

# Speaking the language of data

Sign up to my newsletter:



## Why do charts work?



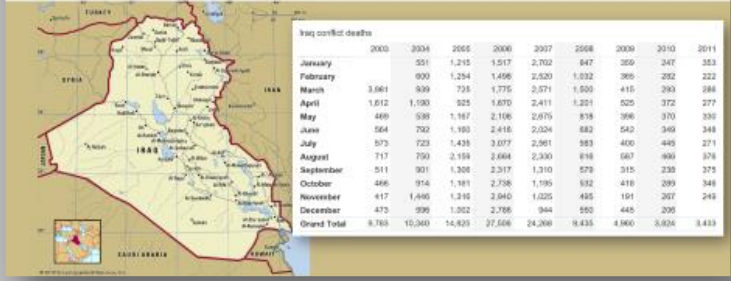
## Choosing the chart



## Telling a story

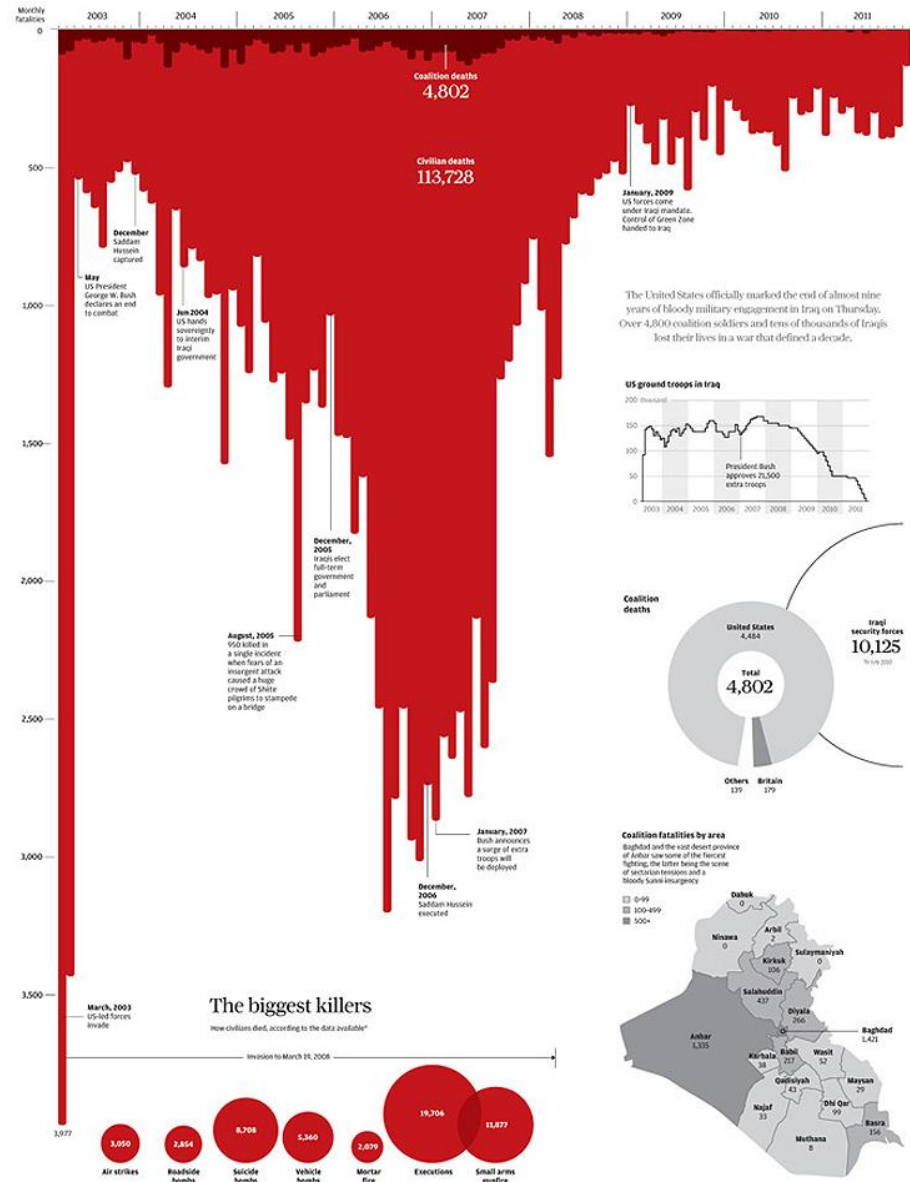


## Bring it together



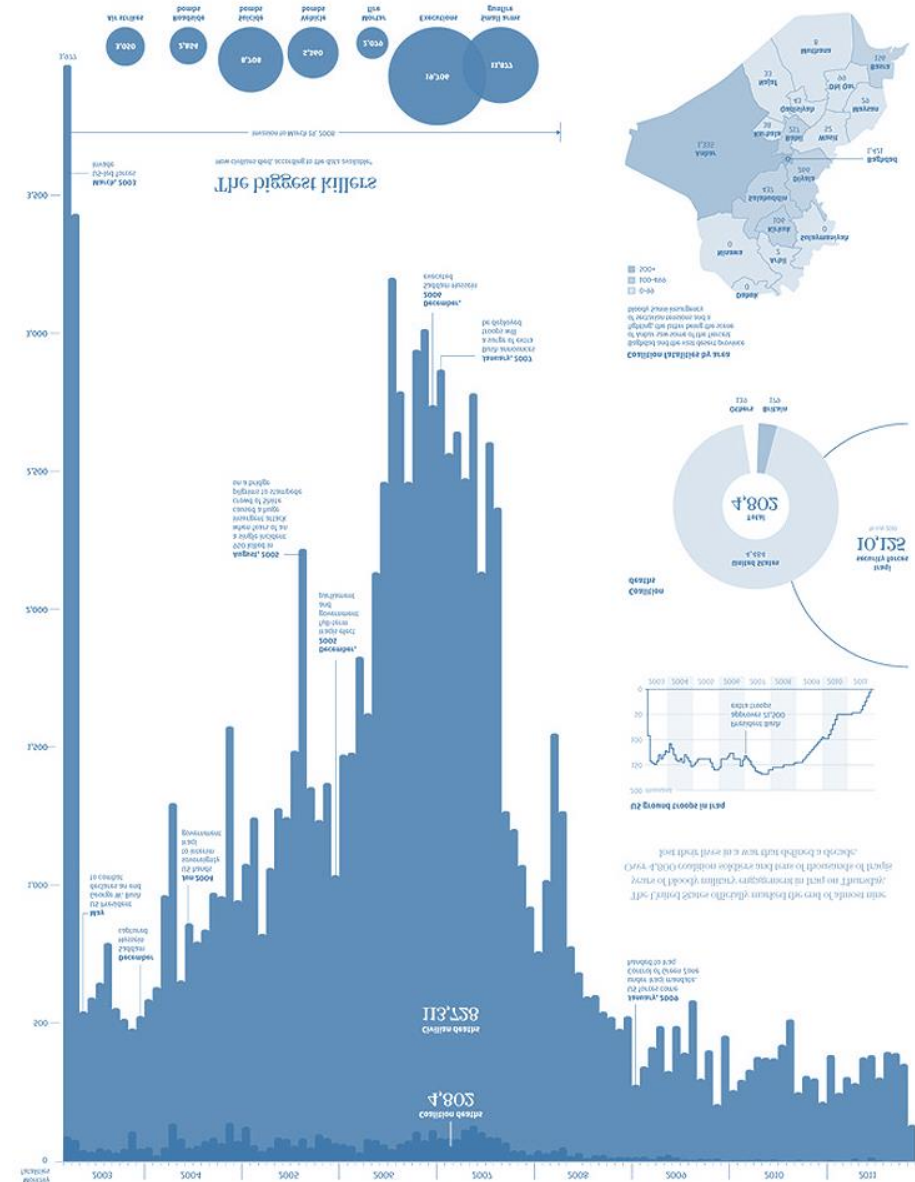
# Andy Cotgreave

# Iraq's bloody toll

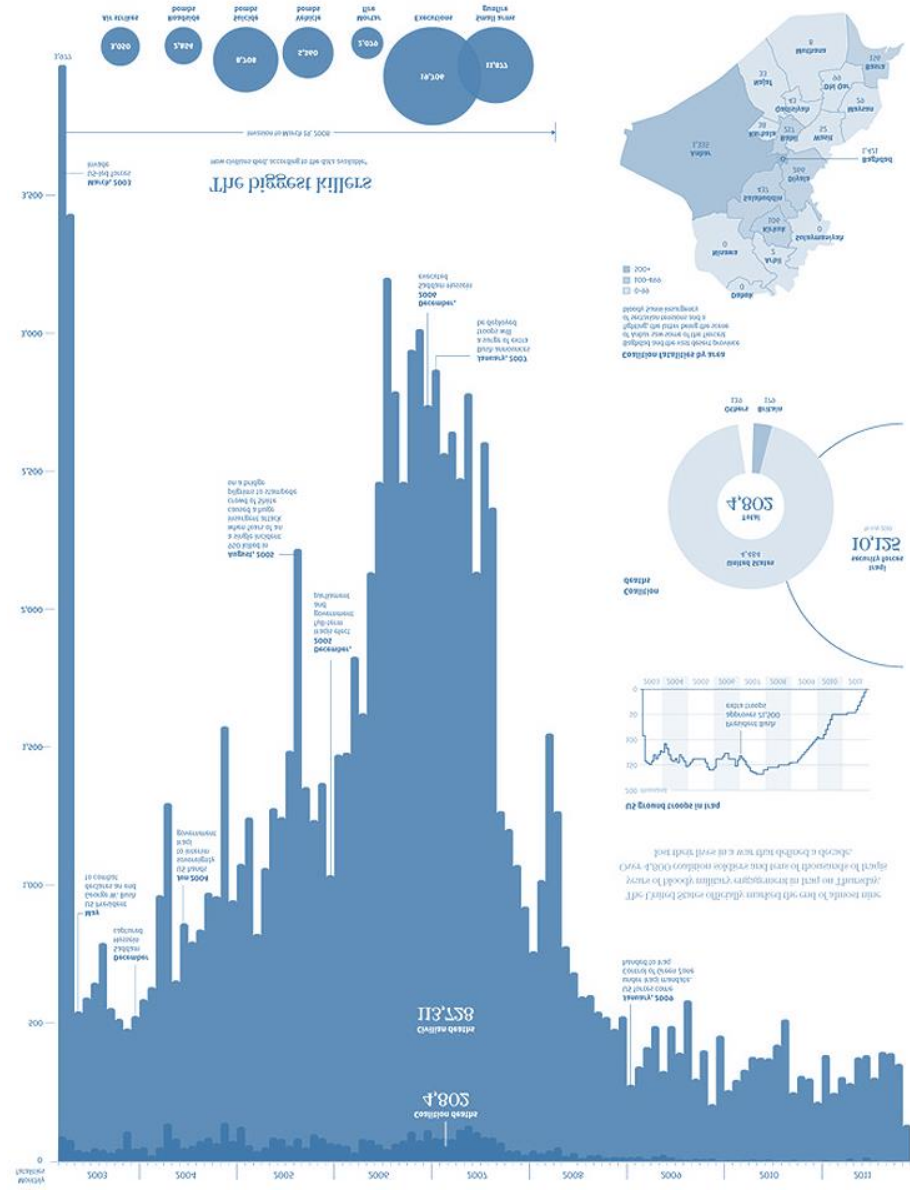


Original: Simon Scarr, South China Morning Post

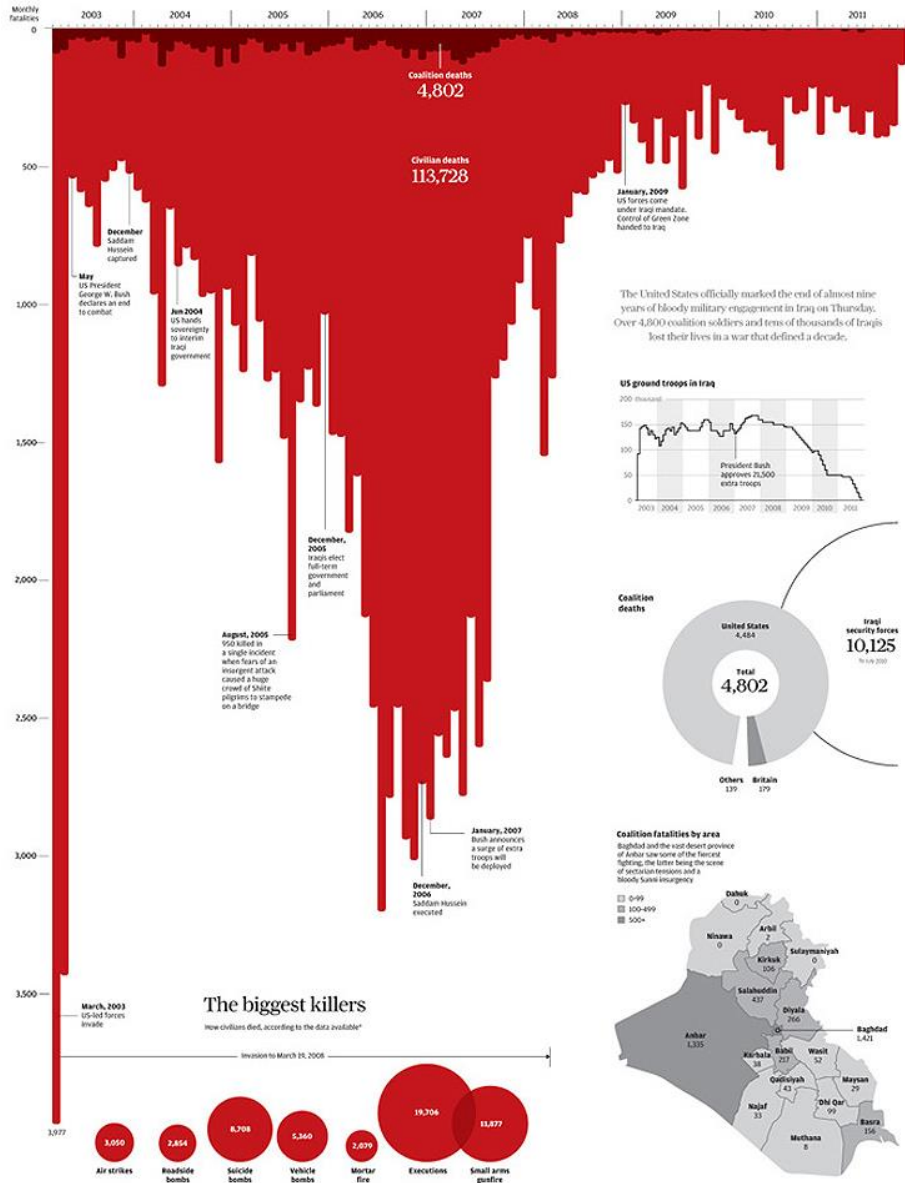
# Iraq: deaths on the decline



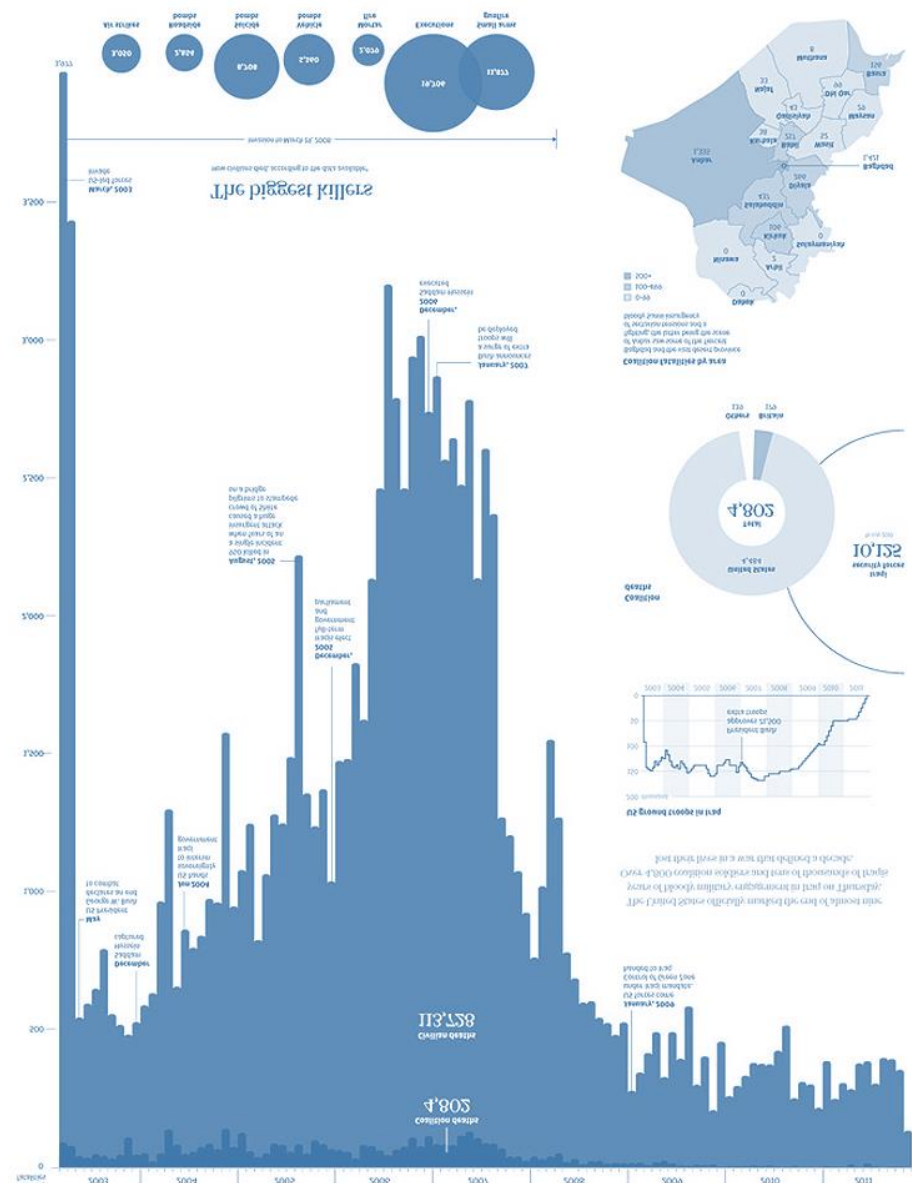
# Iraq: deaths on the decline



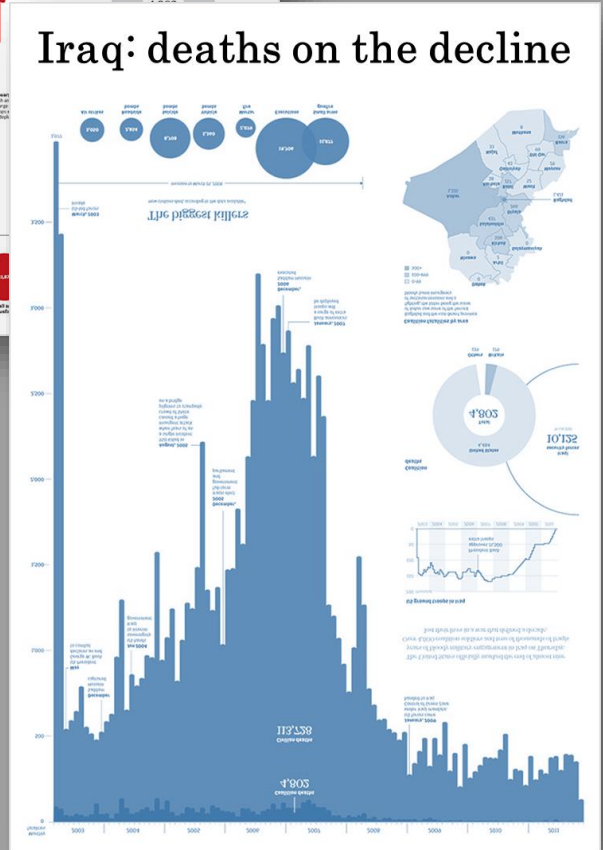
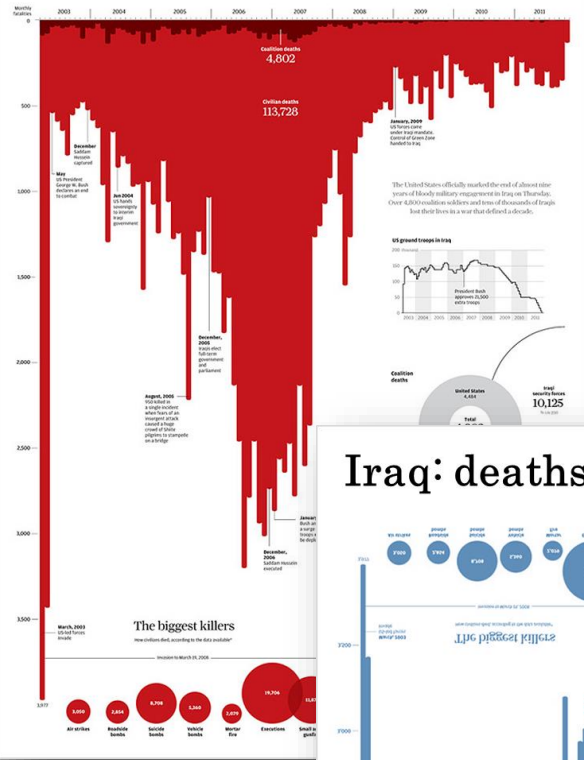
# Iraq's bloody toll



