

Análise Visual de Dados

Introdução

Instrutor

- Nivan Ferreira
- Professor do Centro de Informática da UFPE
- PhD em Ciência da Computação (NYU)
- Pesquisador da Área de Visualização de Dados

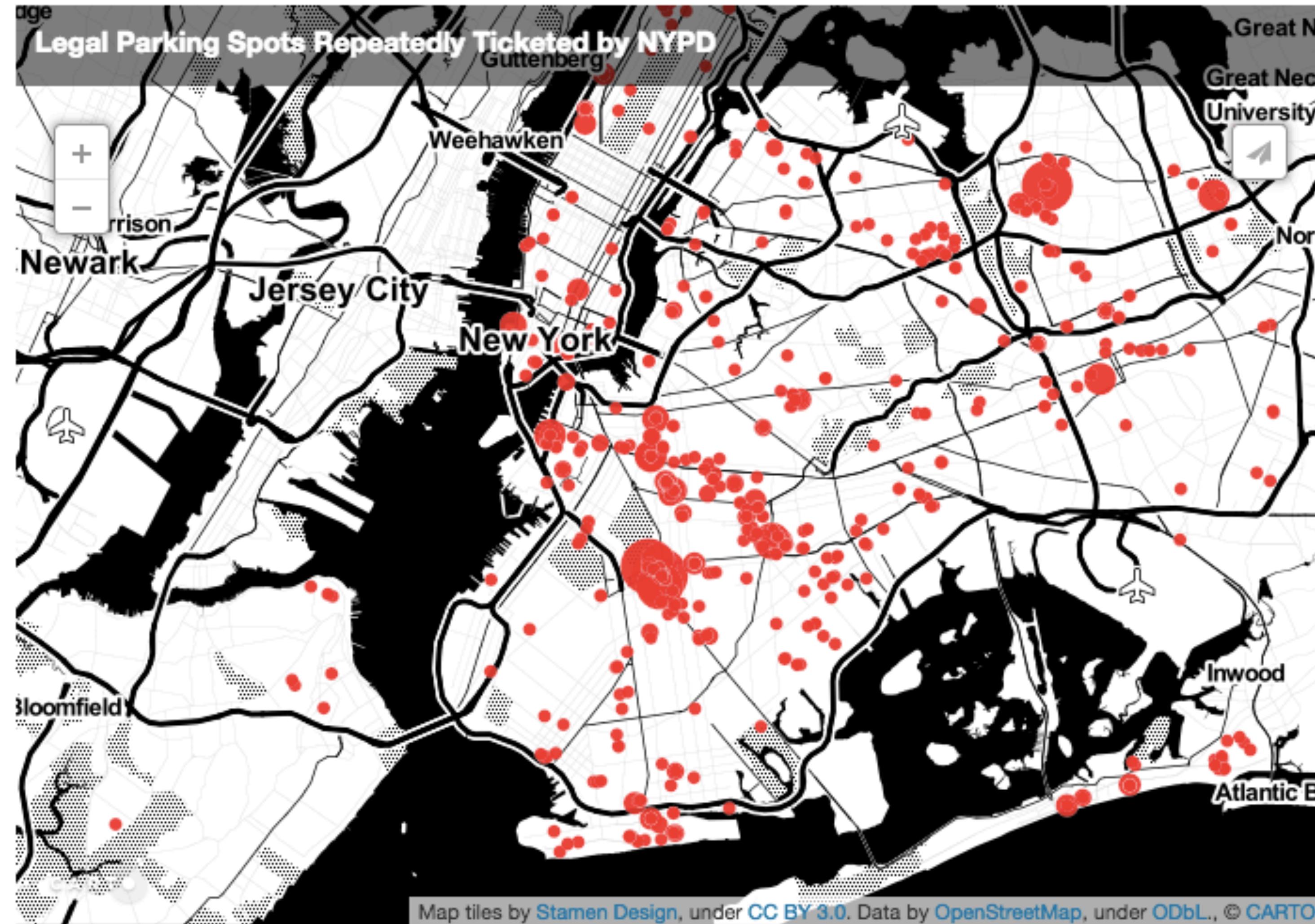


Por que Aprender
Análise Visual de Dados?

Pequena História



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**Exploring urban
data
Cities**

How an open data blogger proved the NYPD issued parking tickets in error

When Ben Wellington crunched freely available parking data for New York City, he uncovered thousands of tickets issued to vehicles that were legally parked. Max Galka reports on this and other revealing uses of data in our cities

