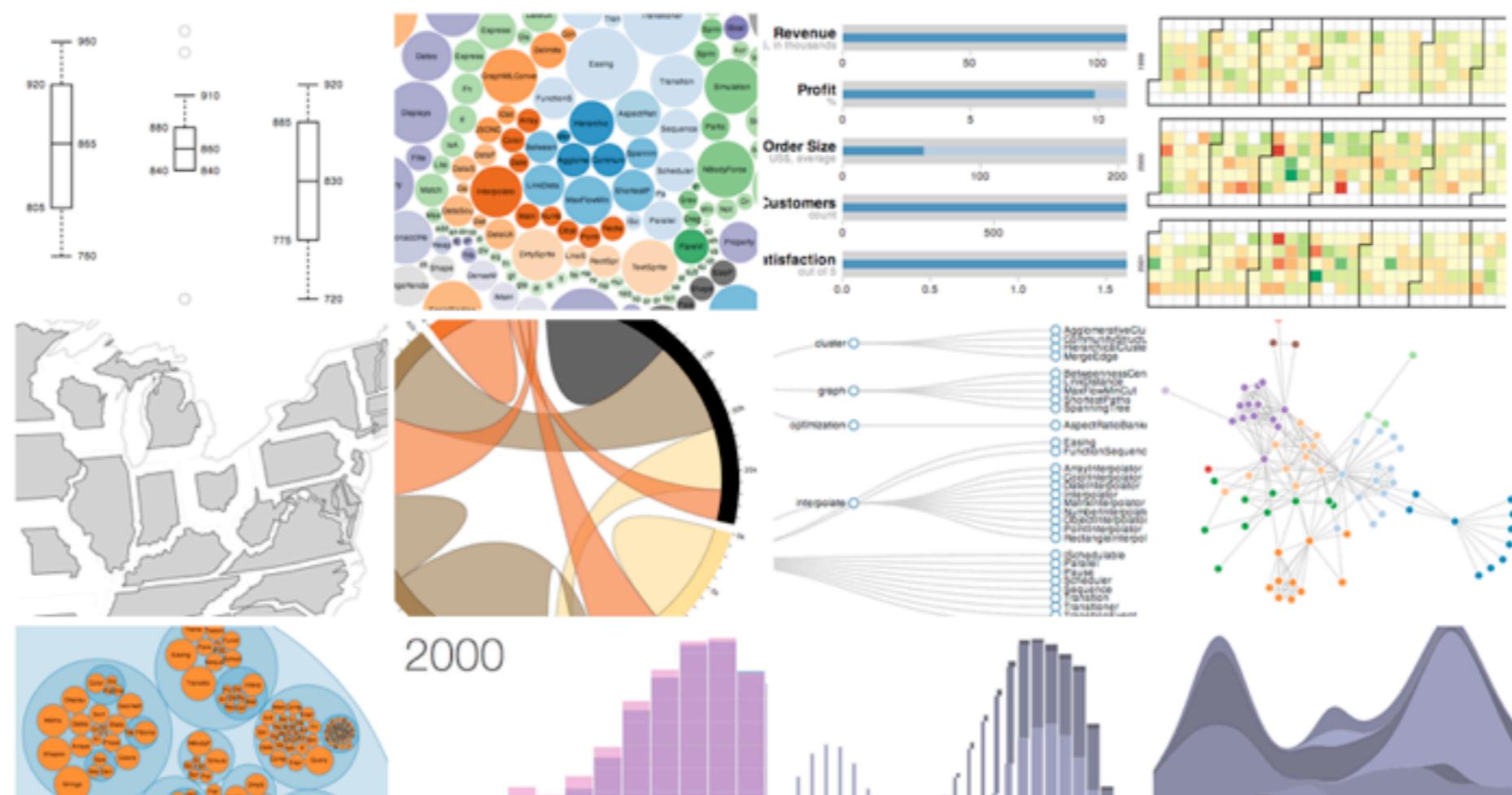


## Gallery

[New Page](#)[Edit Page](#)[Page History](#)[Wiki](#) > [Gallery](#)

Welcome to the D3 gallery. Feel free to add links to your work! More examples are available in the [D3 repository](#). If you want to share an example and don't have your own hosting, consider using [Gist](#) and [bl.ocks](#).

### Visual Index



D3 is Immense.



Last edited by benchristensen, a day ago  
[Delete this Page](#)



## GitHub

[About](#)  
[Blog](#)  
[Features](#)  
[Contact & Support](#)  
[Training](#)  
[GitHub Enterprise](#)  
[Site Status](#)

## Tools

[Gauges: Analyze web traffic](#)  
[Speaker Deck: Presentations](#)  
[Gist: Code snippets](#)  
[GitHub for Mac](#)  
[Issues for iPhone](#)  
[Job Board](#)

## Extras

[GitHub Shop](#)  
[The Octodex](#)

## Documentation

[GitHub Help](#)  
[Developer API](#)  
[GitHub Flavored Markdown](#)  
[GitHub Pages](#)



[Terms of Service](#) [Privacy](#) [Security](#)  
 © 2012 GitHub Inc. All rights reserved.