# Iraq: deaths on the decline

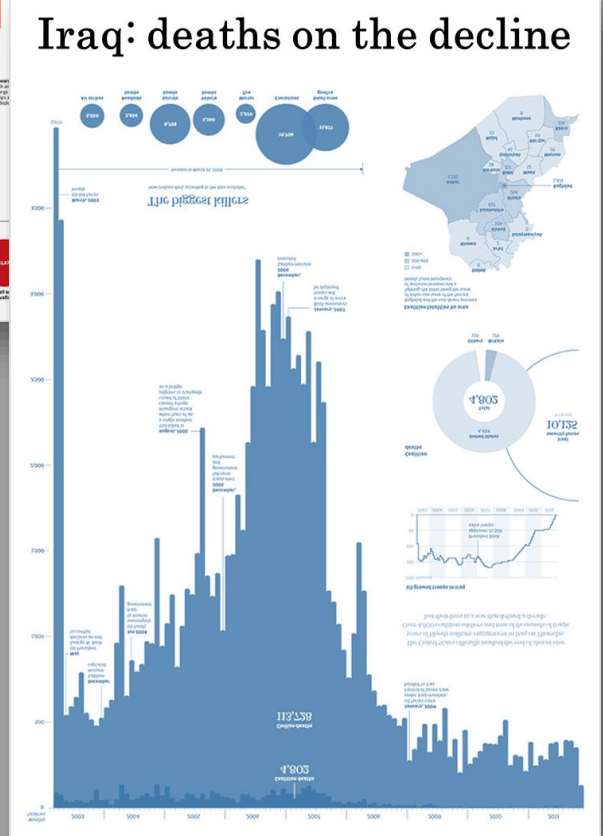
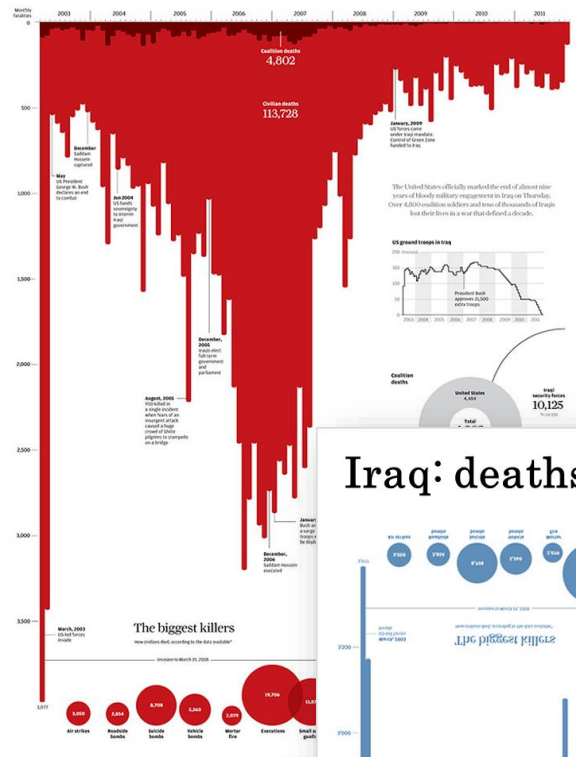


# Iraq's bloody toll



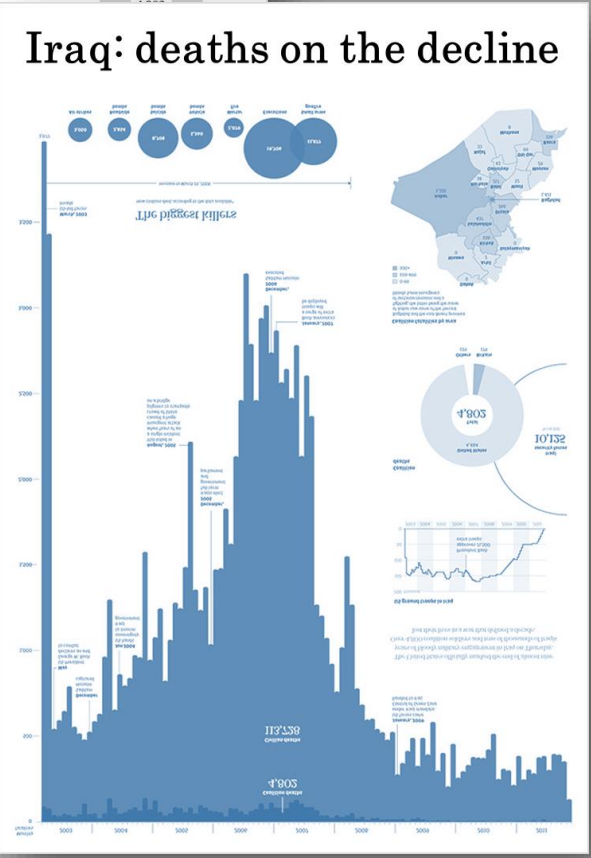
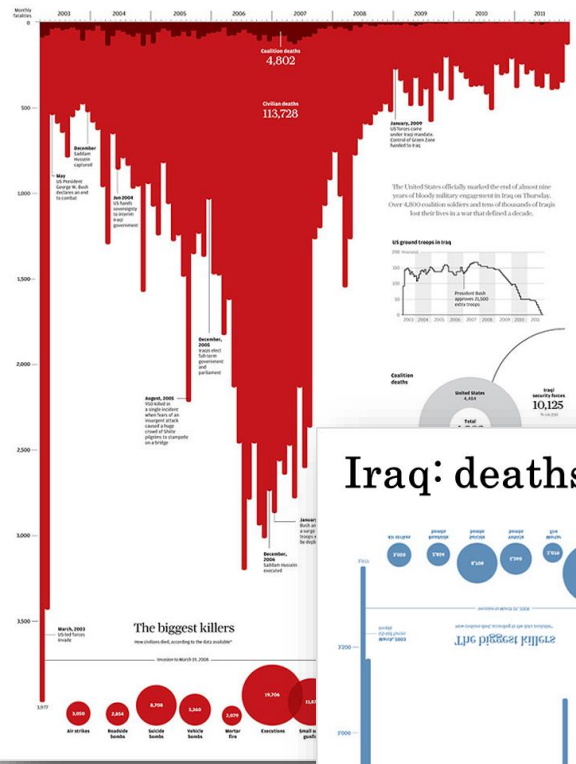
Data visualization is not neutral; every element is a choice, every choice an opinion.

# Iraq's bloody toll



Data visualization is not neutral;  
every element is a choice, every choice an opinion.

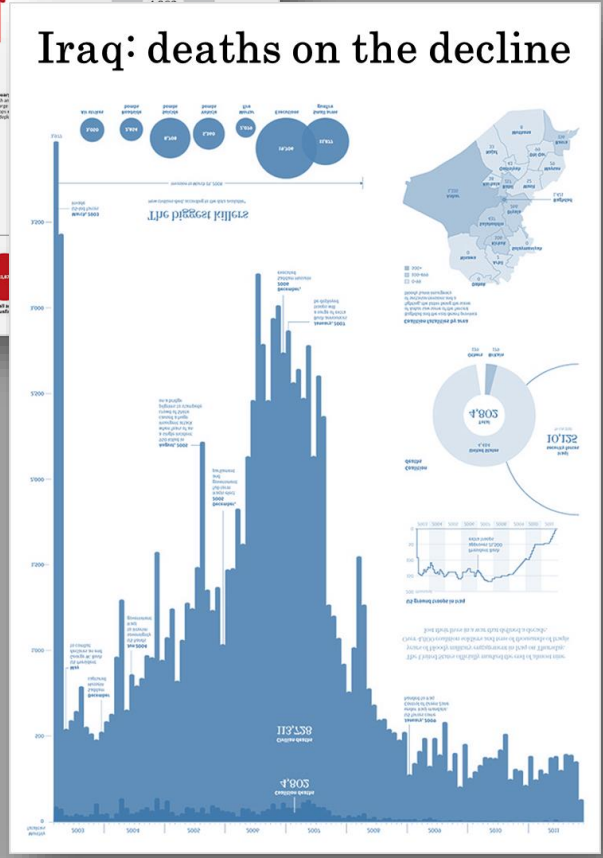
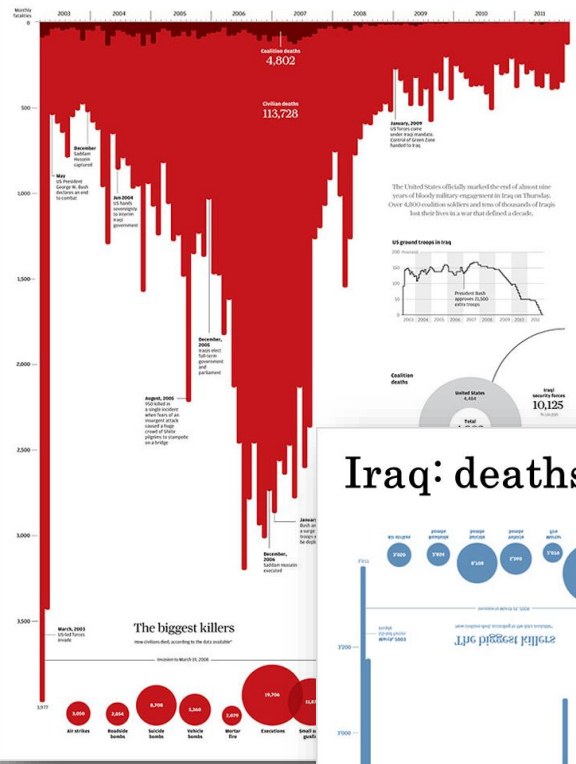
# Iraq's bloody toll



Data visualization  
is not neutral;  
every element is a  
choice, every  
choice an opinion.



# Iraq's bloody toll

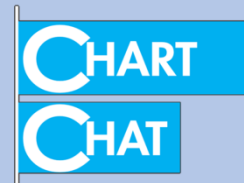


Data visualization is not neutral; every element is a choice, every choice an opinion.

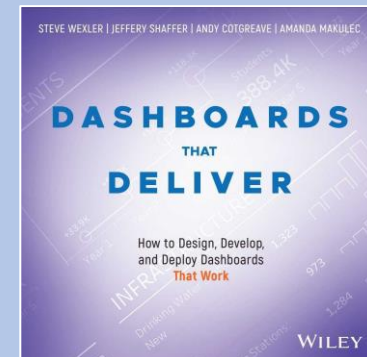
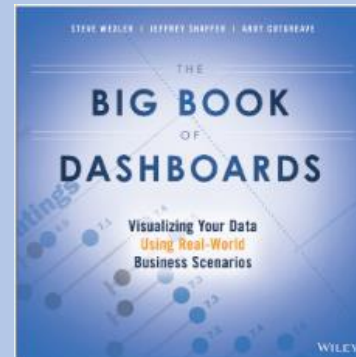