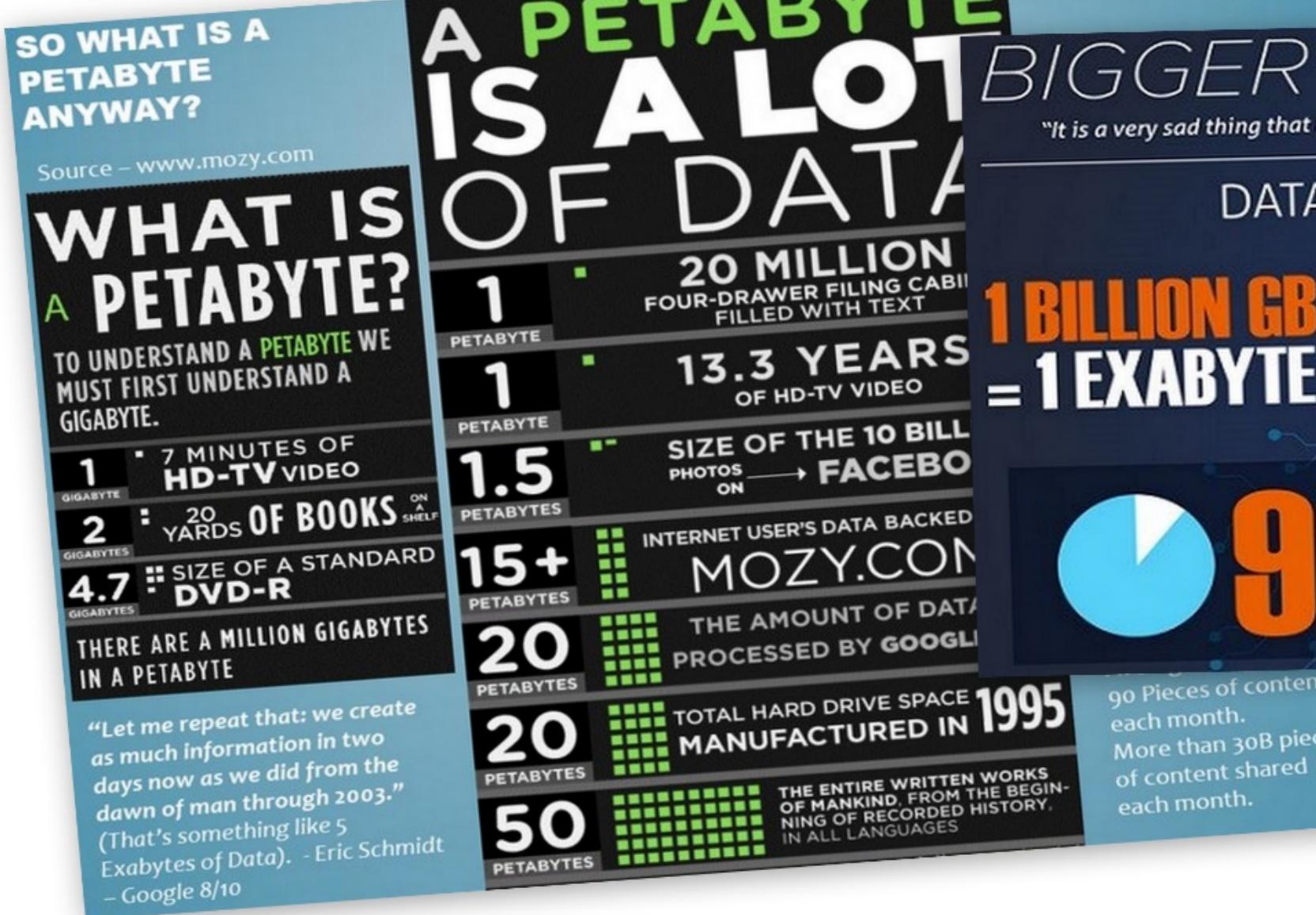


Cities is supported by

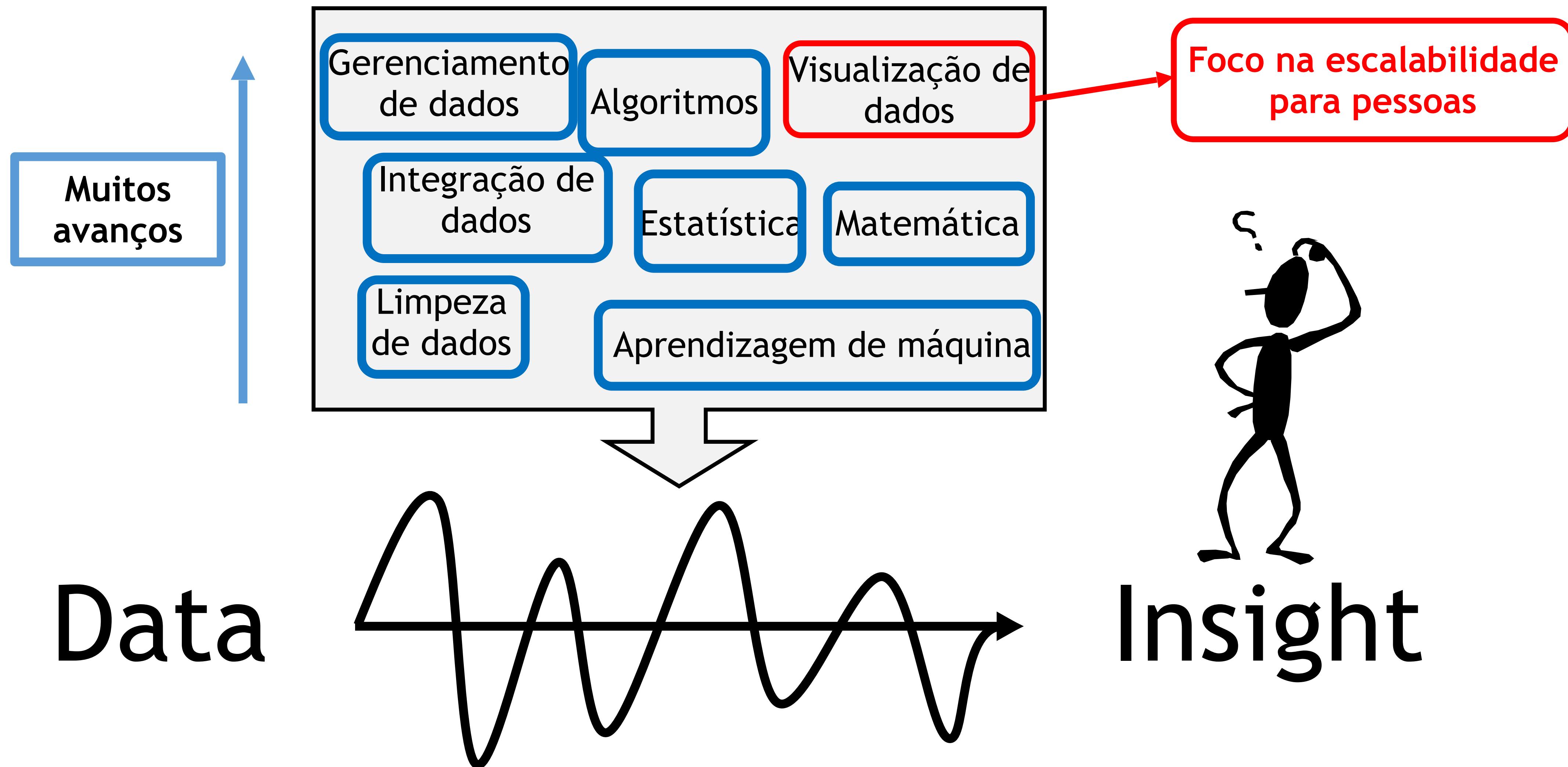


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Análise de Dados

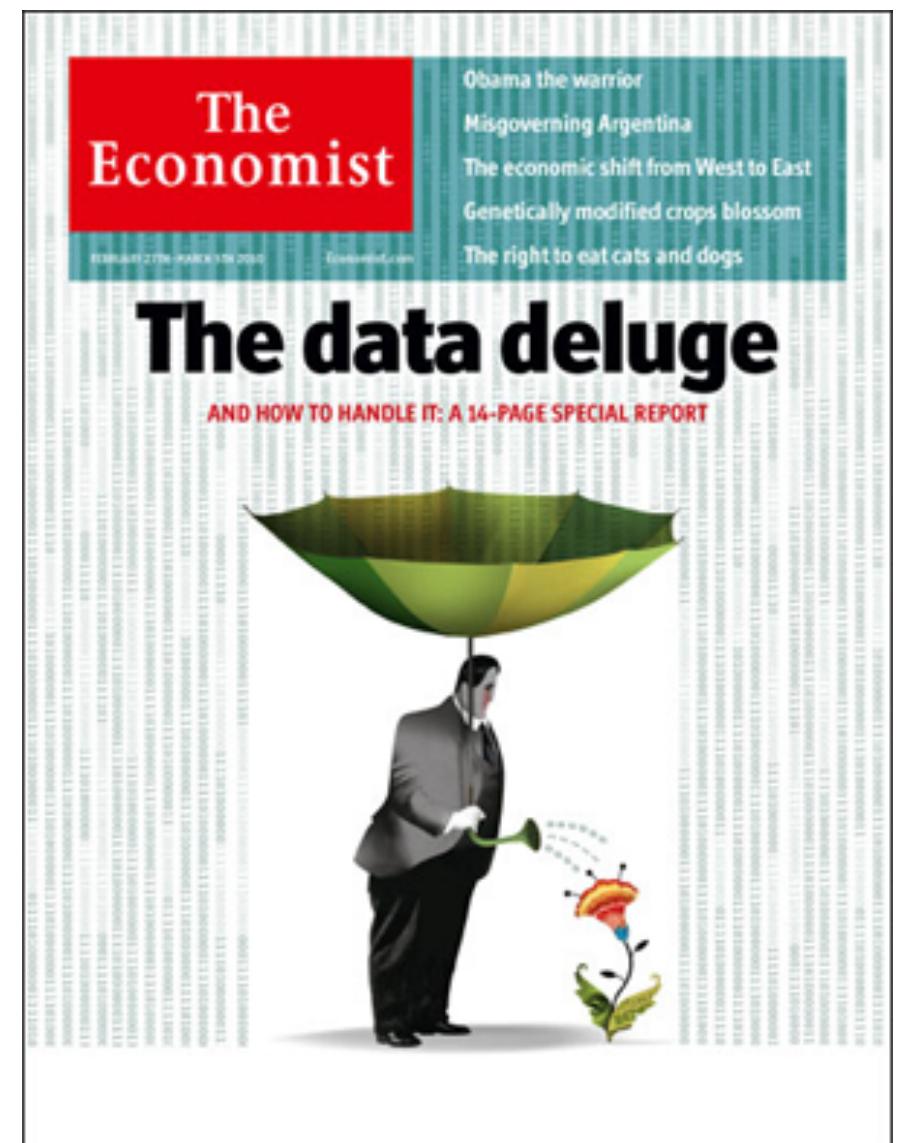


Visualização de Dados para Data Science

*"The ability to take data - to be able to **understand** it, to **process** it, to **extract value** from it, to **visualize** it, to **communicate** it's going to be a hugely important skill in the next decades. Because now we really do have essentially free and ubiquitous data. So the complimentary scarce factor is the ability to understand that data and extract value from it."*