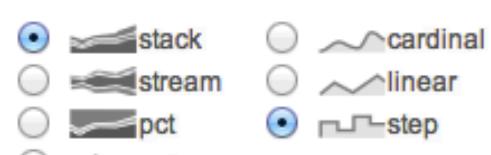
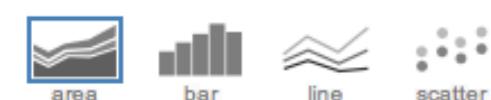


Powered by the Dedicated Servers and  
 Cloud Computing of Rackspace Hosting®

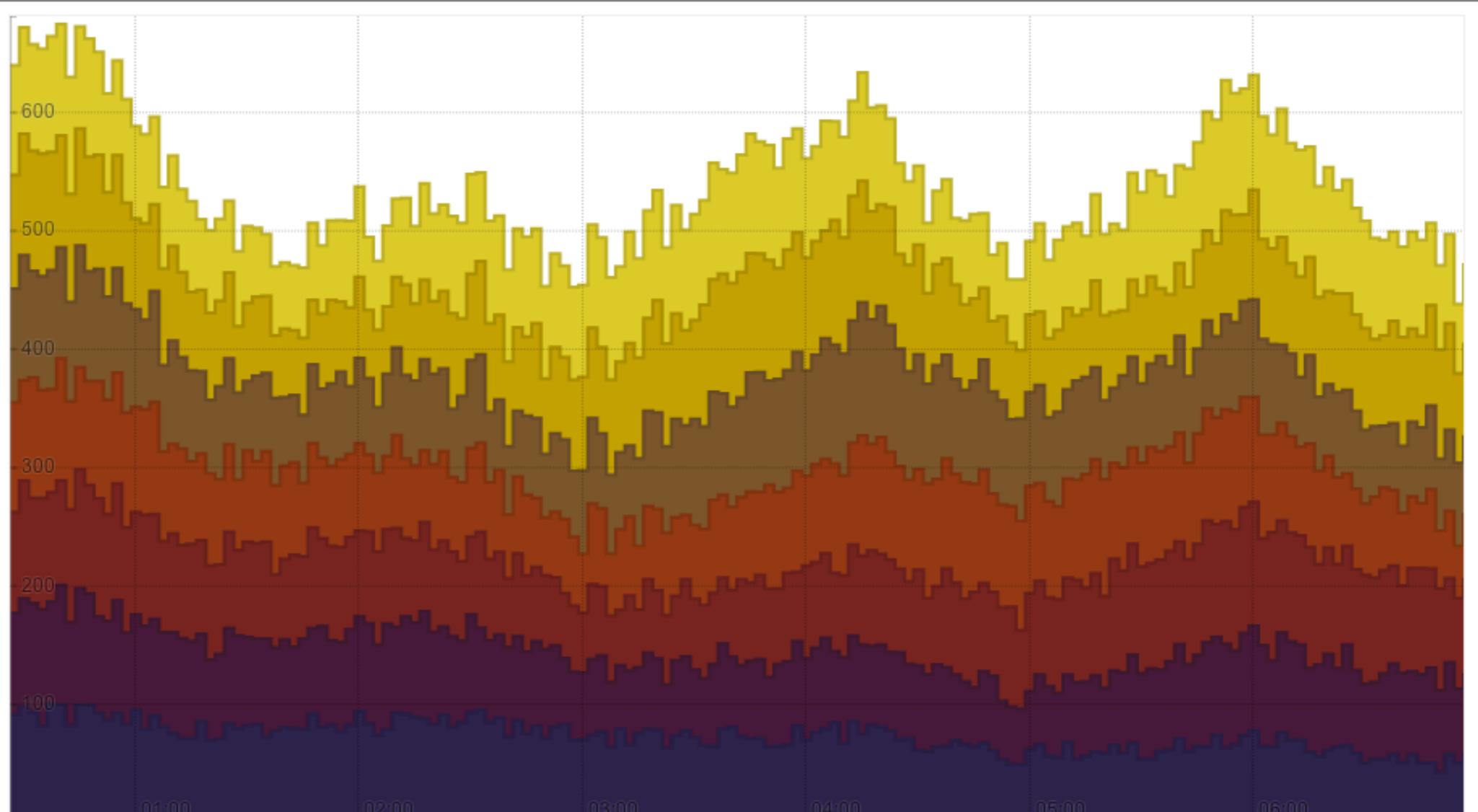
D3 is Immense.

## Random Data in the Future

- ✓ New York
- ✓ London
- ✓ Tokyo
- ✓ Paris
- ✓ Amsterdam
- ✓ Shanghai
- ✓ Moscow



Smoothing



Rickshaw (based on D3) is powerful

# HTML Charting Libraries

1. Highcharts
2. D3
3. Rickshaw
4. Flotr 2

# HTML Charting Libraries

1. Highcharts
2. D3
3. Rickshaw
4. Flotr 2



7th  
Takeaway

## **6. REFERENCES**

Where can I read more?

## Books

Stephen Few - "Dashboard Design" & "Now you see it"

Brian Suda - "Designing with Data"

Edward Tufte - The first two.

## Blogs

Stephen Few -> <http://perceptualedge.com>

Intercom (me) -> <http://blog.intercom.io>

TIME REMAINING

INTRO

KNOW YOUR AUDIENCE

KNOW YOUR DOMAIN

KNOW YOUR DATA

KNOW YOUR VISUALS

KNOW YOUR STYLE

CLOSING POINTS

FIN

TOPIC





Thanks everyone! – @destraynor