# Andy Cotgreave

Technical Evangelist, Tableau

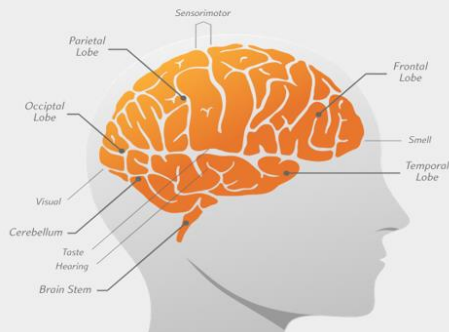


## How To Speak Data

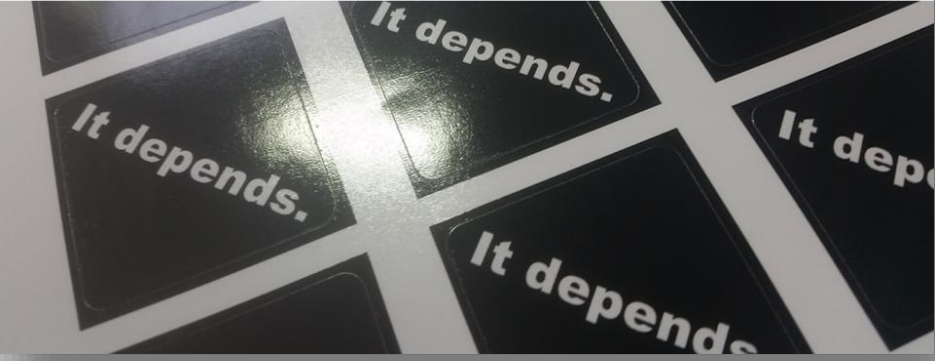


# Speaking the language of data

## Why do charts work?



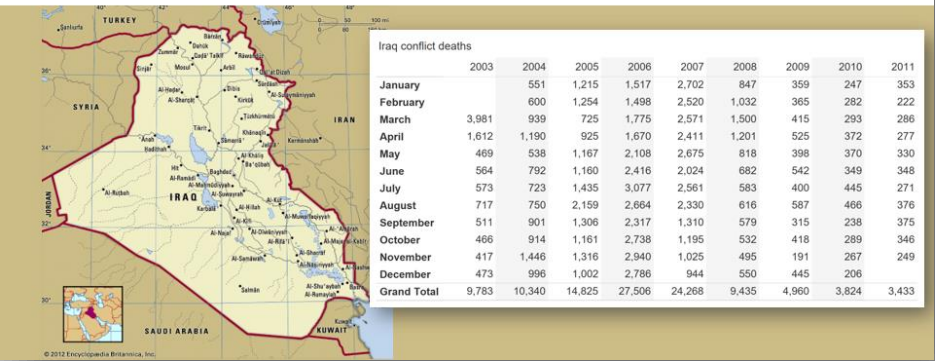
## Choosing the chart



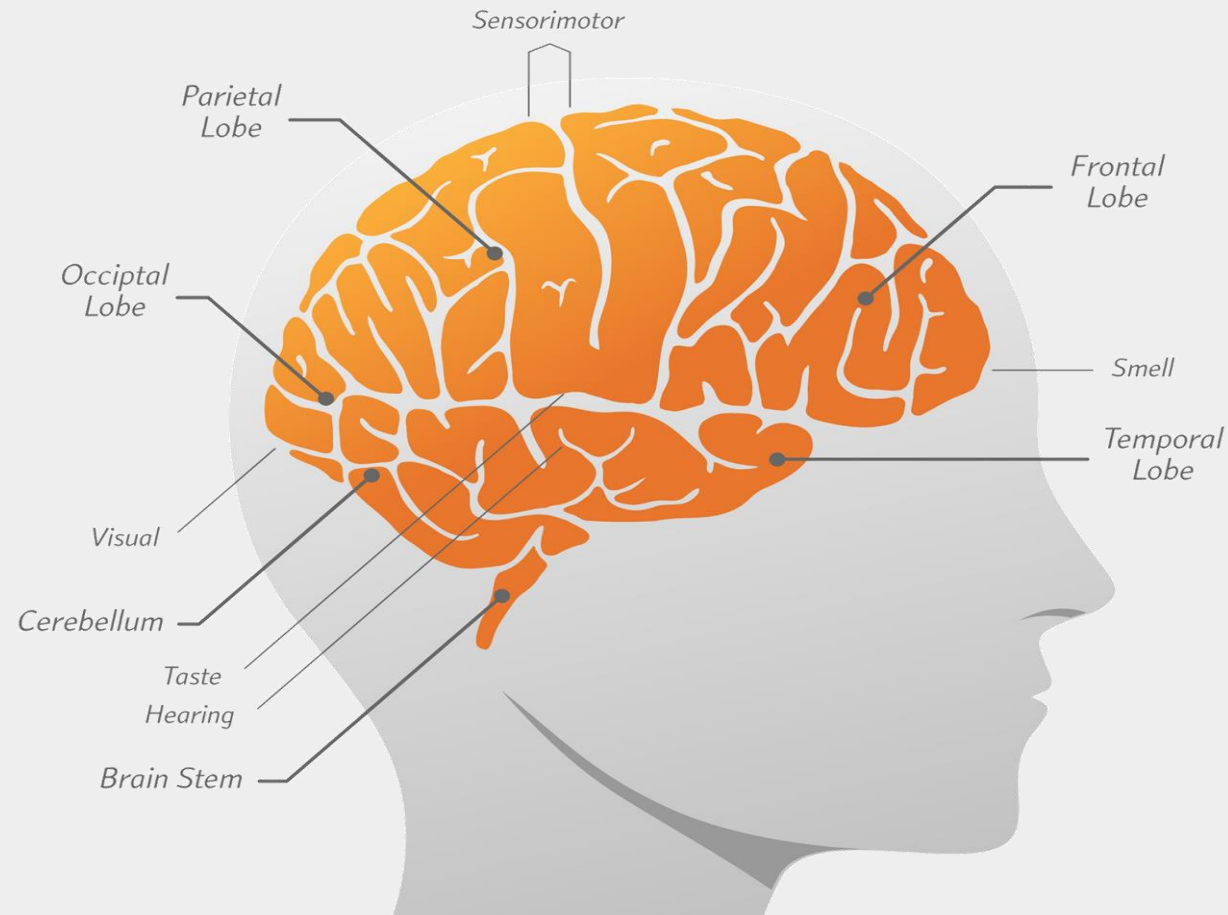
## Telling a story

**L E V E R S**

## Bring it together



# Why do charts work?



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

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

1 1 1 1 1 1 1 1 1 1 1 1 1 1 1

2 2 2 2 2 2 2 2 2 2 2 2

3 3 3 3 3 3

4 4 4 4 4 4 4 4

5 5 5 5 5 5 5 5 5 5 5 5 5

6 6

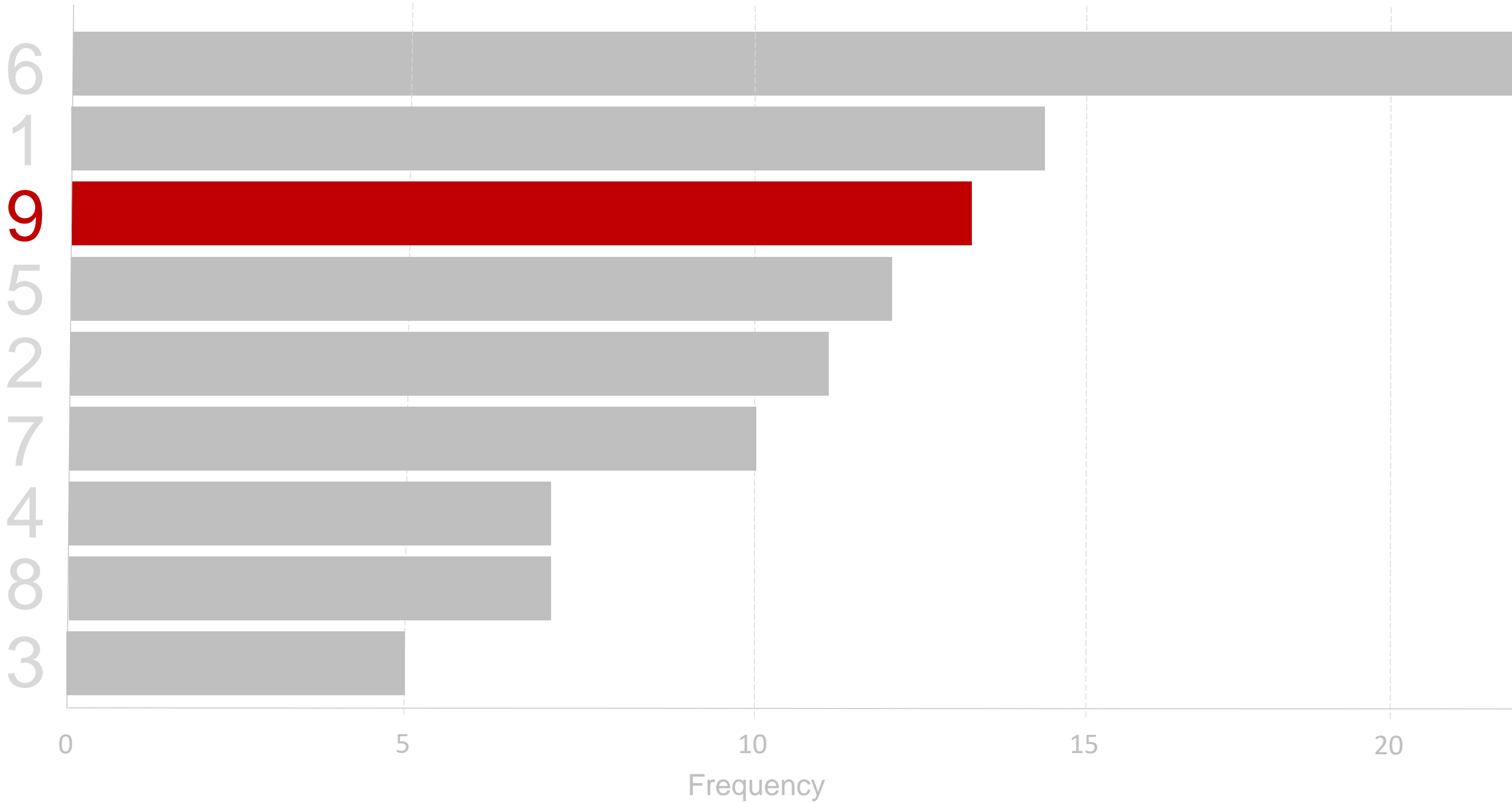
7 7 7 7 7 7 7 7 7 7 7

8 8 8 8 8 8 8 8

9 9 9 9 9 9 9 9 9 9 9 9 9 9







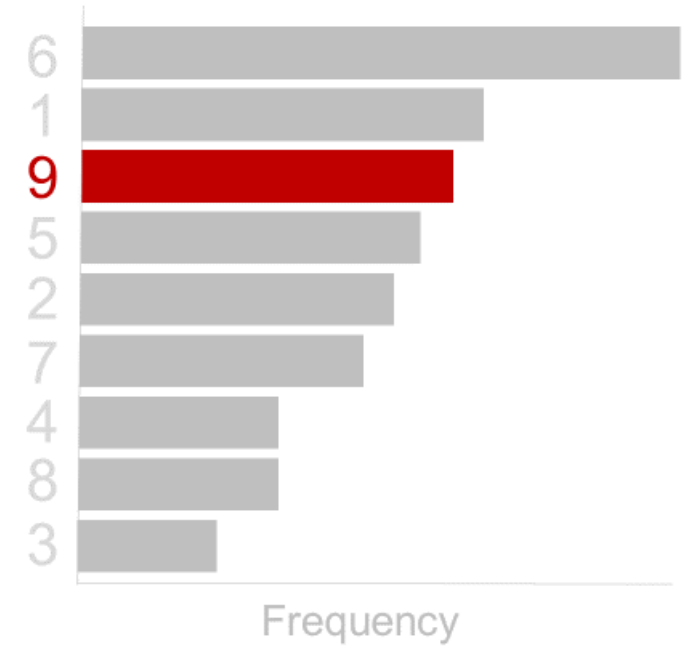
# Position

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

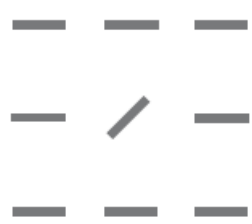
# Colour

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

# Length



# Preattentive Attributes



Orientation



Length



Width



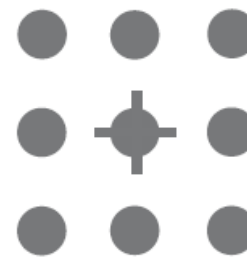
Size



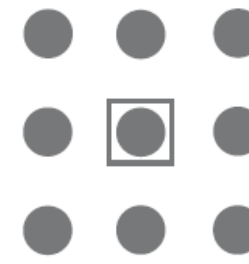
Shape



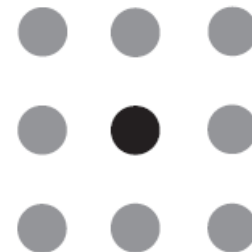
Curvature



Added Marks



Enclosure



Color Value



Color Hue

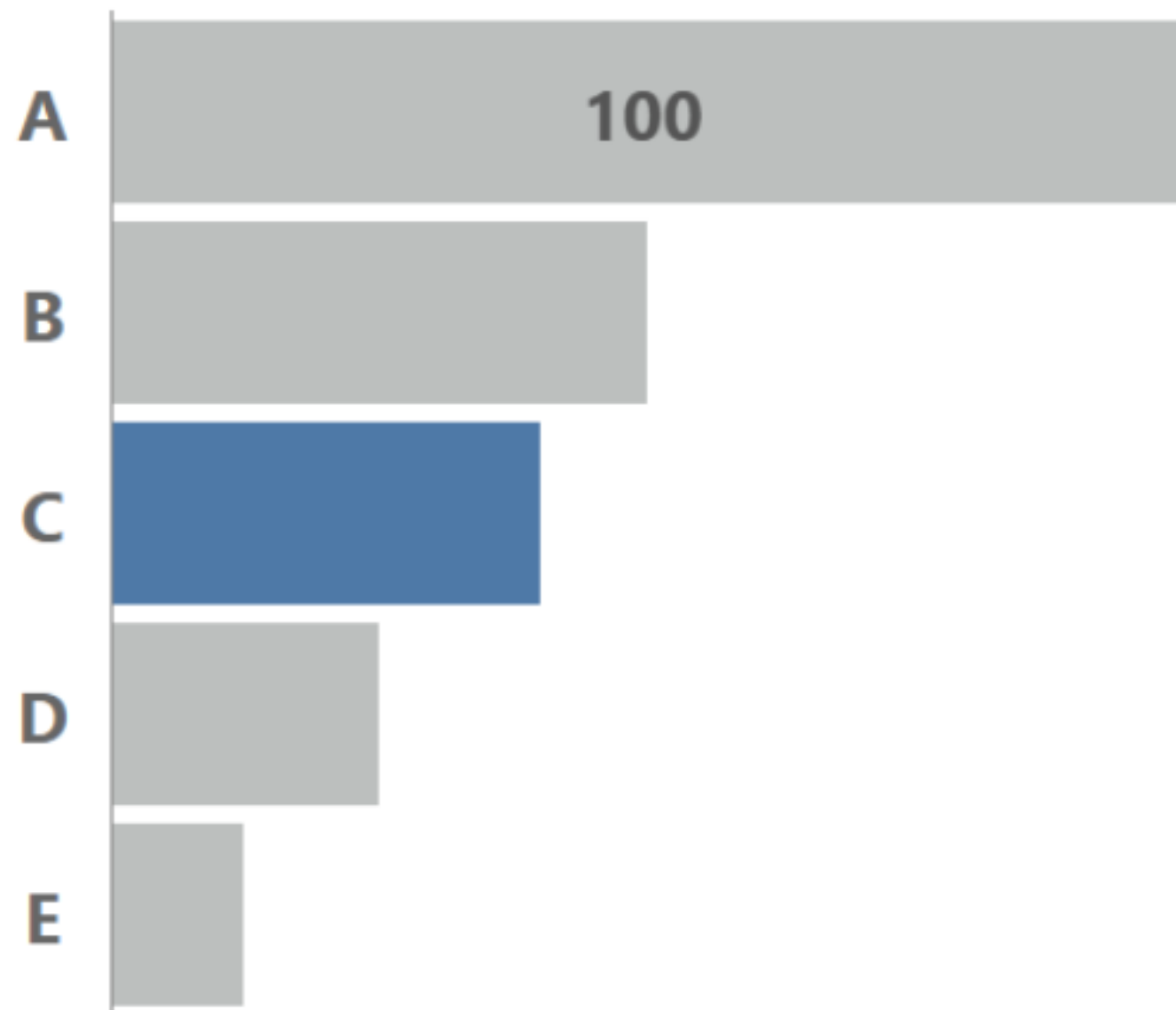


Position

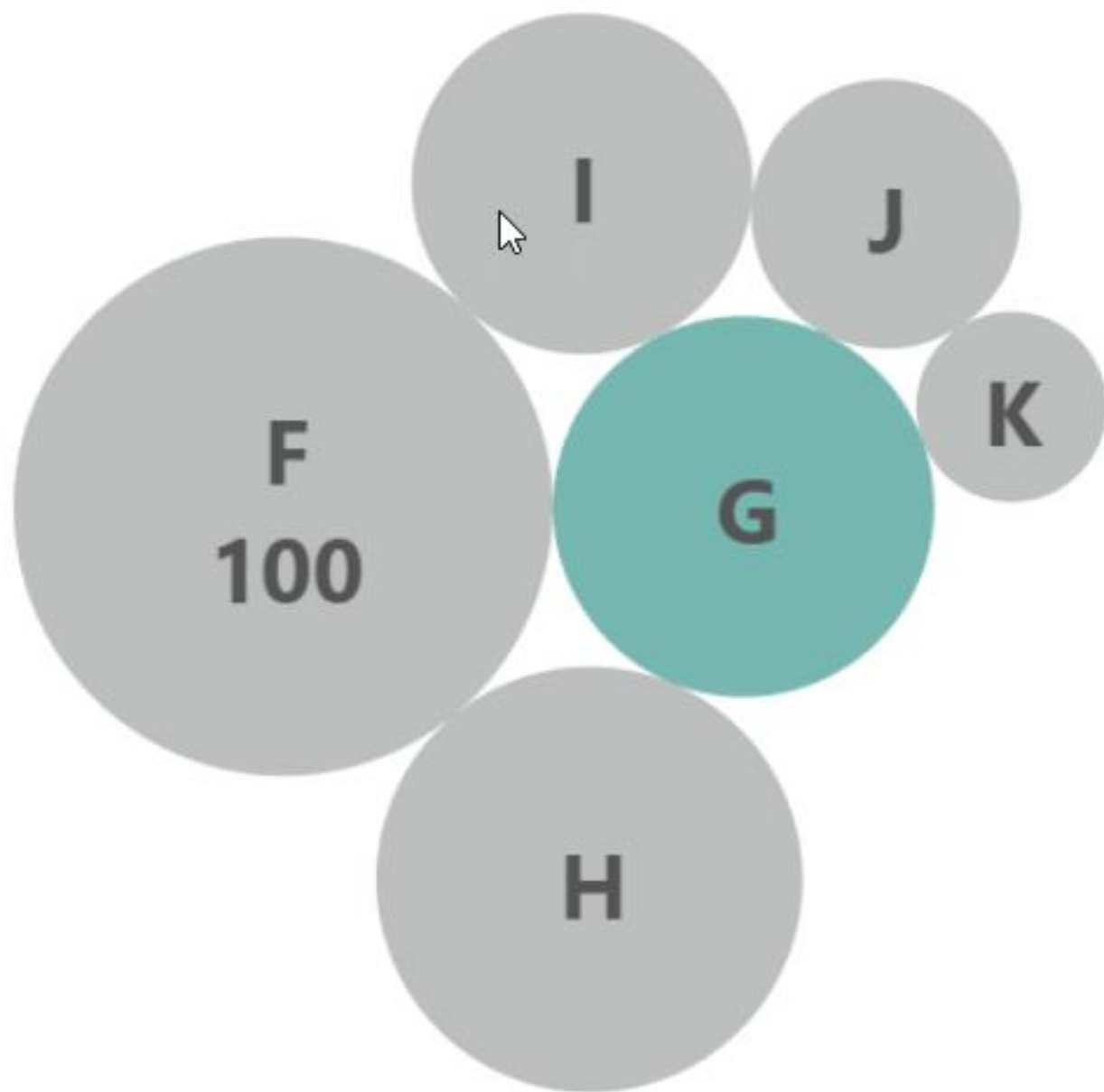


Spatial Grouping

If the length of A is 100, what is C?



If the area of F is 100, what is G?



**The results...**

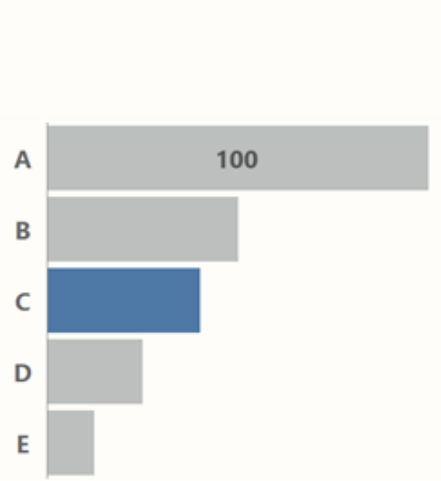
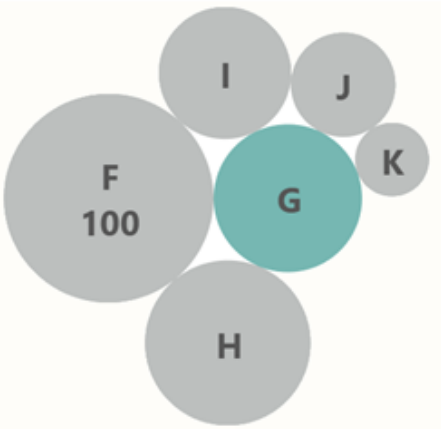
# Circles and Bars: The Results

Last 3 years

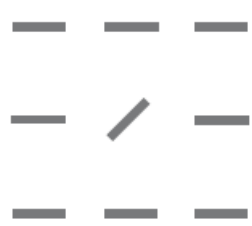
Responses: 3,427



Updated: 26/01/2021 16:33:43



# Preattentive Attributes



Orientation



Length



Width



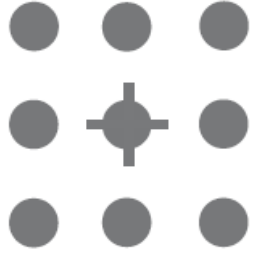
Size



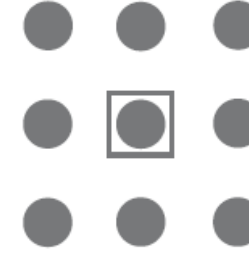
Shape



Curvature



Added Marks



Enclosure



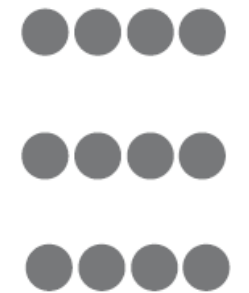
Color Value



Color Hue



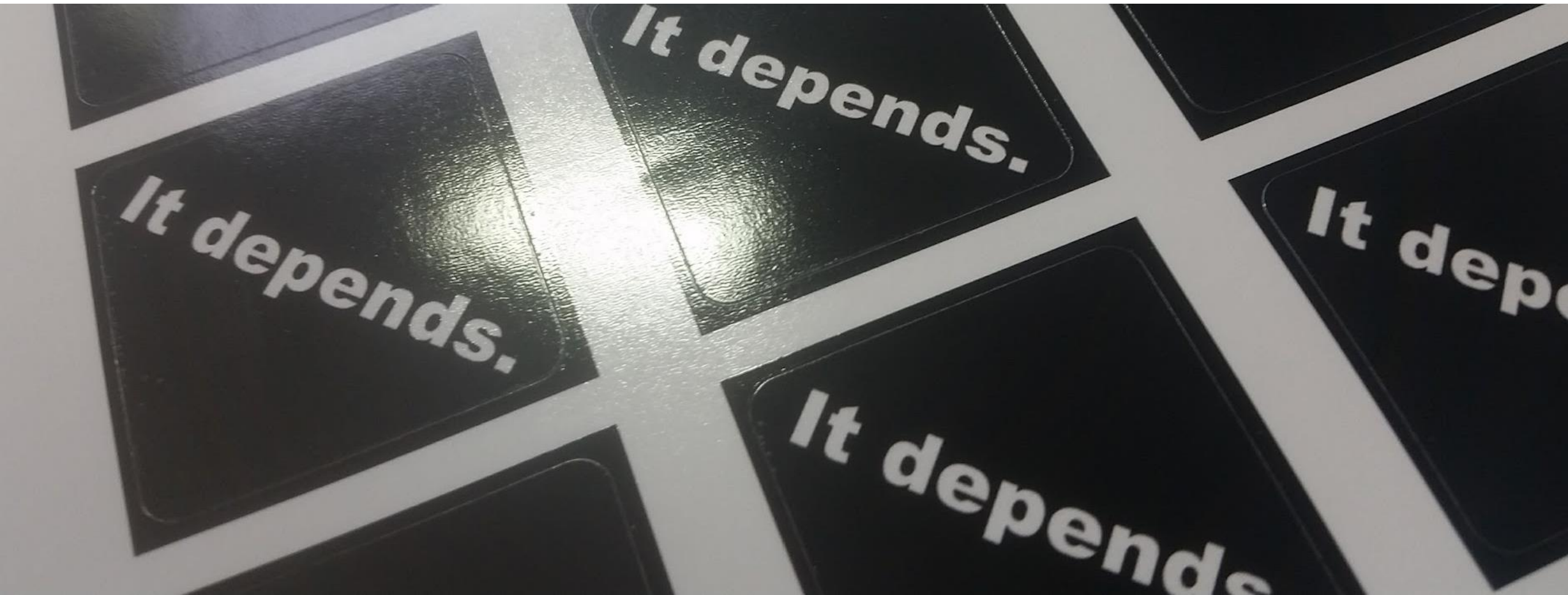
Position



Spatial Grouping



# Choosing the chart



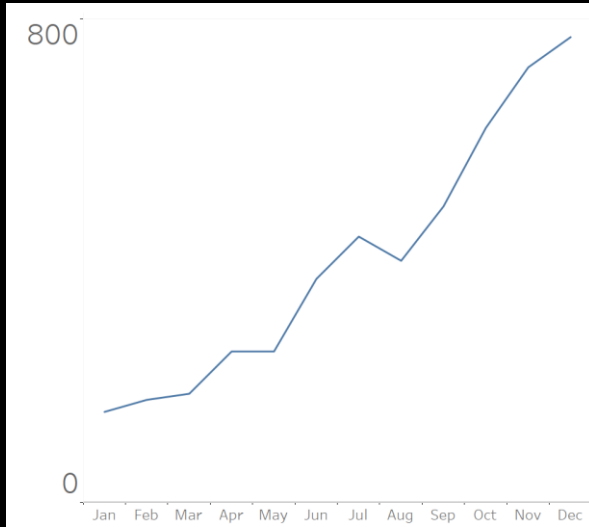
# What chart would you use to show this data?

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
A	90	100	130	150	100	190	220	240	220	240	330	340	2,350
B	60	70	50	100	150	180	220	160	270	380	390	430	2,460

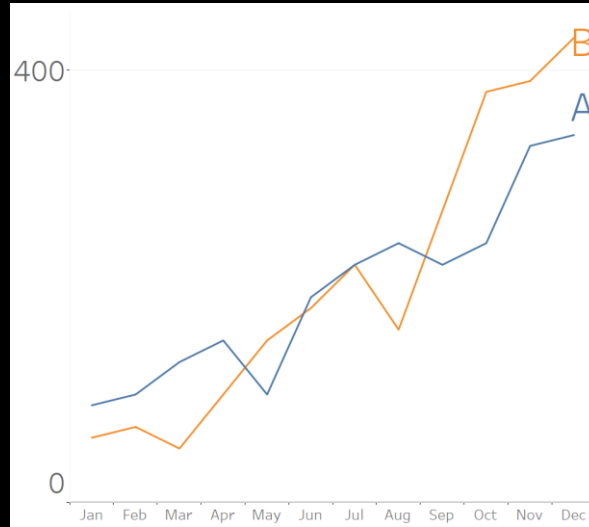
**What chart would you  
use to show this data?**

**It Depends**

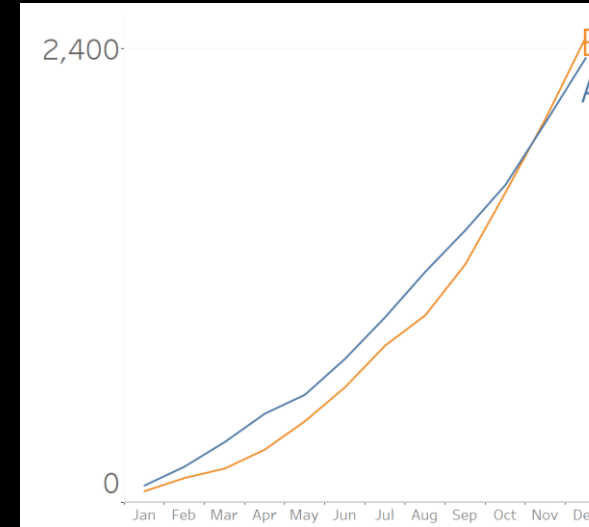
**Total sales thru this year?**



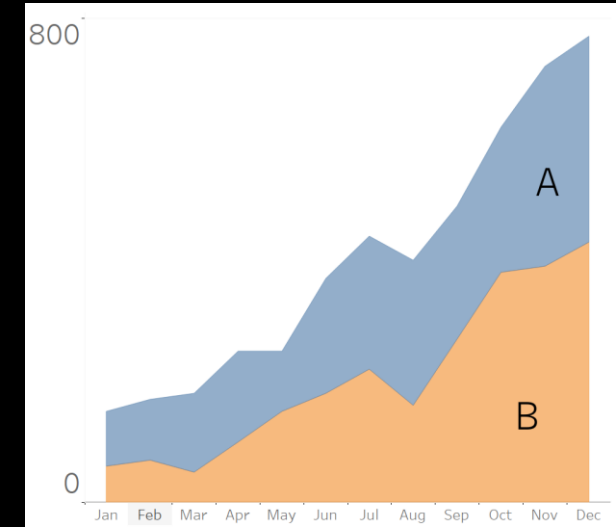
**Sales of A and B thru this year?**



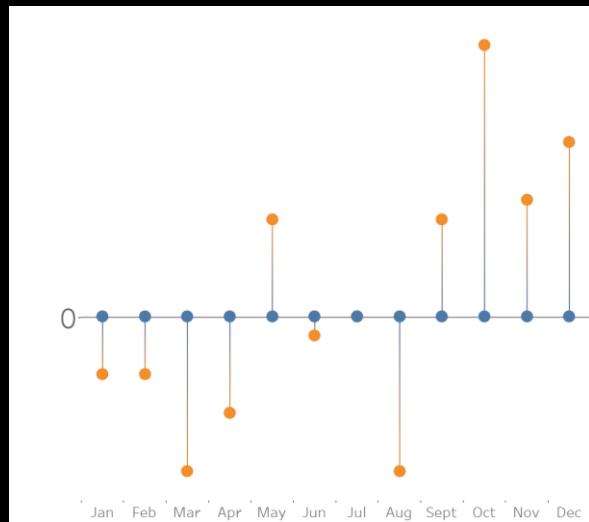
**Cumulative sales of A and B this year?**



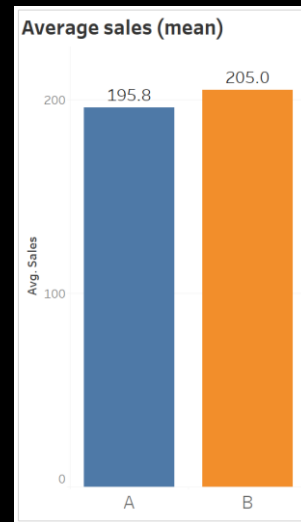
**Total sales, broken down by A and B?**



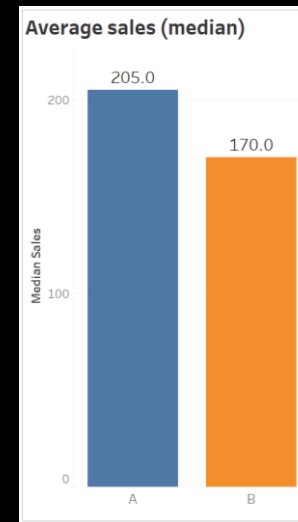
**Difference between A and B this year?**



**B did better than A! (Average sales)**



**A did better than B! (Average sales)**



**Which story do you want to tell?**

# Telling a story

**L E V E R S**

The background of the slide is a blue-tinted image of a control panel. It features several rows of buttons, some labeled 'START' and 'PFL'. There are also some physical switches or sliders visible. The overall aesthetic is technical and professional.