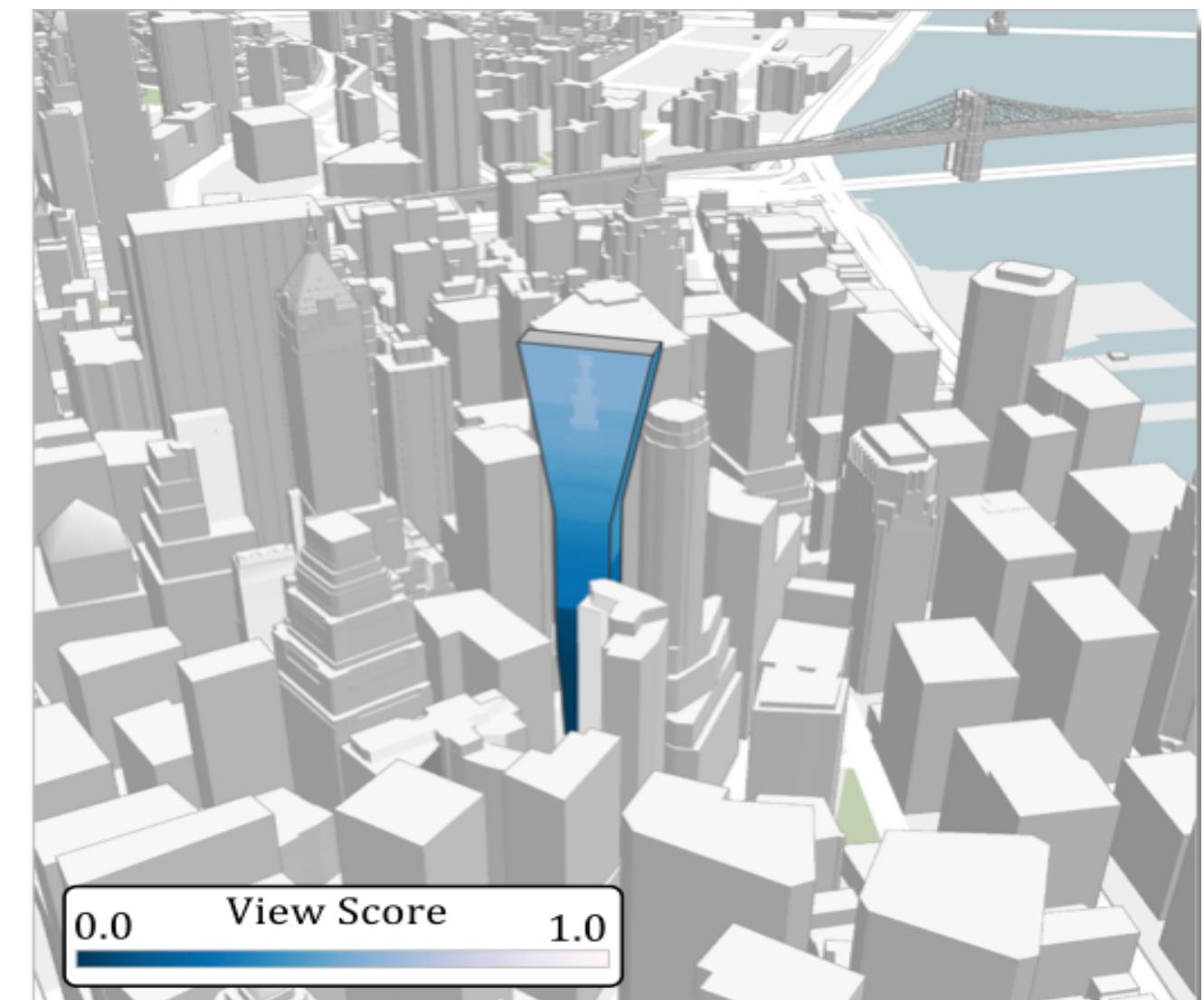
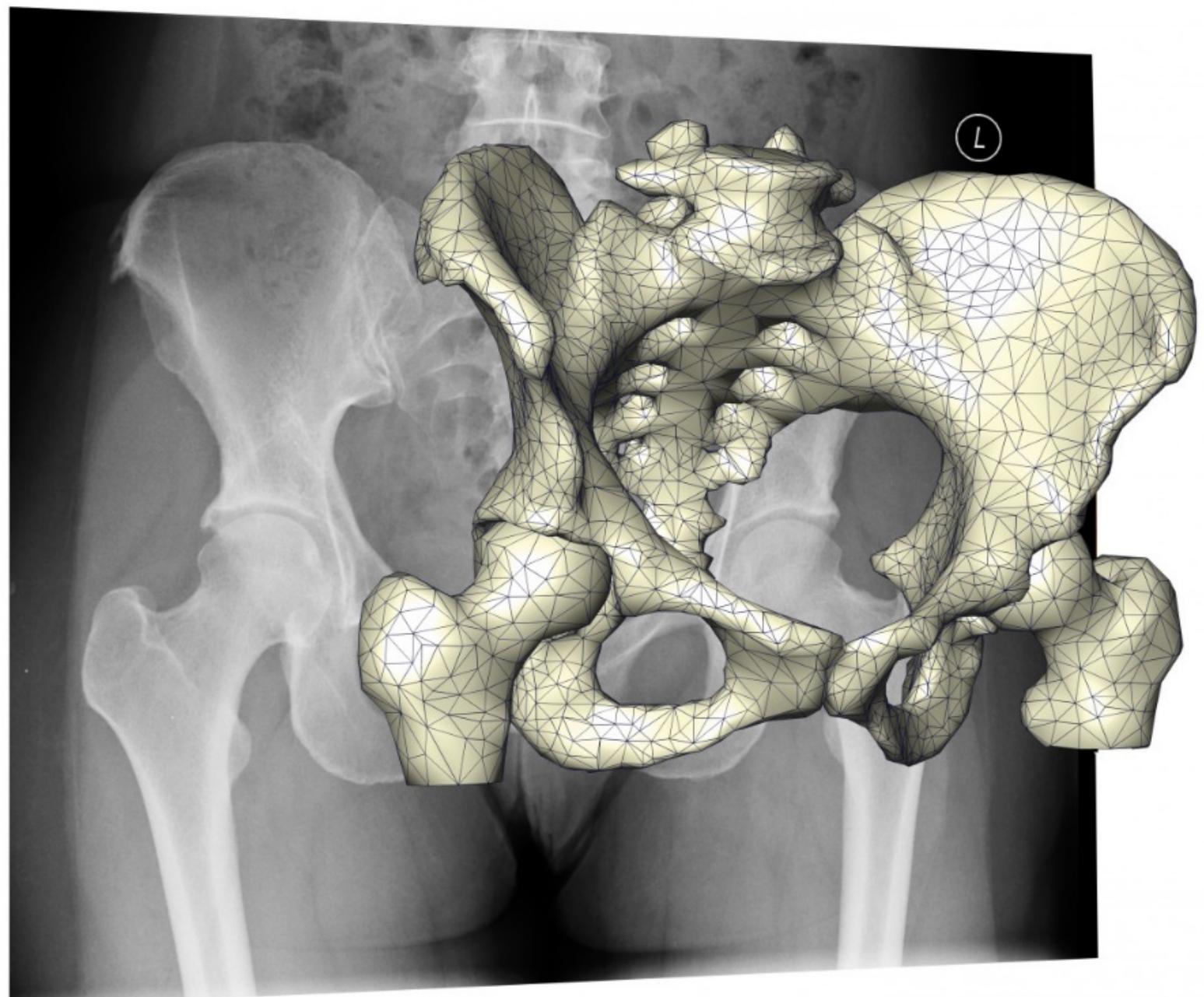
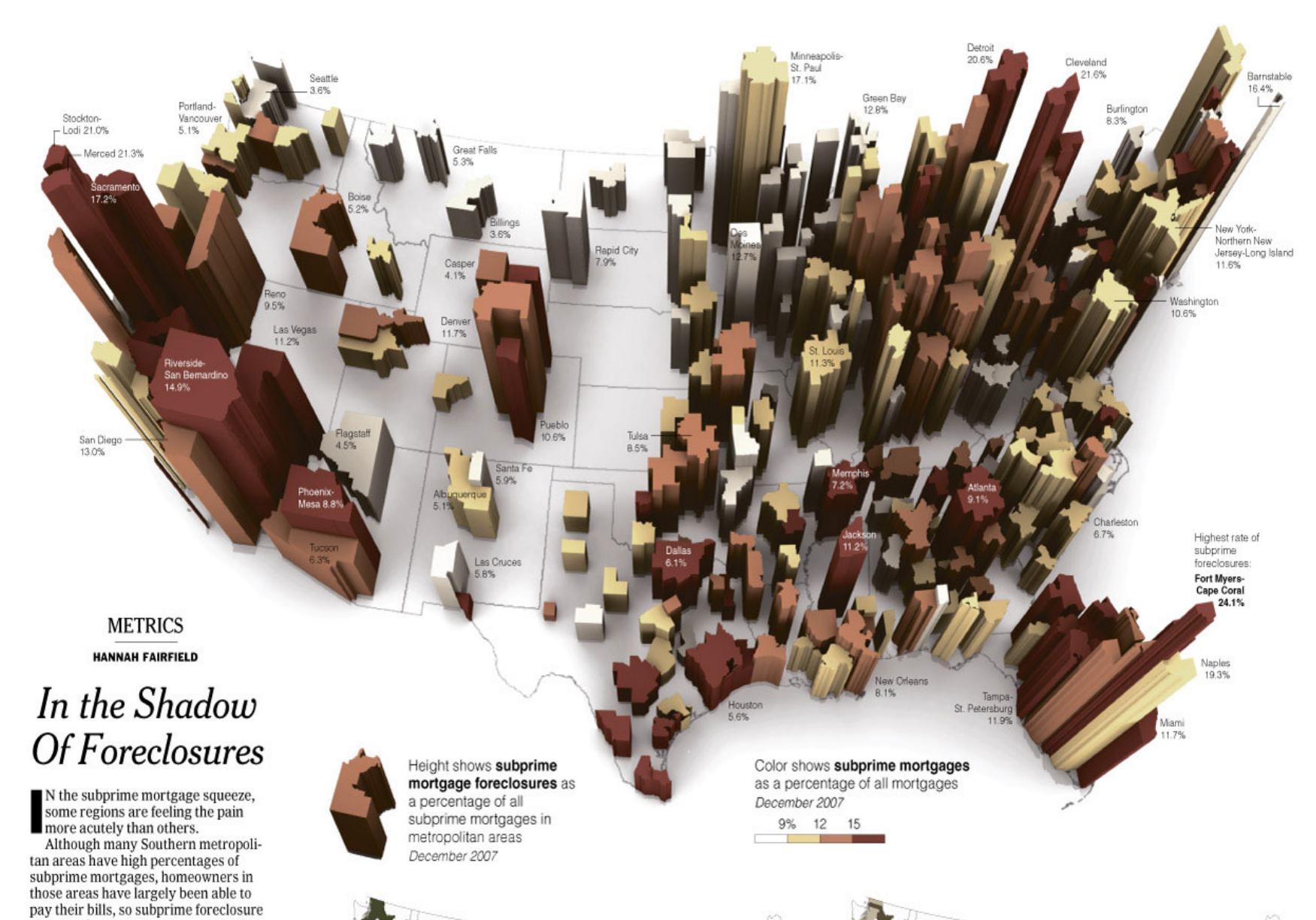