A blue-tinted background image of a control panel, likely from a vintage synthesizer or audio mixer. The panel features several rows of controls, including buttons labeled 'START', 'PFL', 'KONF', 'Fader Start Ein', and 'Effekt'. There are also sliders and knobs with numerical markings (0, 12, 18, 24, 30, 36, 48, 60). The overall aesthetic is technical and professional.

# LEVERES

**L**

**E**

**V**

**E**

**R**

**S**

L

Level of detail?

Granular

Sparse

E

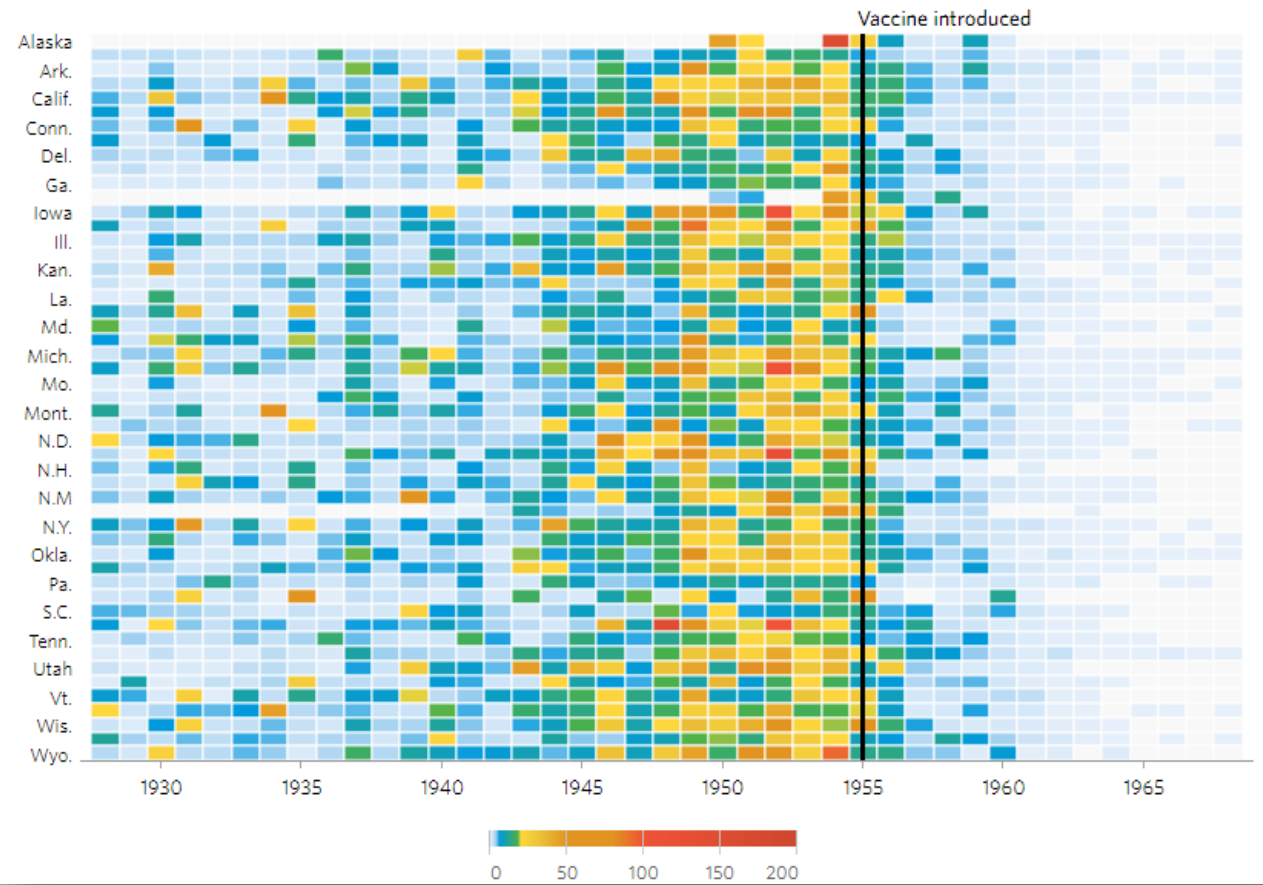
V

E

R

S

### Polio





L

Level of detail?

Granular

Sparse

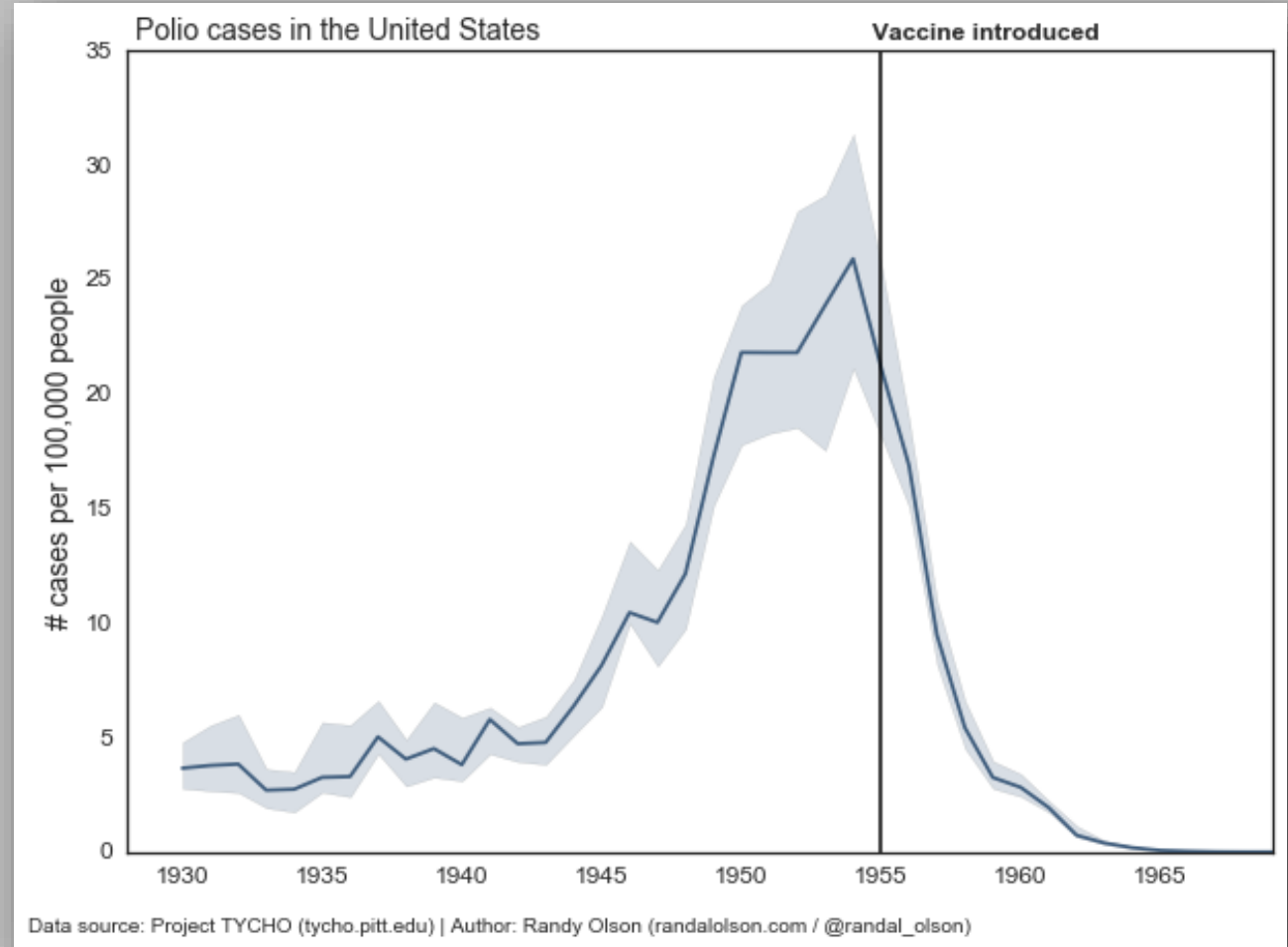
E

V

E

R

S



L

Level of detail?

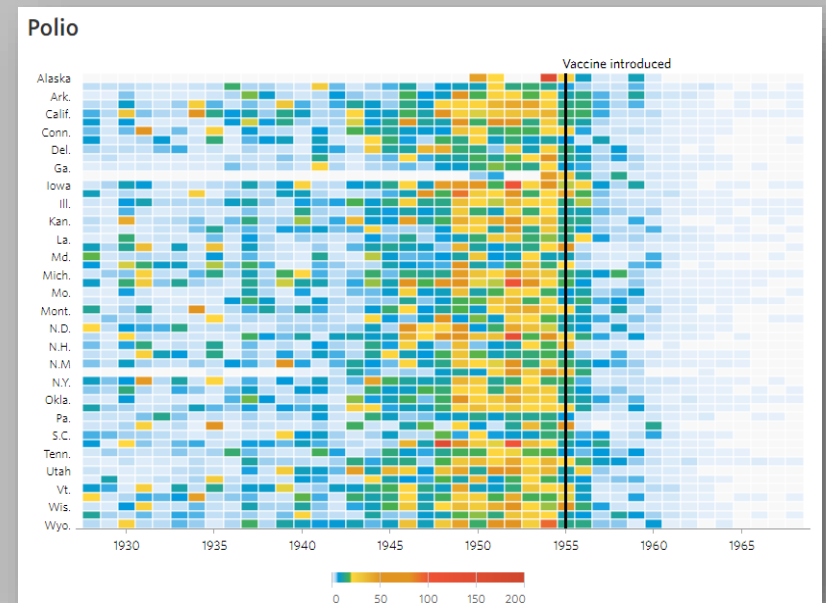
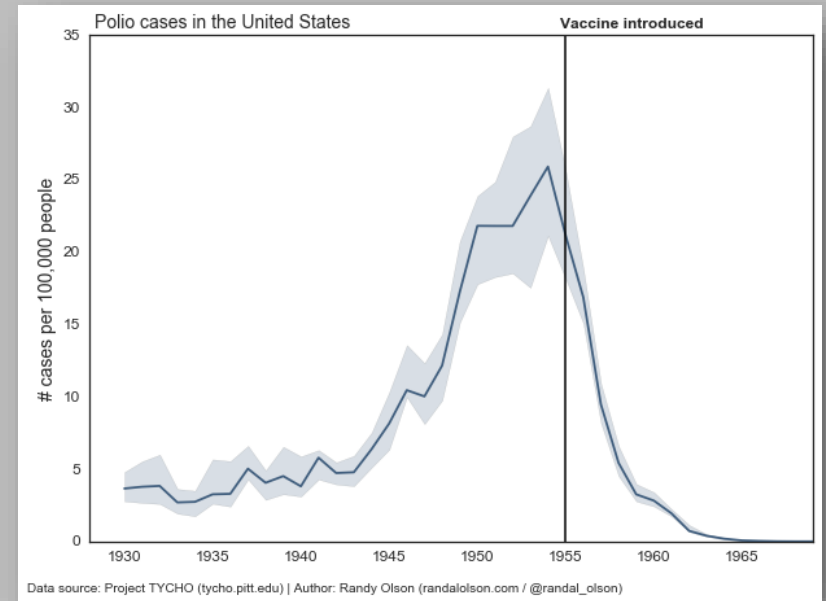
E

V

E

R

S



**L**

Level of detail?

**E**

Emotional?

**V**

**E**

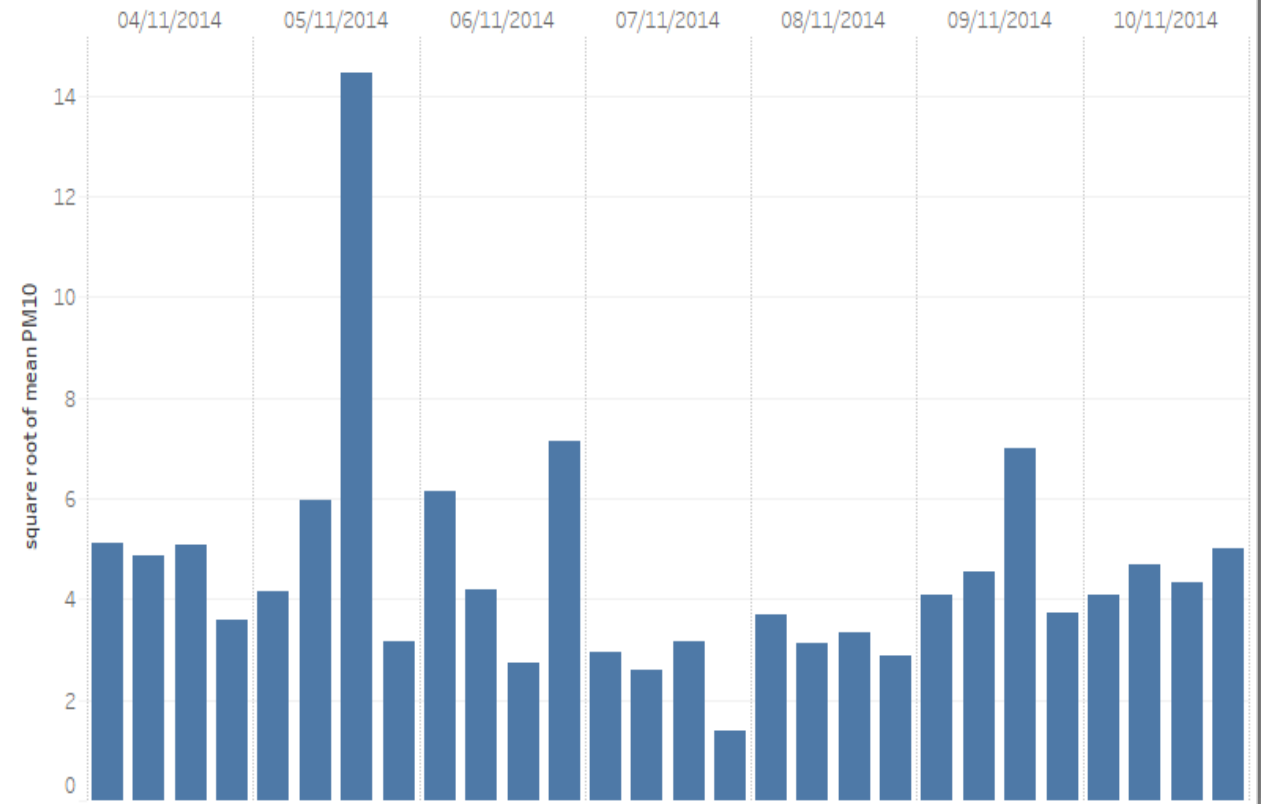
**R**

**S**

Dry

Emotive

Air Quality in Sheffield, 4-10 Nov 2014



L

Level of detail?

Dry

Emotive

E

Emotional?

V

E

R

S



Why would you do this?

L

Level of detail?

E

Emotional?

V

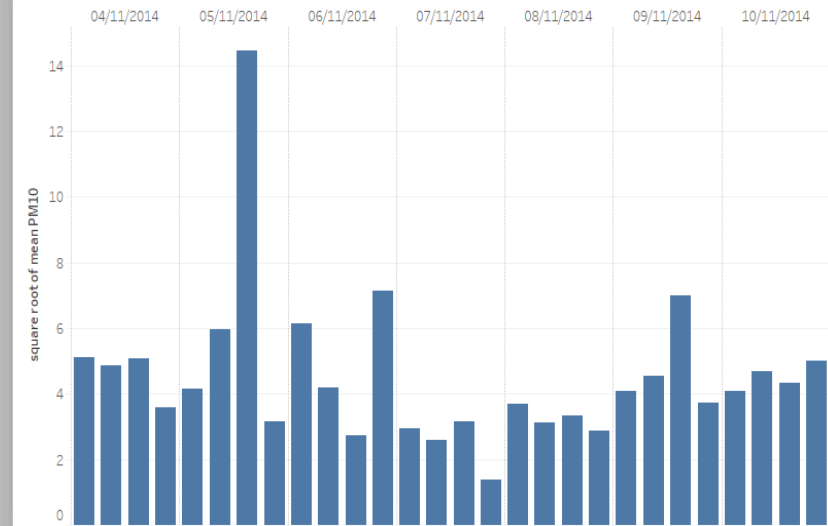
E

R

S



Air Quality in Sheffield, 4-10 Nov 2014



L

Level of detail?

E

Emotional?

V

Vagueness?

E

R

S

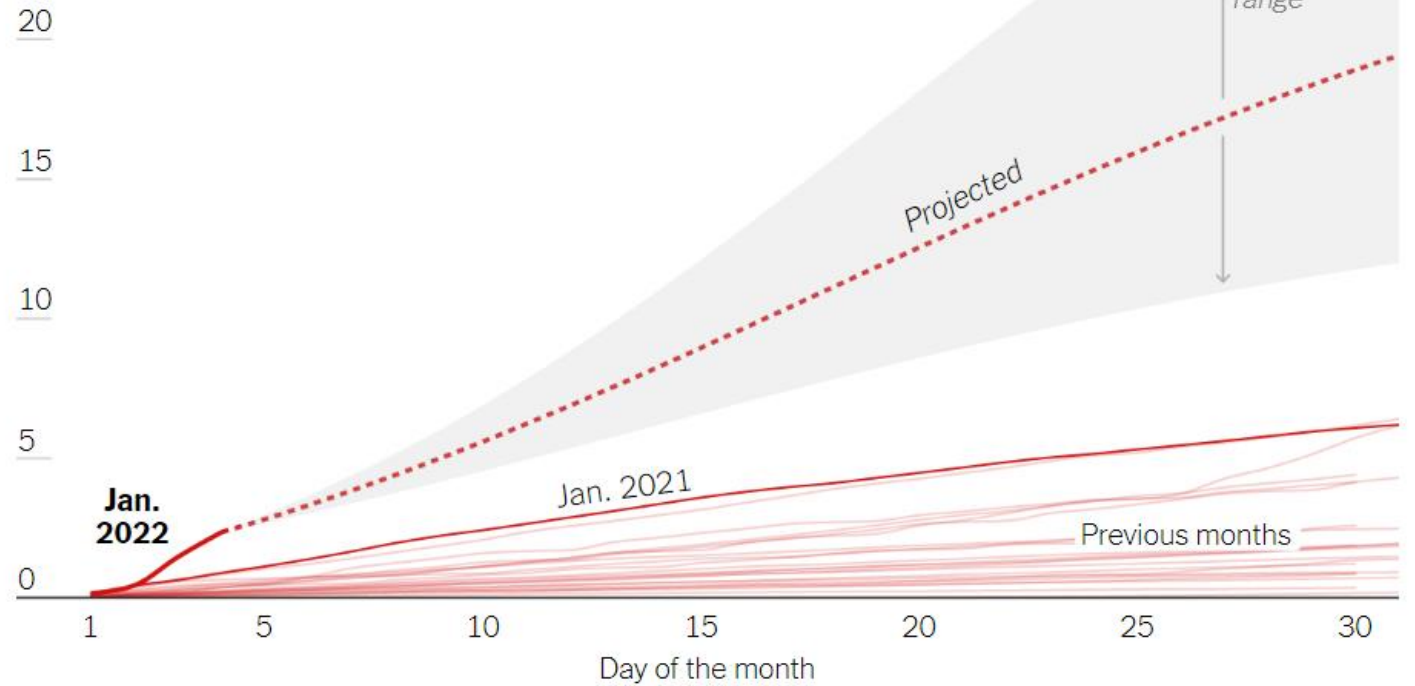
Precise

Ambiguous

### This month will likely see a record number of cases

Total new Covid-19 cases by month, United States

25 million total cases



L

Level of detail?

E

Emotional?

V

Vagueness?