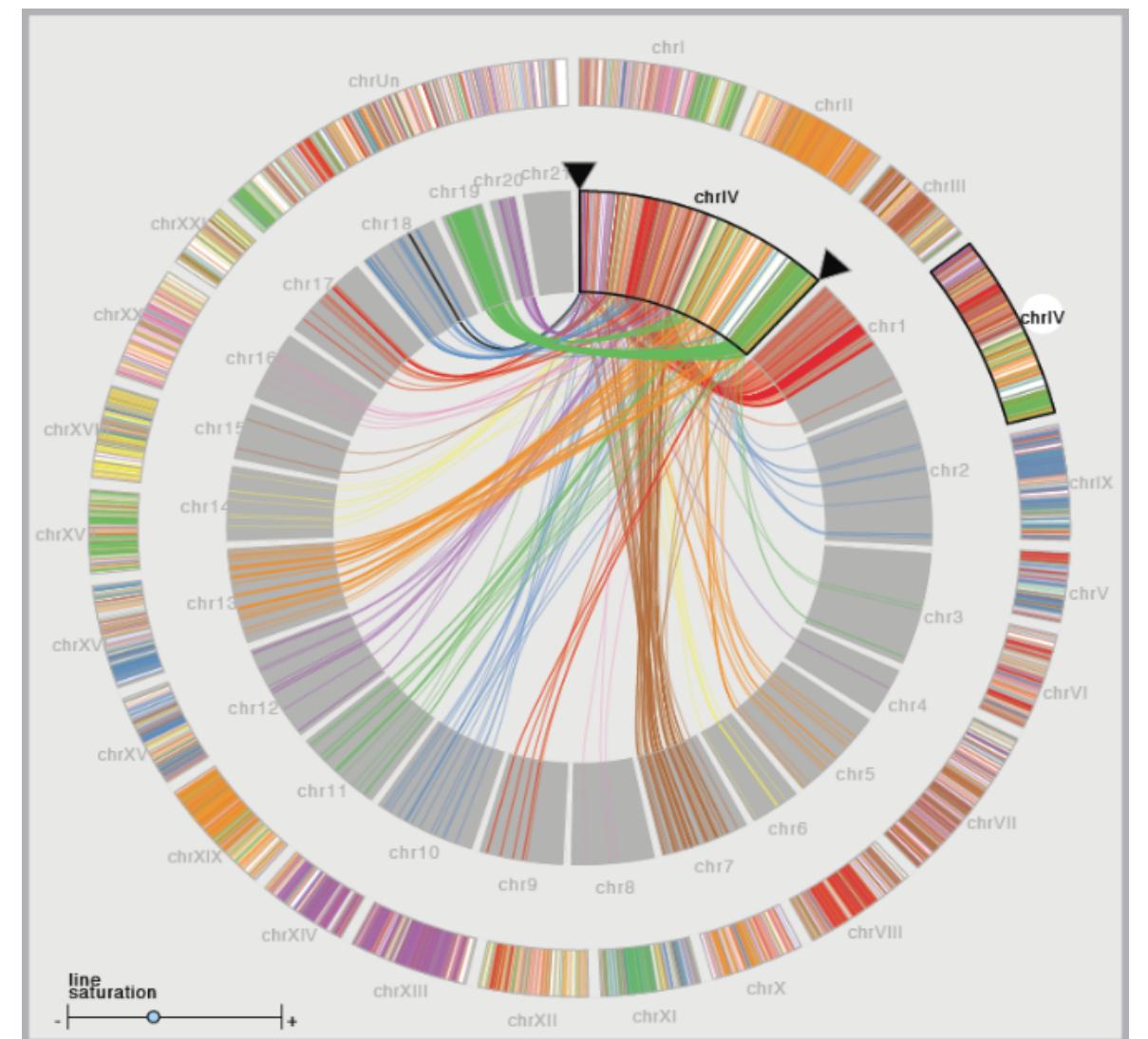
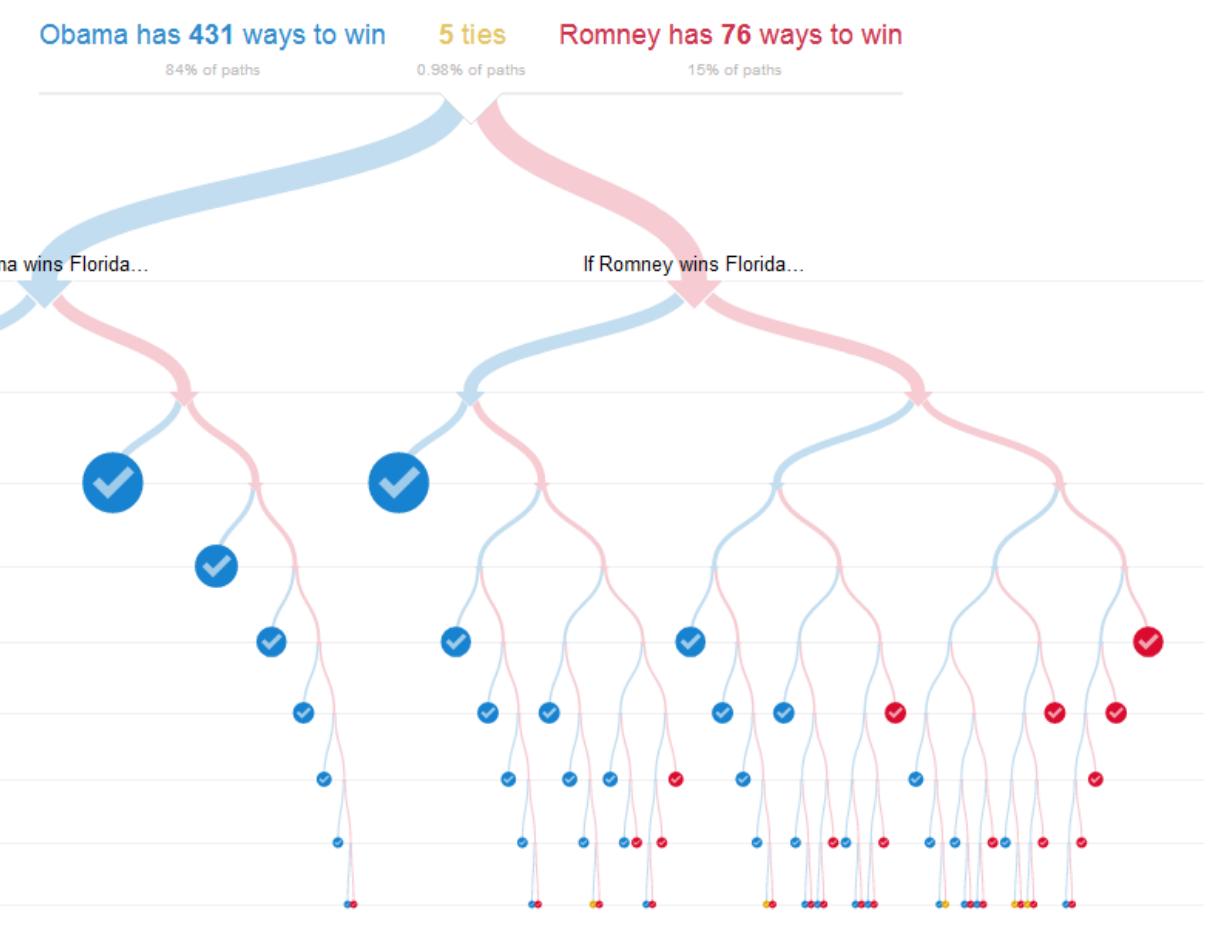