E

R

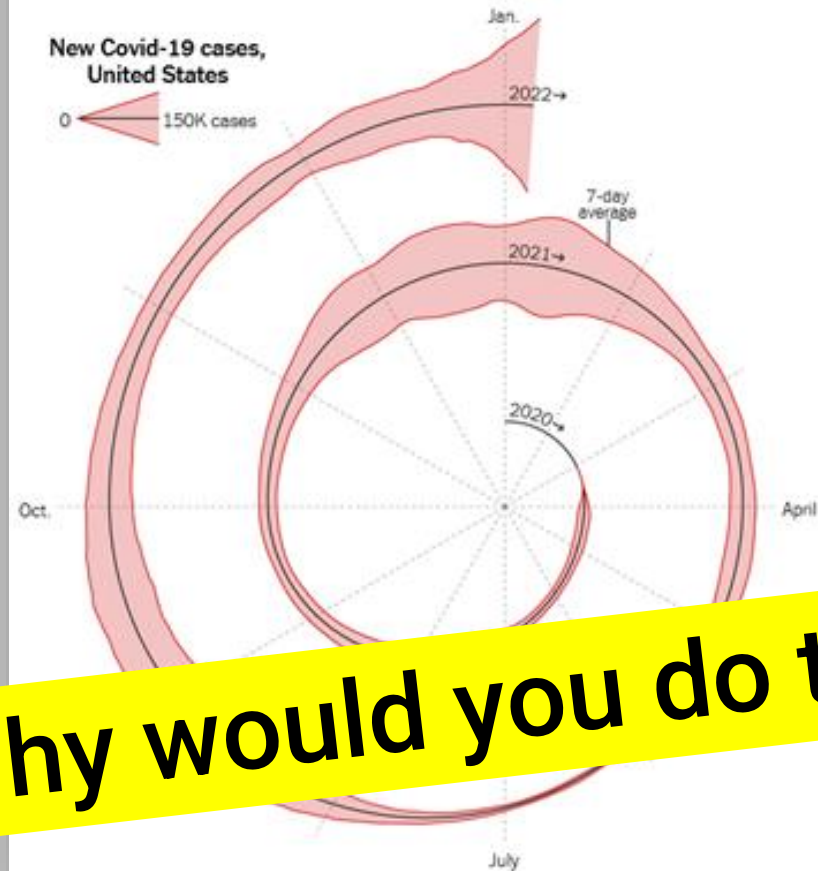
S

Precise

Ambiguous

## Here's When We Expect Omicron to Peak

Jan. 6, 2022



Why would you do this?

L

Level of detail?

E

Emotional?

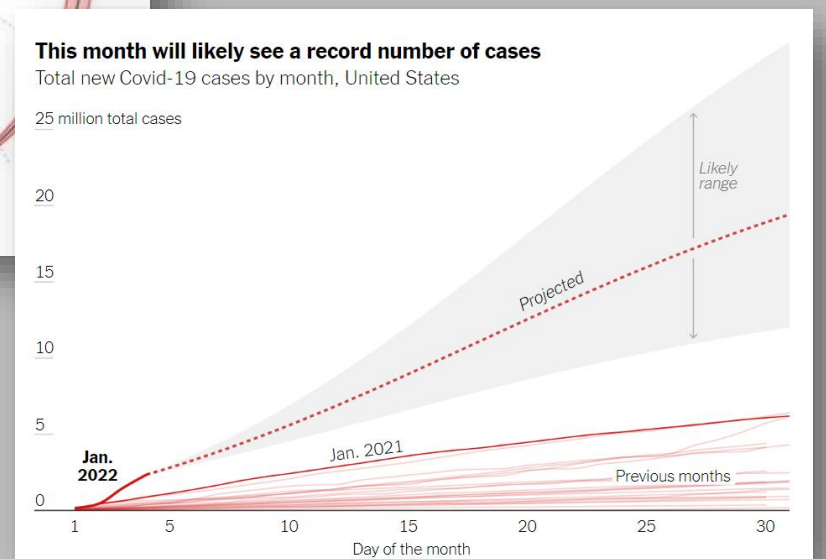
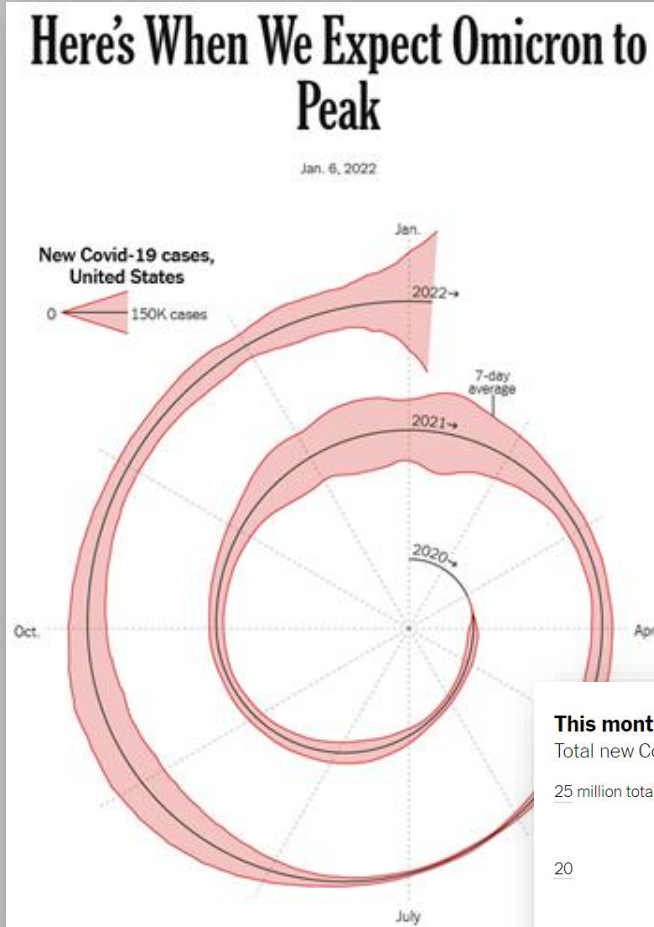
V

Vagueness?

E

R

S





**L**

Level of detail?

**E**

Emotional?

**V**

Vagueness?

**E**

Exploratory?

**R**

**S**

Explore

Explain



L

Level of detail?

E

Emotional?

V

Vagueness?

E

Exploratory?

R

S

Explore

Explain

### Agency Utilization Rollup

\$3.8M  
Fees

\$3.4M  
Potential

\$1.3M  
New Biz + Opportunity

\$2.6M  
Internal Projects

+12.2  
FTE Overstaffed

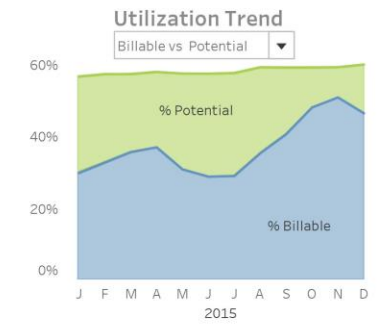


	Target vs Billable vs Non-Billable %	Non-Billable vs Billable Hours	Cost   Fees   Potential
Creative	99% 53% / 46%	5,749 / 6,743	\$1,083K
Account Management	105% 47% / 58%	10,670 / 8,620	\$1,159K   \$795K
Project Management	104% 35% / 69%	8,396 / 4,274	\$698K   \$808K
Technology	102% 28% / 74%	14,454 / 5,468	\$883K   \$1,762K
Operations	4%	10 / 33	
Executive/Admin	57% 57%	2,179 / 16	
New Biz	106% 106% / 100%	2,350 / 1	

Show Potential at 100% of Target

	New Biz + Opp	Internal Projects	Internal Admin
Creative	1,456 hrs   12% Cost \$533K	1,301 hrs   10%	2,992 hrs   24%
Account Management	4,524 hrs   25%	1,579 hrs   9%	4,567 hrs   25%
Project Management	1,455 hrs   12%	2,283 hrs   19%	4,659 hrs   38%
Technology	361 hrs   2%	9,608 hrs   49%	4,485 hrs   23%
Operations	6 hrs   0%	0 hrs   0%	5 hrs   0%
Executive/Admin	0 hrs   0%	4 hrs   0%	2,176 hrs   56%
New Biz	1,764 hrs   80%	40 hrs   2%	546 hrs   25%

Cost \$533K      Cost \$755K      Cost \$1,163K



L

Level of detail?

E

Emotional?

V

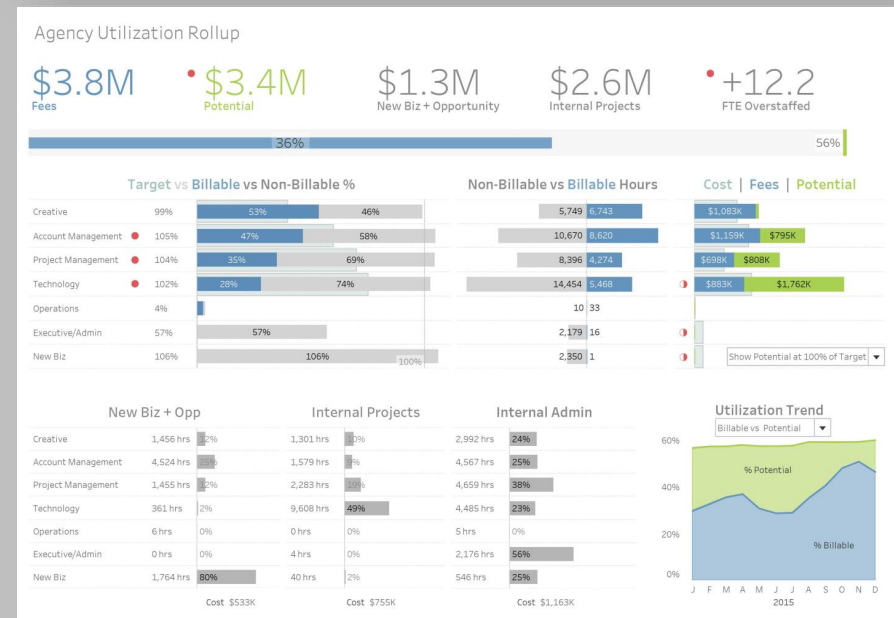
Vagueness?

E

Exploratory?

R

S



**L**

Level of detail?

Slow

Fast

**E**

Emotional?

**V**

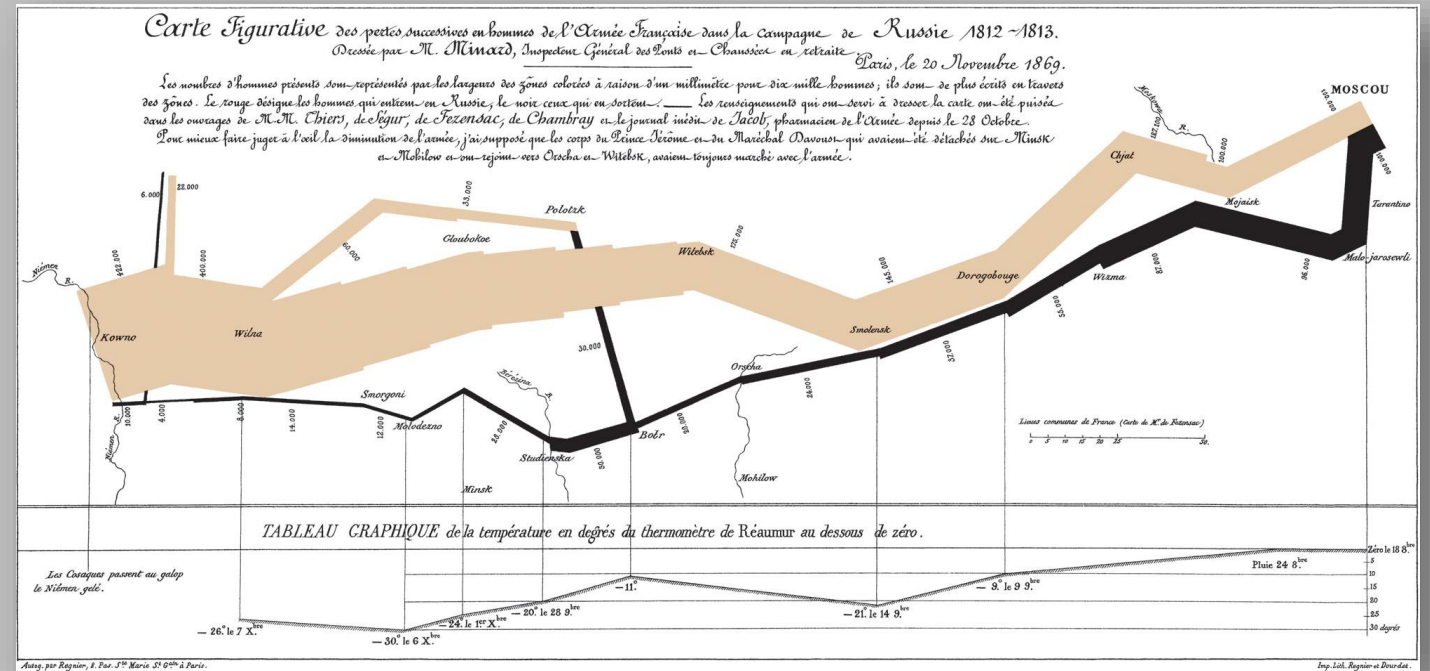
Vagueness?

**E**

Exploratory?

**R**

Rapidity?

**S**

Have you seen this chart before?

# Carte Figurative des pertes successives en hommes de l'Armée Française dans la campagne de Russie 1812-1813.

Dressée par M. Minard, Inspecteur Général des Ponts et Chaussées en retraite Paris, le 20 Novembre 1869.

Les nombres d'hommes présents sont représentés par les largeurs des zones colorées à raison d'un millimètre pour dix mille hommes; ils sont de plus écrits en travers des zones. Le rouge désigne les hommes qui entrent en Russie, le noir ceux qui en sortent. — Les renseignements qui ont servi à dresser la carte ont été puisés dans les ouvrages de M. M. Chiers, de Légué, de Fezensac, de Chambray et le journal inédit de Jacob, pharmacien de l'Armée depuis le 28 Octobre.

Pour mieux faire juger à l'œil la diminution de l'armée, j'ai supposé que les corps du Prince Jérôme et du Maréchal Davout qui avaient été détachés sur Minsk et Mohilow et ont rejoint vers Orscha et Witebsk, avaient toujours marché avec l'armée.

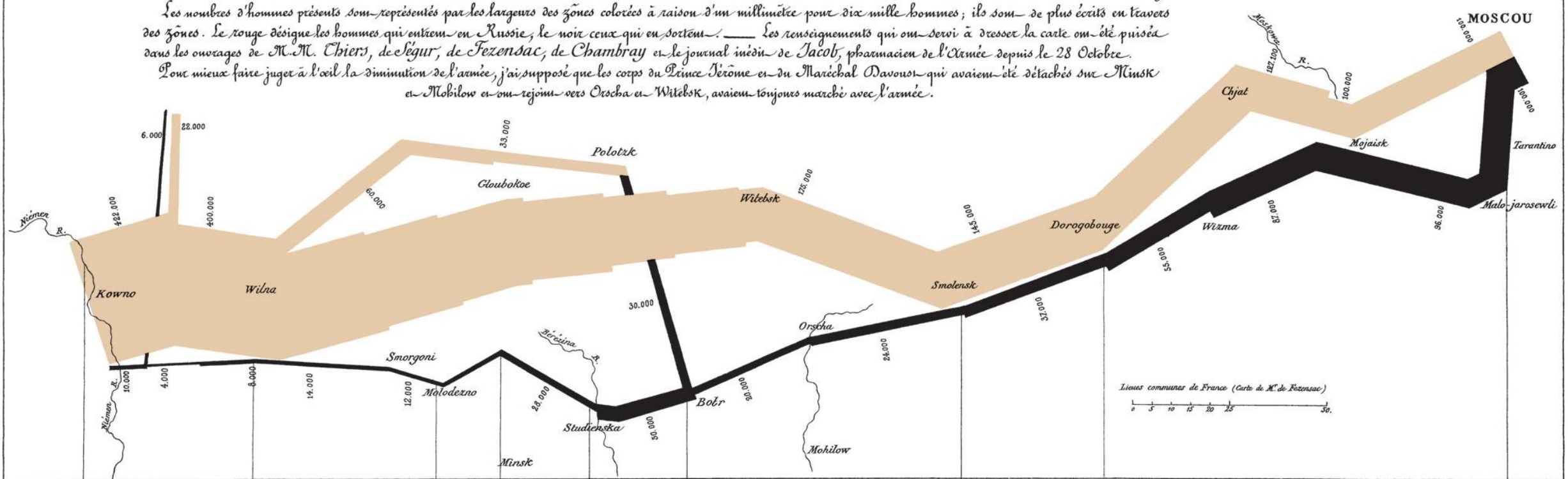
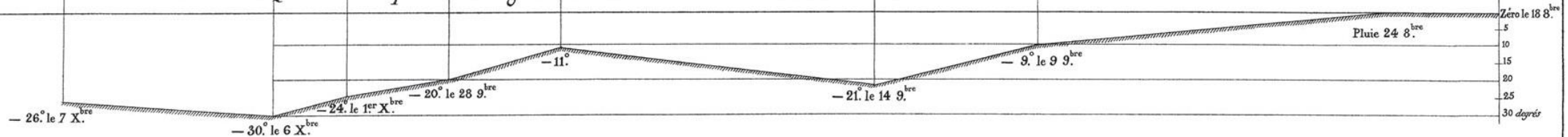


TABLEAU GRAPHIQUE de la température en degrés du thermomètre de Réaumur au dessous de zéro.



Les Cosaques passent au galop le Niémen gelé.



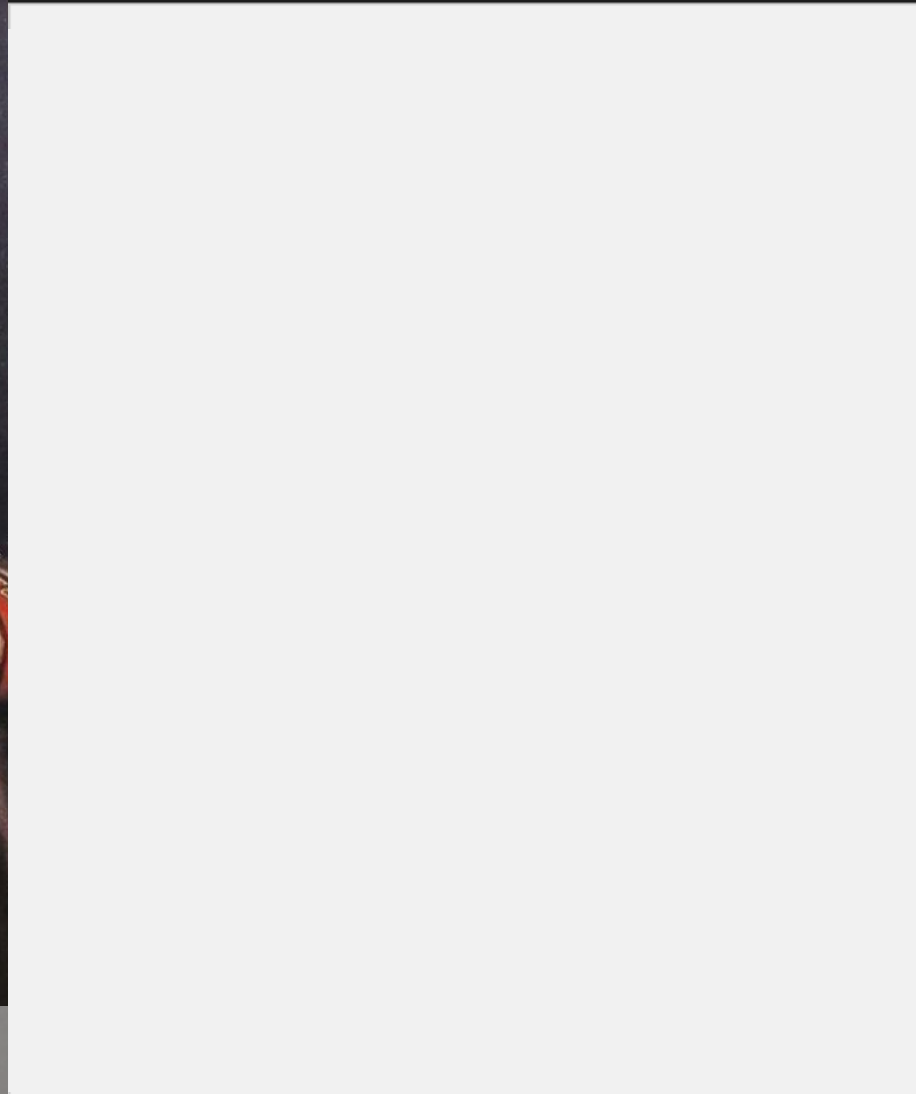
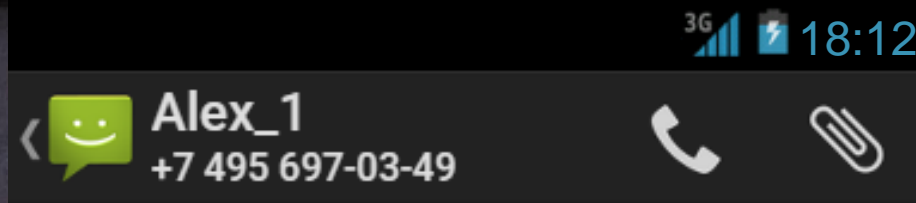
**Field Marshal  
Mikhail Kutuzov**



**Emperor  
Alexander I**



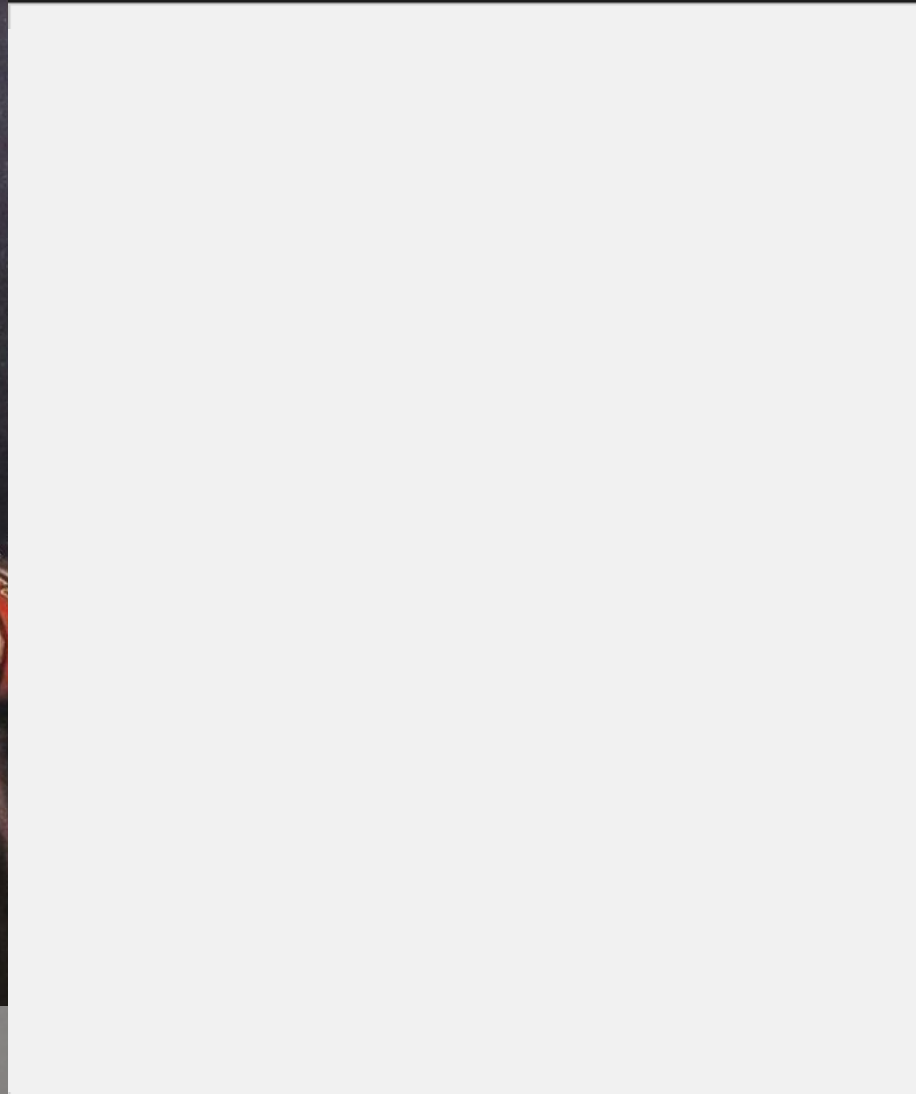
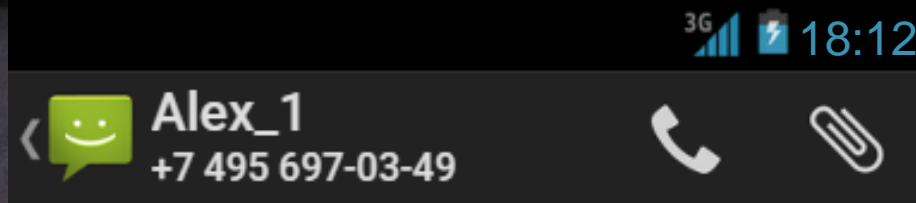
Field Marshal  
Mikhail Kutuzov



Emperor  
Alexander I



Field Marshal  
Mikhail Kutuzov



Emperor  
Alexander I



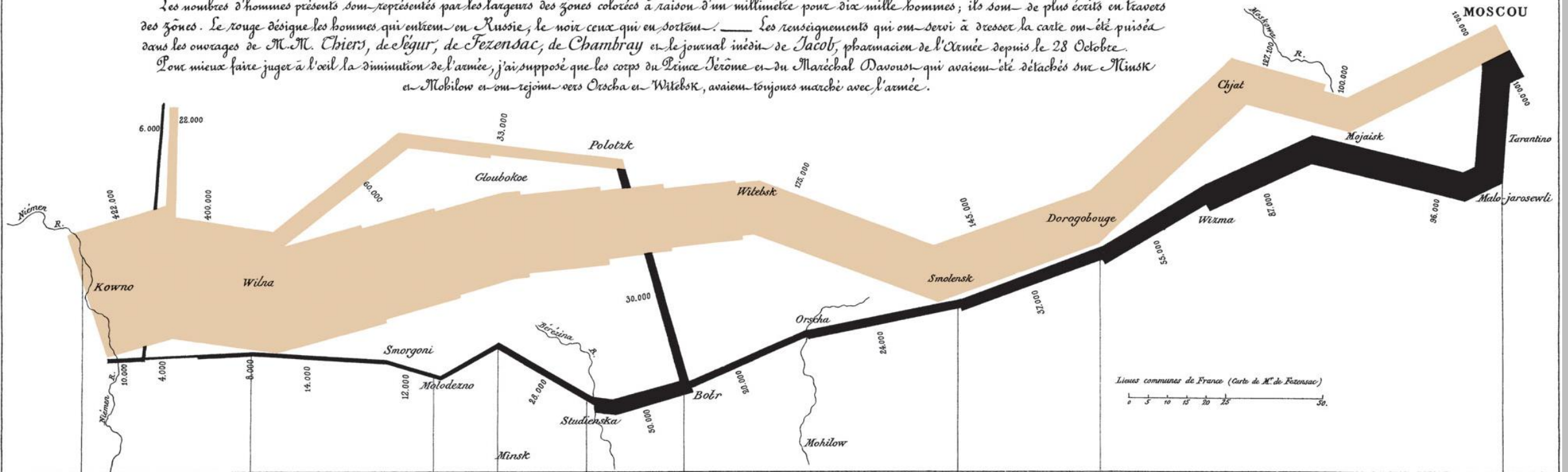
# What is the key point I need to make?

## Carte Figurative des pertes successives en hommes de l'Armée Française dans la campagne de Russie 1812-1813.

Dressée par M. Minard, Inspecteur Général des Ponts et Chaussées en retraite. Paris, le 20 Novembre 1869.

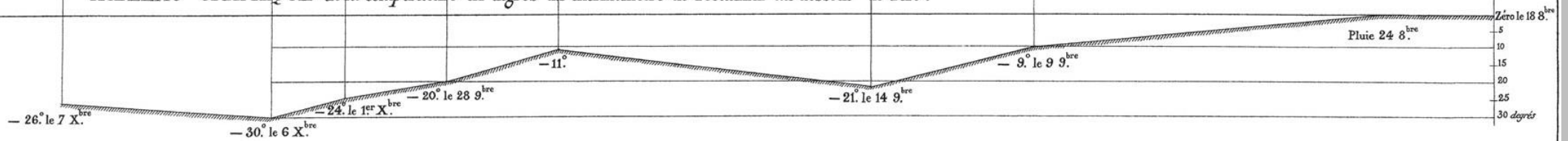
Les nombres d'hommes présents sont représentés par les largeurs des zones colorées à raison d'un millimètre pour dix mille hommes; ils sont de plus écrits en travers des zones. Le rouge désigne les hommes qui ont été en Russie; le noir ceux qui en sont sortis. — Les renseignements qui ont servi à dresser la carte ont été puisés dans les ouvrages de M. M. Chiers, de Léger, de Fezensac, de Chambray et le journal inédit de Jacob, pharmacien de l'Armée depuis le 28 Octobre.

Pour mieux faire juger à l'œil la diminution de l'armée, j'ai supposé que les corps du Prince Jérôme et du Maréchal Davoust qui avaient été détachés sur Minsk et Mohilow et ont rejoint vers Orscha et Witebsk, avaient toujours marché avec l'armée.

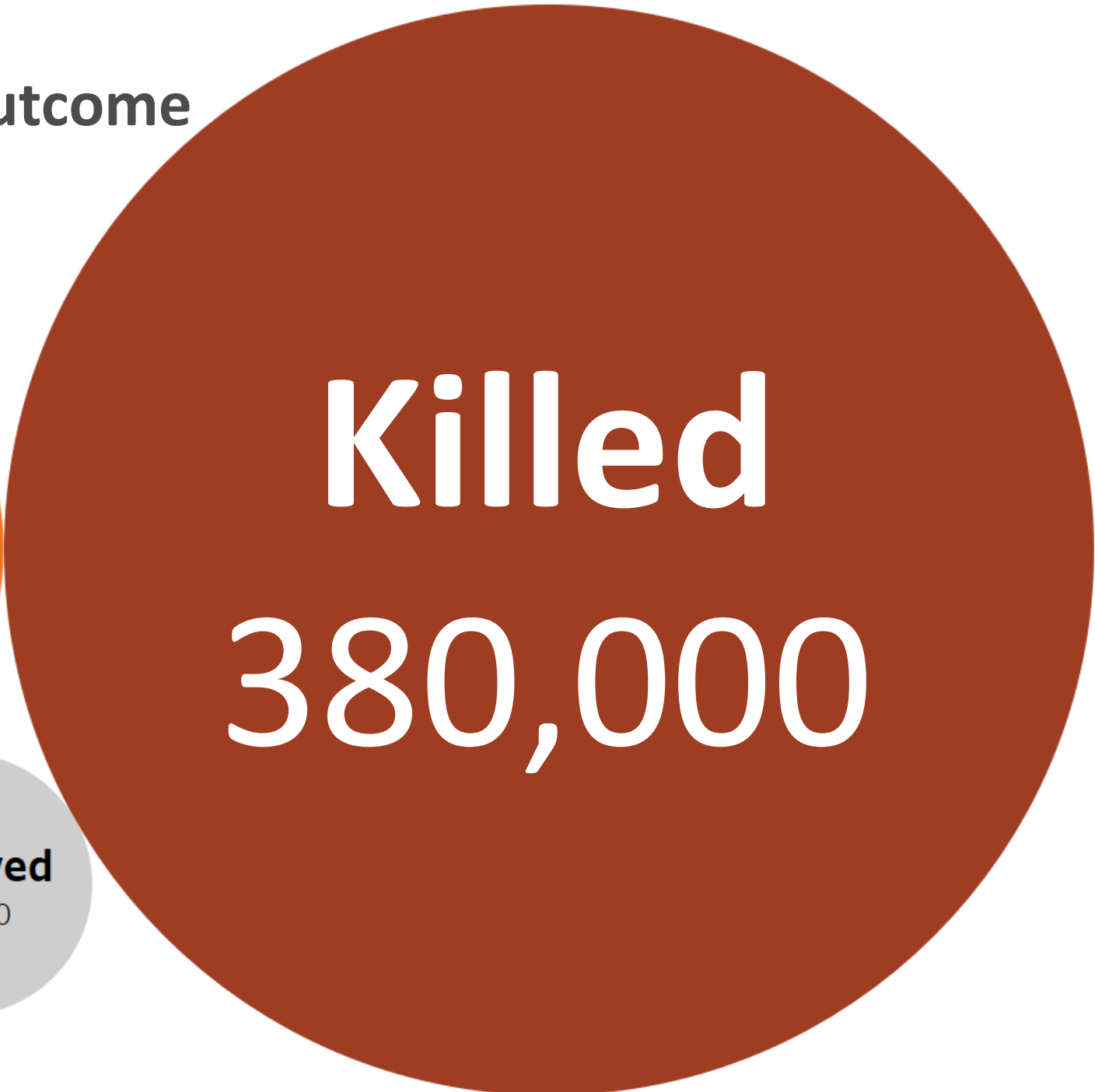


## TABLEAU GRAPHIQUE de la température en degrés du thermomètre de Réaumur au dessous de zéro.

Les Cosaques passent au galop le Niémen gelé.



# 1812: Campaign outcome



L

Level of detail?

E

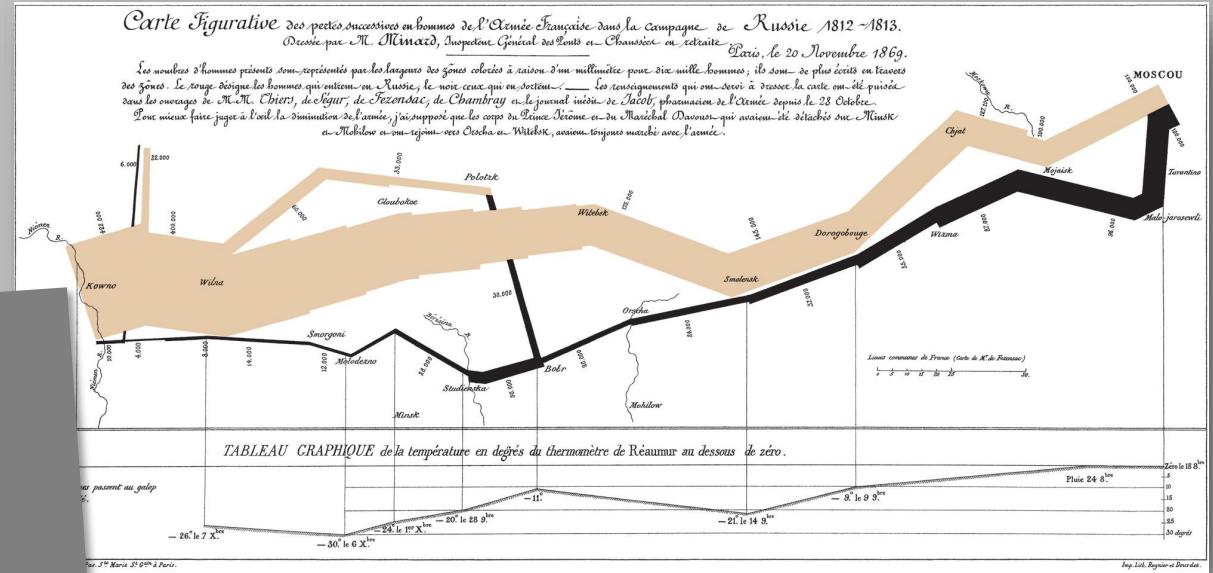
Emotional?

A chart should be understandable in less than half the time it is to be viewed.

R

Rapidity?

S



1812: Campaign outcome

Captured  
100,000

Killed  
380,000

Survived  
22,000

Data Source: Wikipedia

**L**

Level of detail?

**E**

Emotional?

**V**

Vagueness?

**E**

Exploratory?

**R**

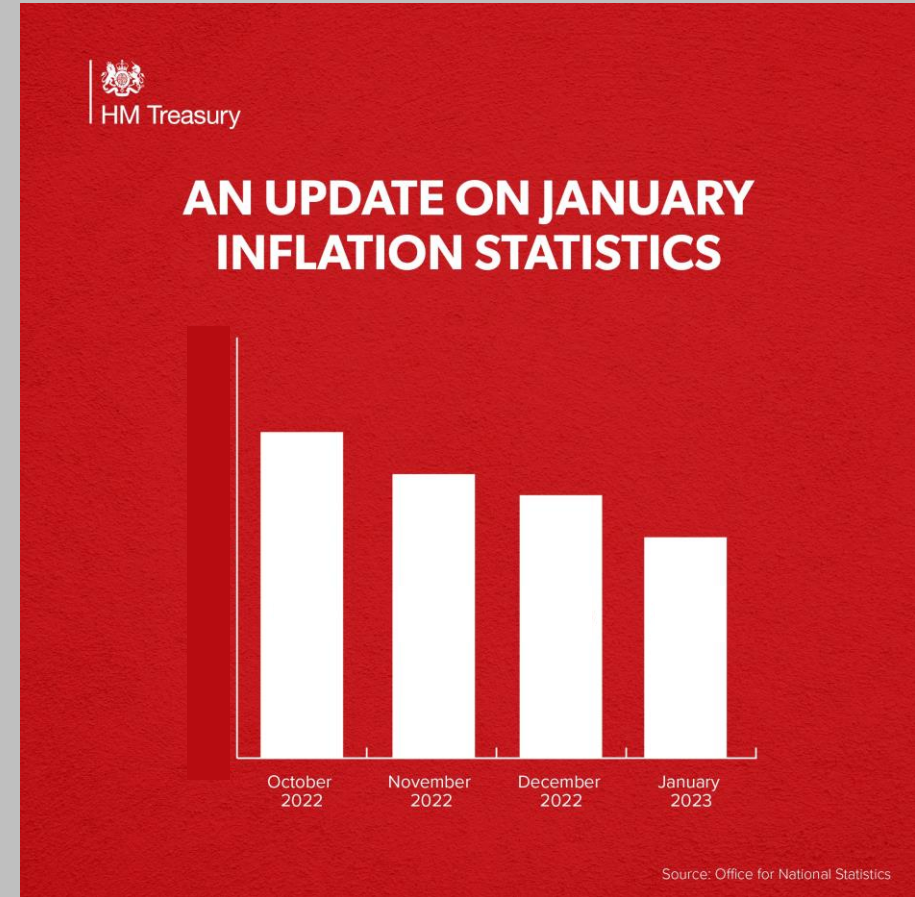
Rapidity?

**S**

Sneakiness?

Honest

Dishonest



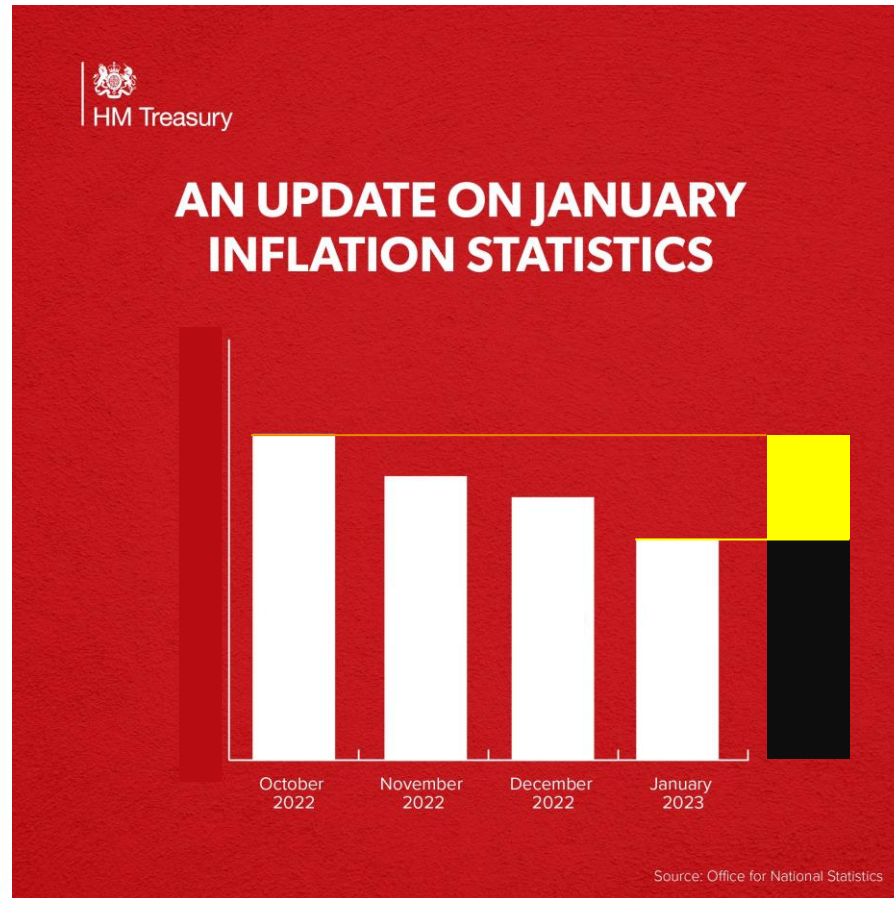


HM Treasury  
@hmtreasury

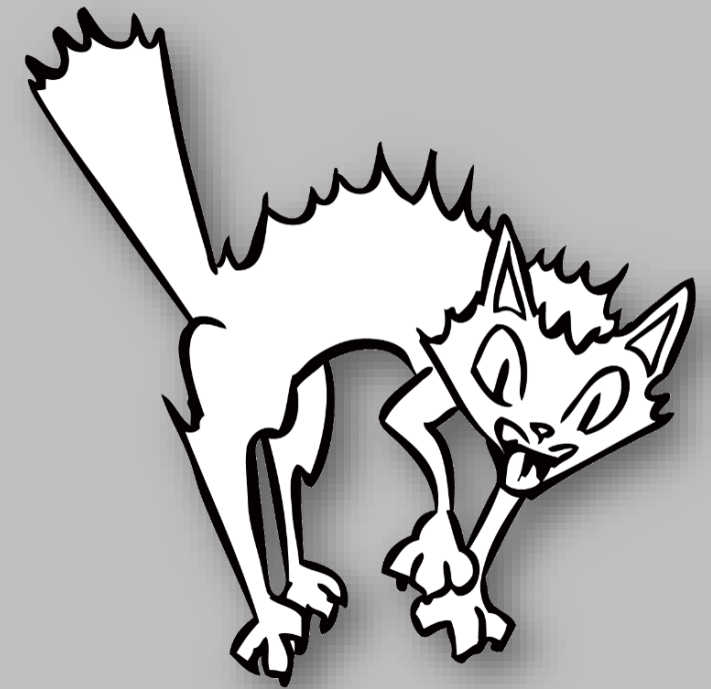


"High inflation strangles growth & causes pain for families & businesses - that's why we must stick to the plan to halve inflation this year, reduce debt & grow the economy."

Chancellor [@Jeremy\\_Hunt](#) responds to statistics from the [@ONS](#) which show a fall in inflation.

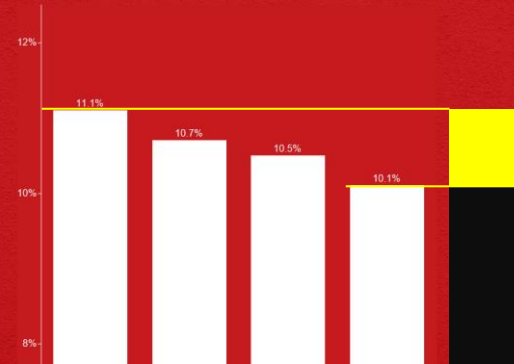


11:58 AM · Feb 15, 2023 · 142.1K Views



How much  
has inflation  
reduced?

## AN UPDATE ON JANUARY INFLATION STATISTICS



Ed Humpherson to David Pares: Treasury Inflation Infographic

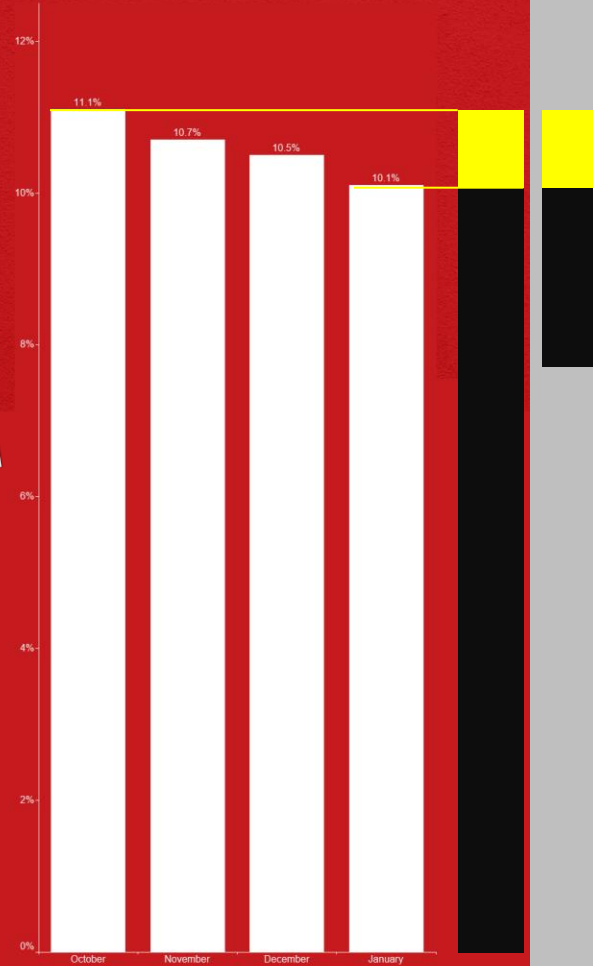
## Ed Humpherson to David Pares: Treasury Inflation Infographic

Dear David,

### HM Treasury Chart on inflation

I am writing to you about a [graph](#) posted on the @HMTreasury Twitter timeline on 15 February that shows the annual inflation rates according to the Consumer Prices Index (CPI) from October 2022 to January 2023. This was an update to a similar [graph](#) posted on 19 January:

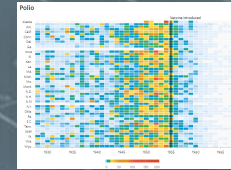
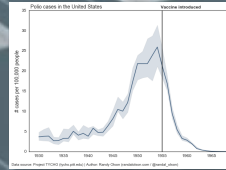
## AN UPDATE ON JANUARY INFLATION STATISTICS



How much  
has inflation  
reduced?

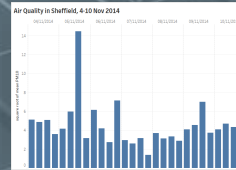
**L**

Level of detail?



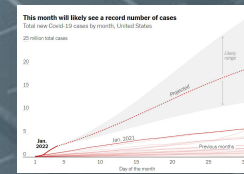
**E**

Emotional?



**V**

Vagueness?



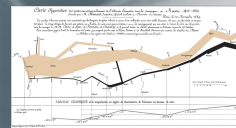
**E**

Exploratory?



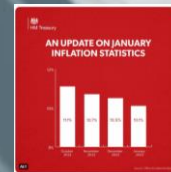
**R**

Rapidity?



**S**

Sneakiness?



**It is ok to push and pull each lever in any direction (except Sneakiness: don't be sneaky!).**

**You need to be intentional about how you are using them.**



# Bring it together



Iraq conflict deaths

	2003	2004	2005	2006	2007	2008	2009	2010	2011
<b>January</b>		551	1,215	1,517	2,702	847	359	247	353
<b>February</b>		600	1,254	1,498	2,520	1,032	365	282	222
<b>March</b>	3,981	939	725	1,775	2,571	1,500	415	293	286
<b>April</b>	1,612	1,190	925	1,670	2,411	1,201	525	372	277
<b>May</b>	469	538	1,167	2,108	2,675	818	398	370	330
<b>June</b>	564	792	1,160	2,416	2,024	682	542	349	348
<b>July</b>	573	723	1,435	3,077	2,561	583	400	445	271
<b>August</b>	717	750	2,159	2,664	2,330	616	587	466	376
<b>September</b>	511	901	1,306	2,317	1,310	579	315	238	375
<b>October</b>	466	914	1,161	2,738	1,195	532	418	289	346
<b>November</b>	417	1,446	1,316	2,940	1,025	495	191	267	249
<b>December</b>	473	996	1,002	2,786	944	550	445	206	
<b>Grand Total</b>	9,783	10,340	14,825	27,506	24,268	9,435	4,960	3,824	3,433

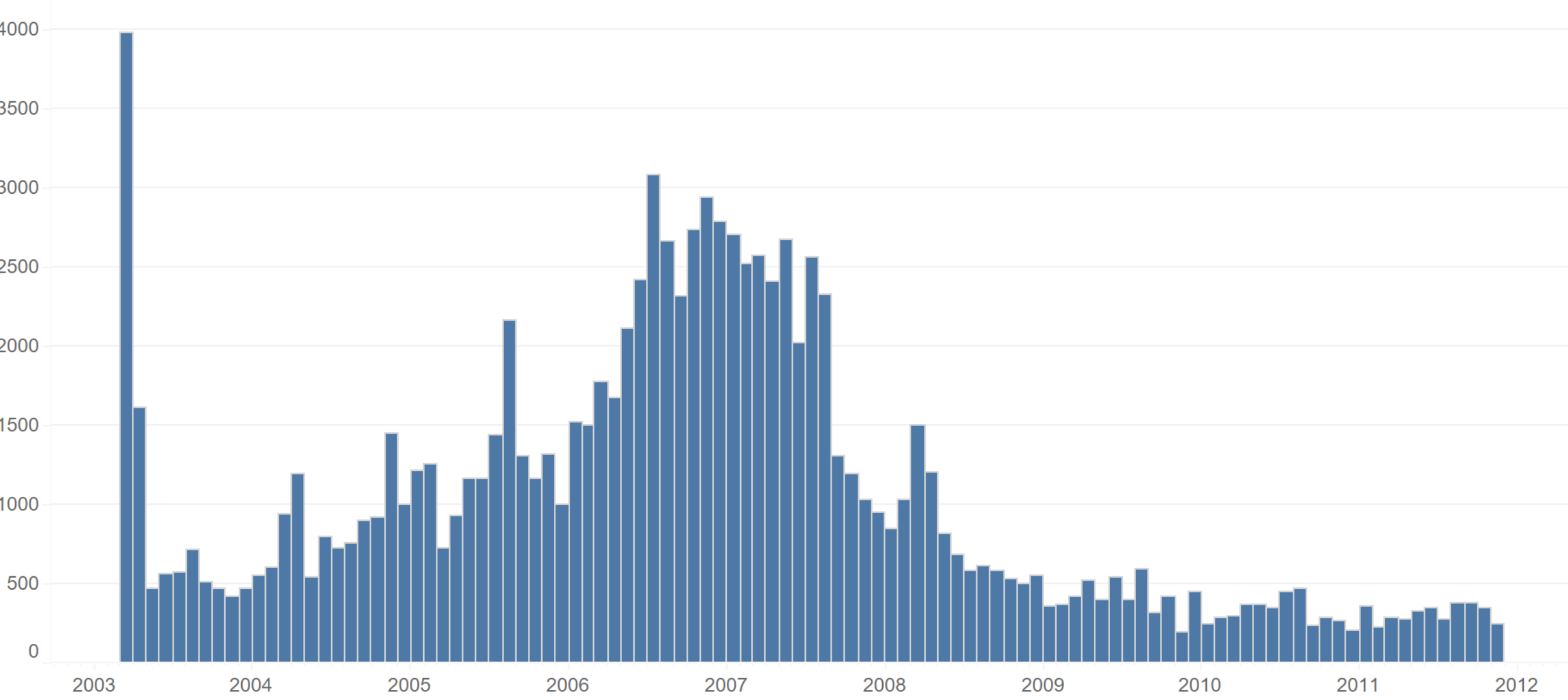
## Iraq conflict deaths

	2003	2004	2005	2006	2007	2008	2009	2010	2011
<b>January</b>		551	1,215	1,517	2,702	847	359	247	353
<b>February</b>		600	1,254	1,498	2,520	1,032	365	282	222
<b>March</b>	3,981	939	725	1,775	2,571	1,500	415	293	286
<b>April</b>	1,612	1,190	925	1,670	2,411	1,201	525	372	277
<b>May</b>	469	538	1,167	2,108	2,675	818	398	370	330
<b>June</b>	564	792	1,160	2,416	2,024	682	542	349	348
<b>July</b>	573	723	1,435	3,077	2,561	583	400	445	271
<b>August</b>	717	750	2,159	2,664	2,330	616	587	466	376
<b>September</b>	511	901	1,306	2,317	1,310	579	315	238	375
<b>October</b>	466	914	1,161	2,738	1,195	532	418	289	346
<b>November</b>	417	1,446	1,316	2,940	1,025	495	191	267	249
<b>December</b>	473	996	1,002	2,786	944	550	445	206	
<b>Grand Total</b>	9,783	10,340	14,825	27,506	24,268	9,435	4,960	3,824	3,433

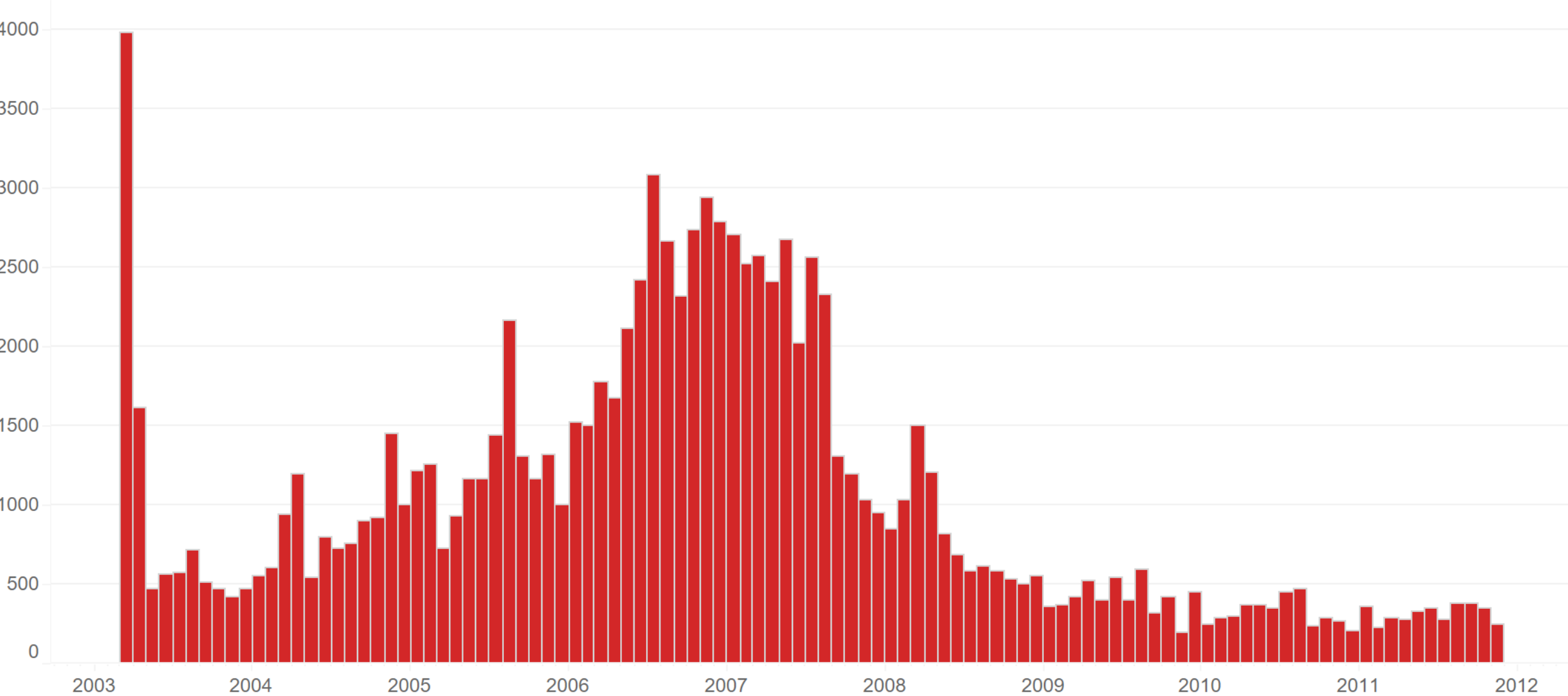
# Iraq conflict deaths



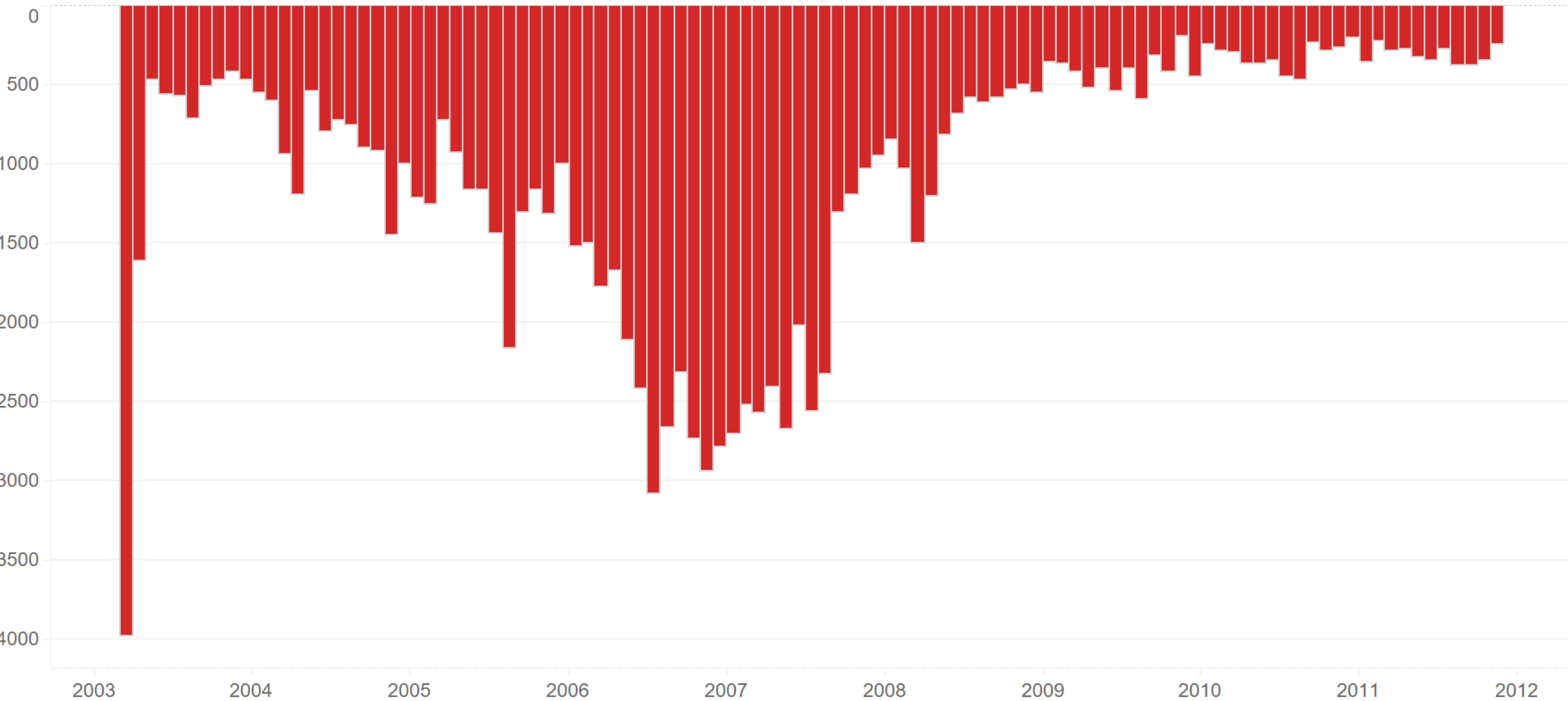
# Iraq conflict deaths



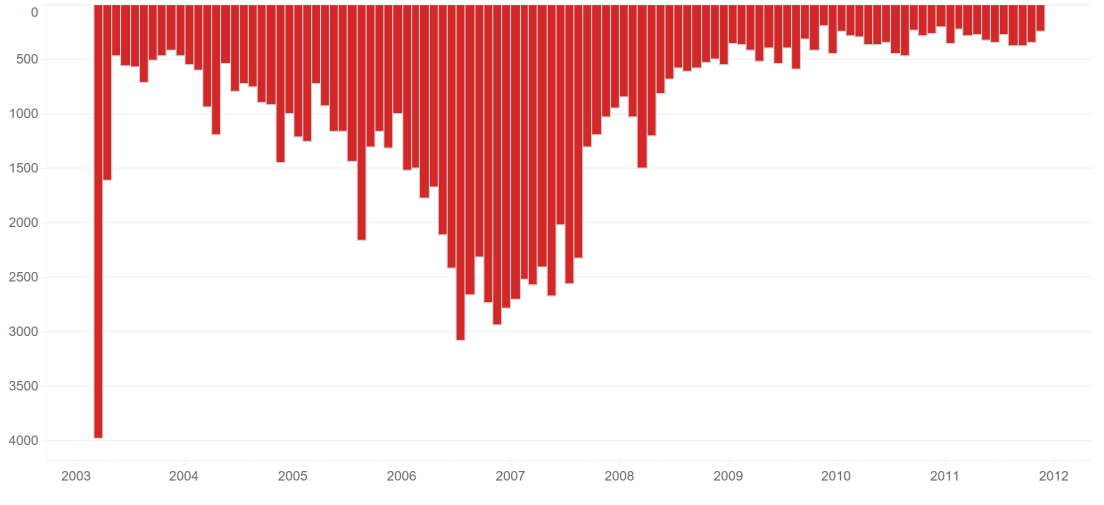
# Iraq conflict deaths



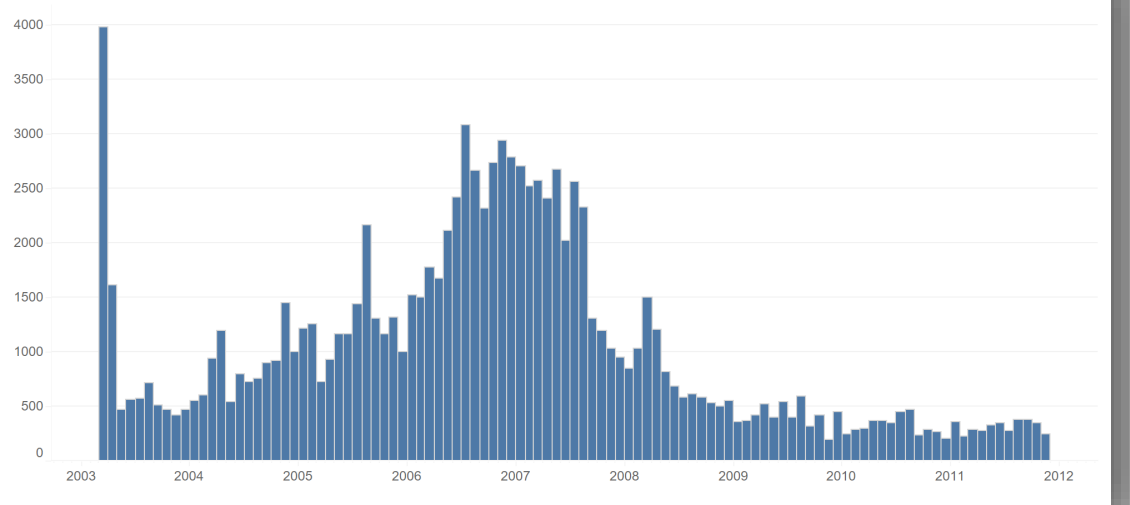
# Iraq conflict deaths



Iraq conflict deaths



Iraq conflict deaths



# Iraq's Bloody Toll

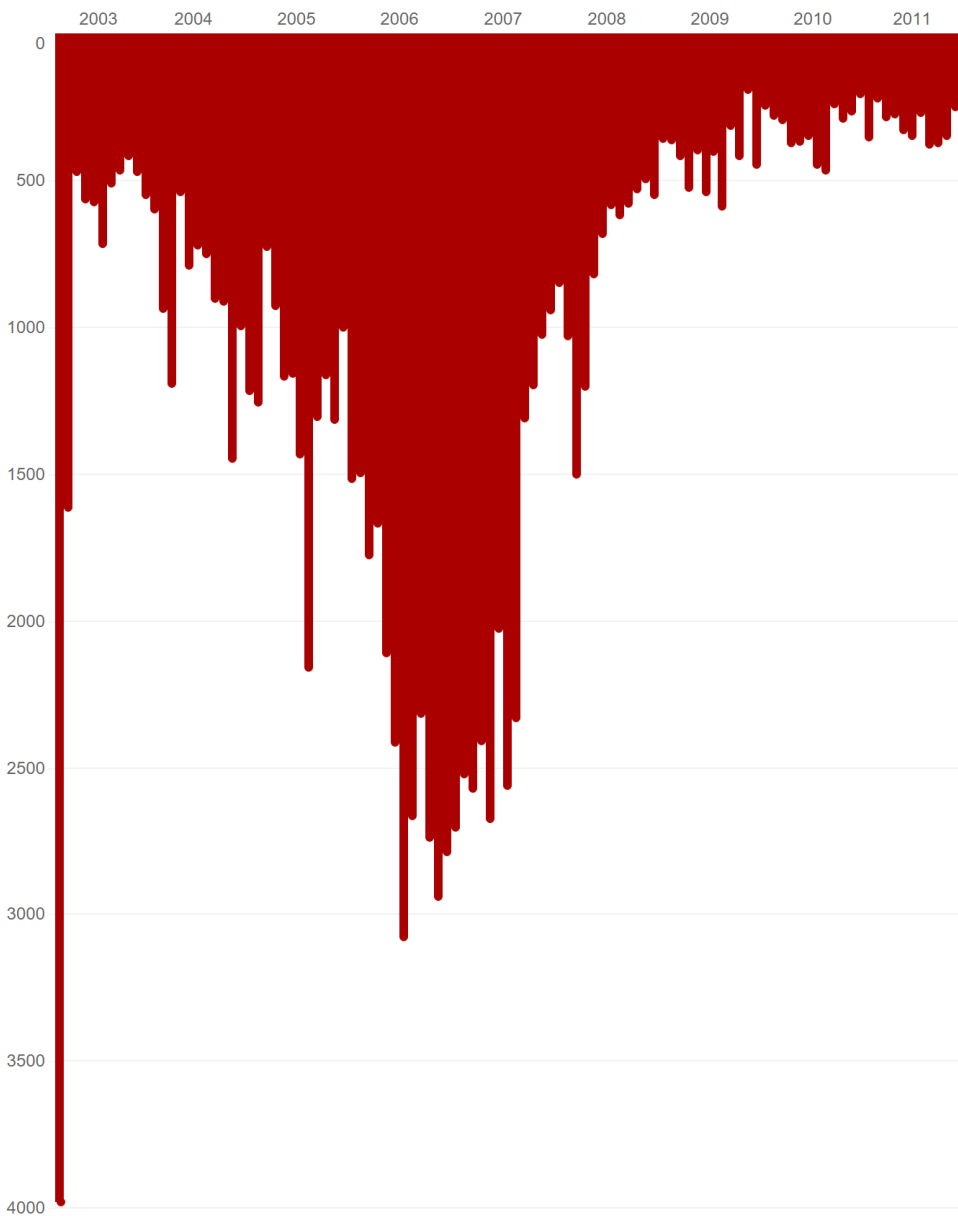


Chart shows monthly documented deaths caused by violence in Iraq, 2003-2011. Design by Andy Cotgreave. Inspired by Simon Scarr, South China Morning Post. Data Source: Iraq Body Count.

# Iraq: Deaths on the Decline

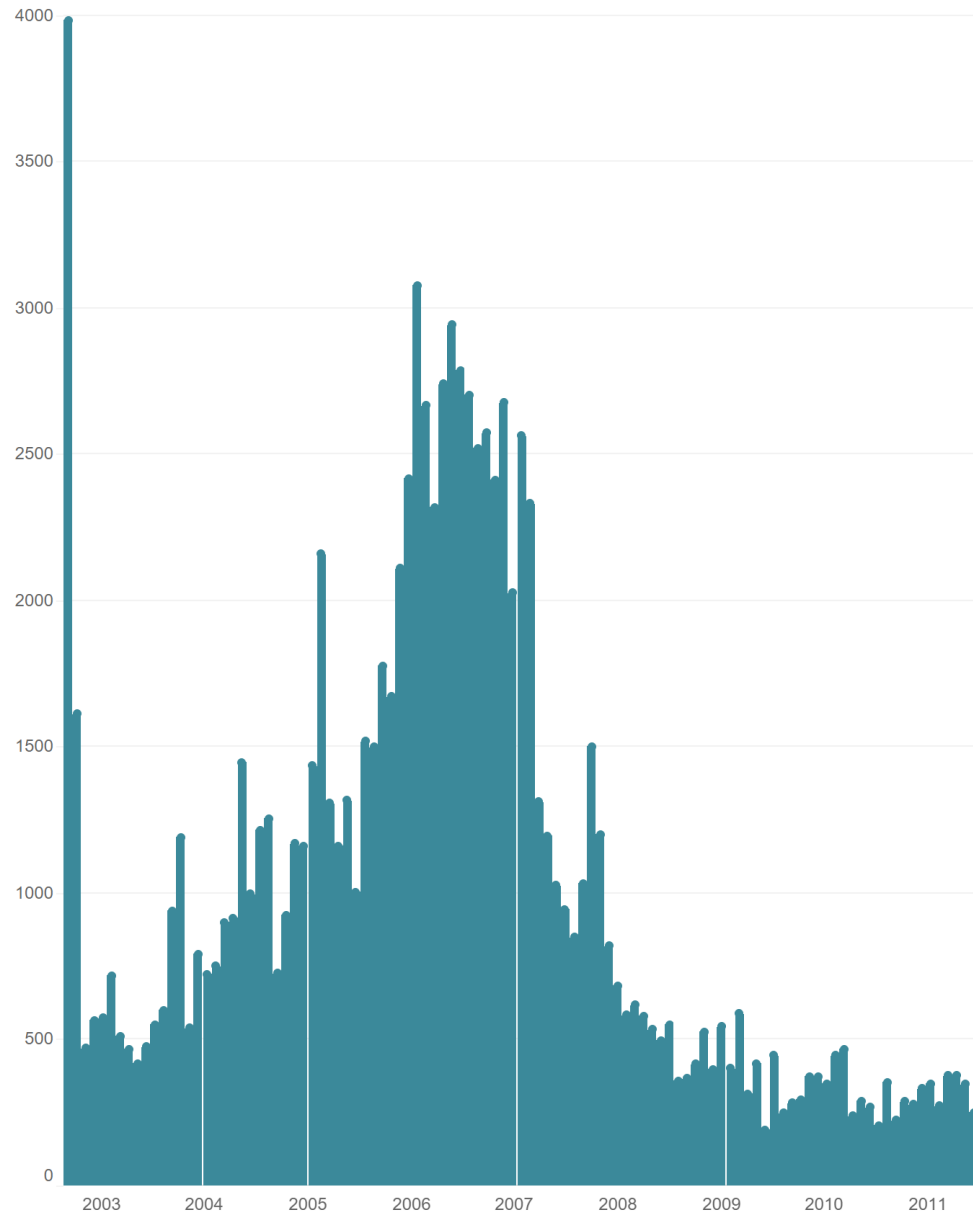
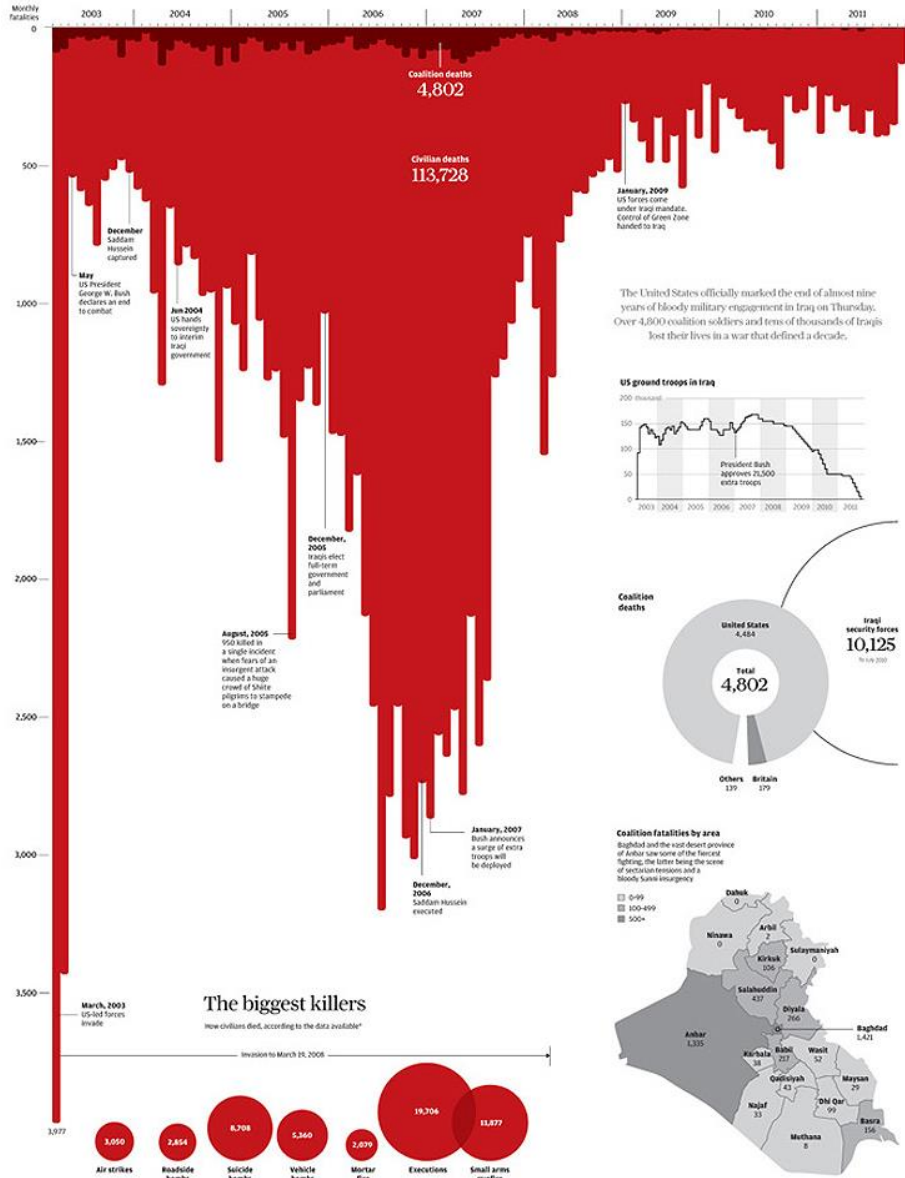


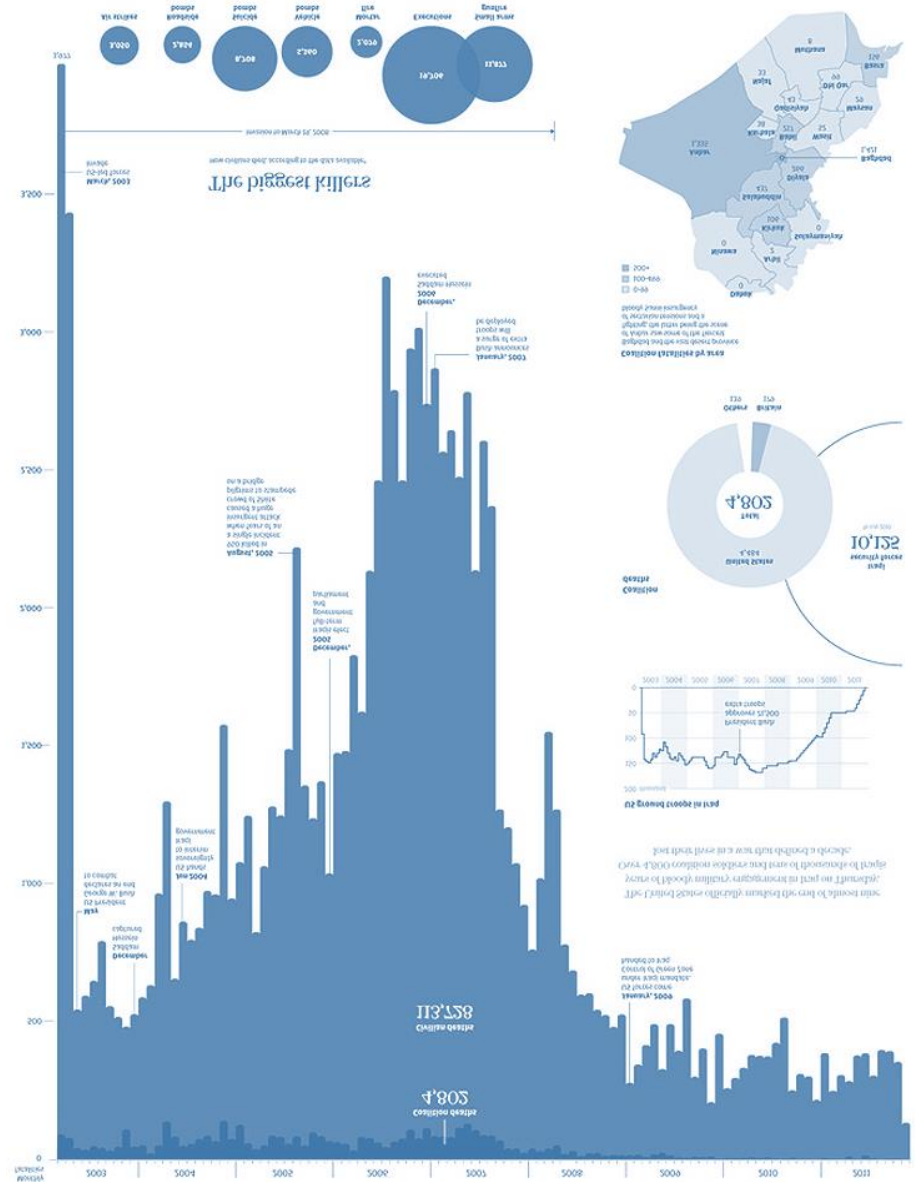
Chart shows monthly documented deaths caused by violence in Iraq, 2003-2011. Design by Andy Cotgreave. Inspired by Simon Scarr, South China Morning Post. Data Source: Iraq Body Count.



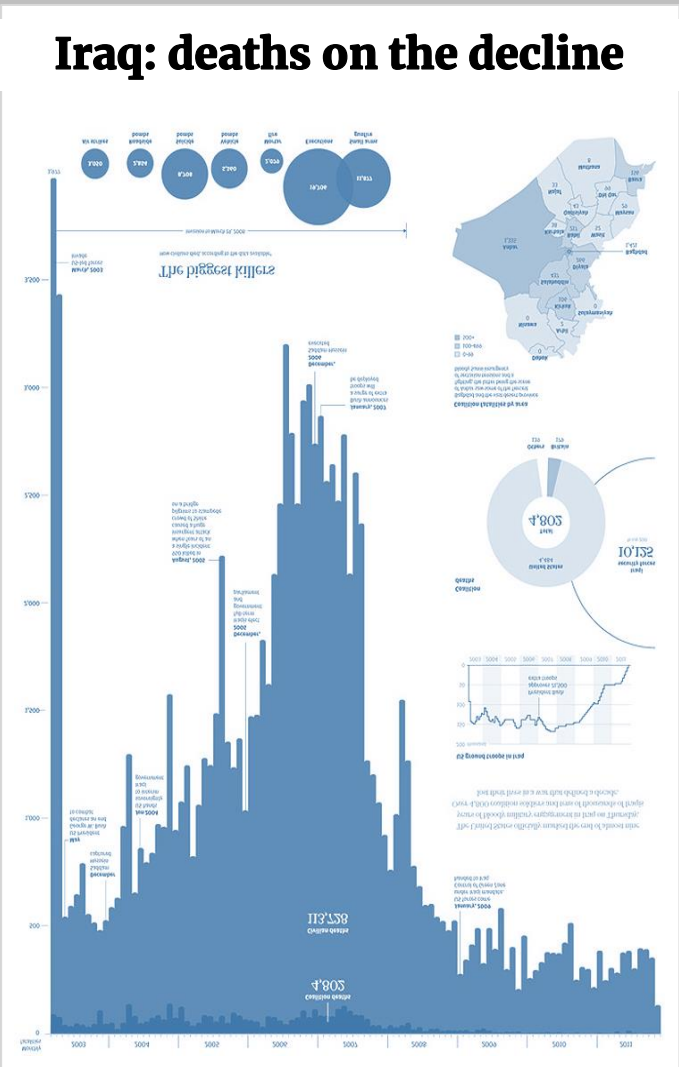
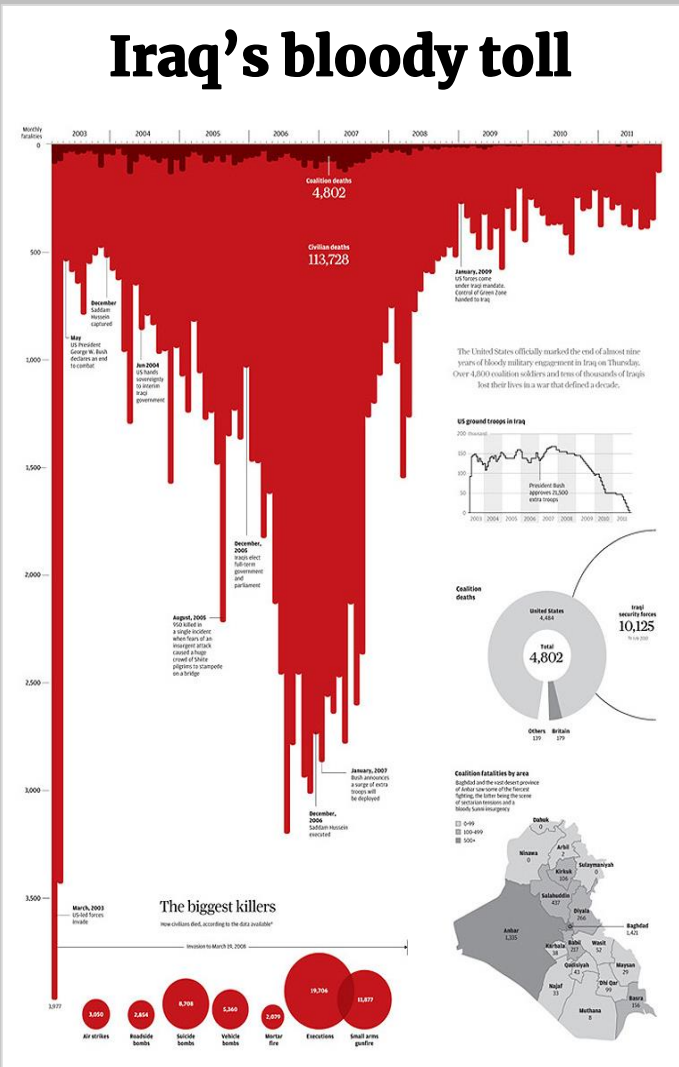
# Iraq's bloody toll



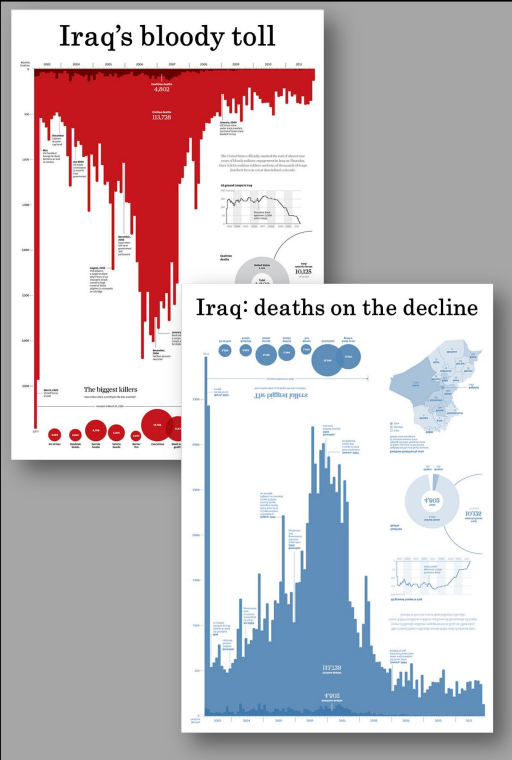
# Iraq: deaths on the decline



# How were the levers applied?



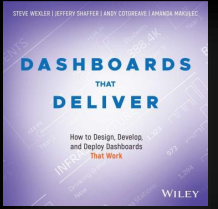




Data visualization is not neutral; every element is a choice, every choice an opinion.

# Thank you

Sign up to my newsletter:



# Andy Cotgreave