Hal Varian, Chief Economist of Google
veja artigo na íntegra: [link](#)



Visualização de Dados em Toda Parte

E



ME FALE MAIS

ESTOU INTERESSADO

O que é
Visualização de Dados?

Visualização de Dados

*O uso de **representações visuais** de dados, suportadas por computadores, para amplificar a cognição*

Readings in Information Visualization: Using Vision to Think

By Stuart K. Card, Jock D. Mackinlay, Ben Shneiderman

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

Dessinée par M. Minard, Inspecteur Général des Ponts et Chaussées en retraite.

Paris, le 20 Novembre 1869.

Les nombres d'hommes perdus sont représentés par les larges des zones colorées à raison d'un millimètre pour dix mille hommes; ils sont de plus écrits en trèfles des zones. Le rouge désigne les hommes qui entreront 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 Séguir, 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 Mogilow et qui rejoignirent Osscha et Wileïk, avaient toujours marché avec l'armée.

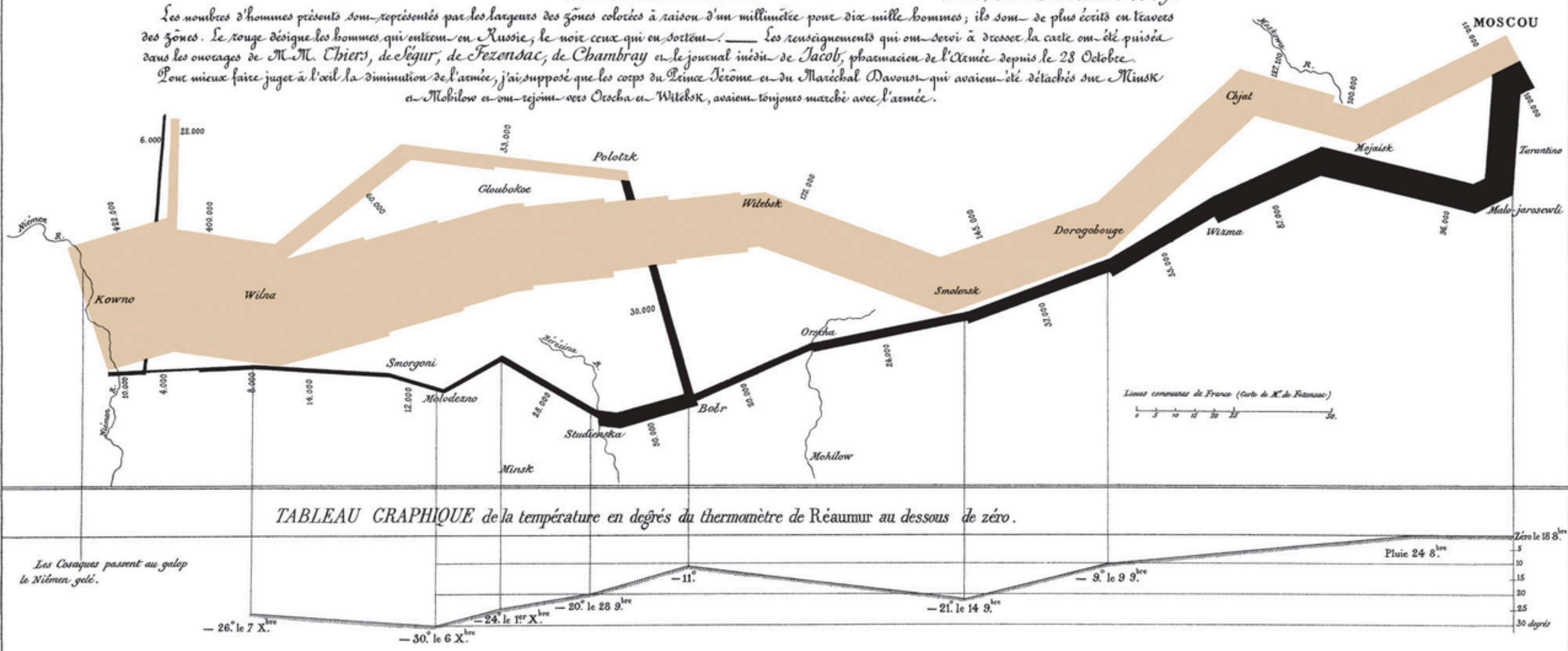


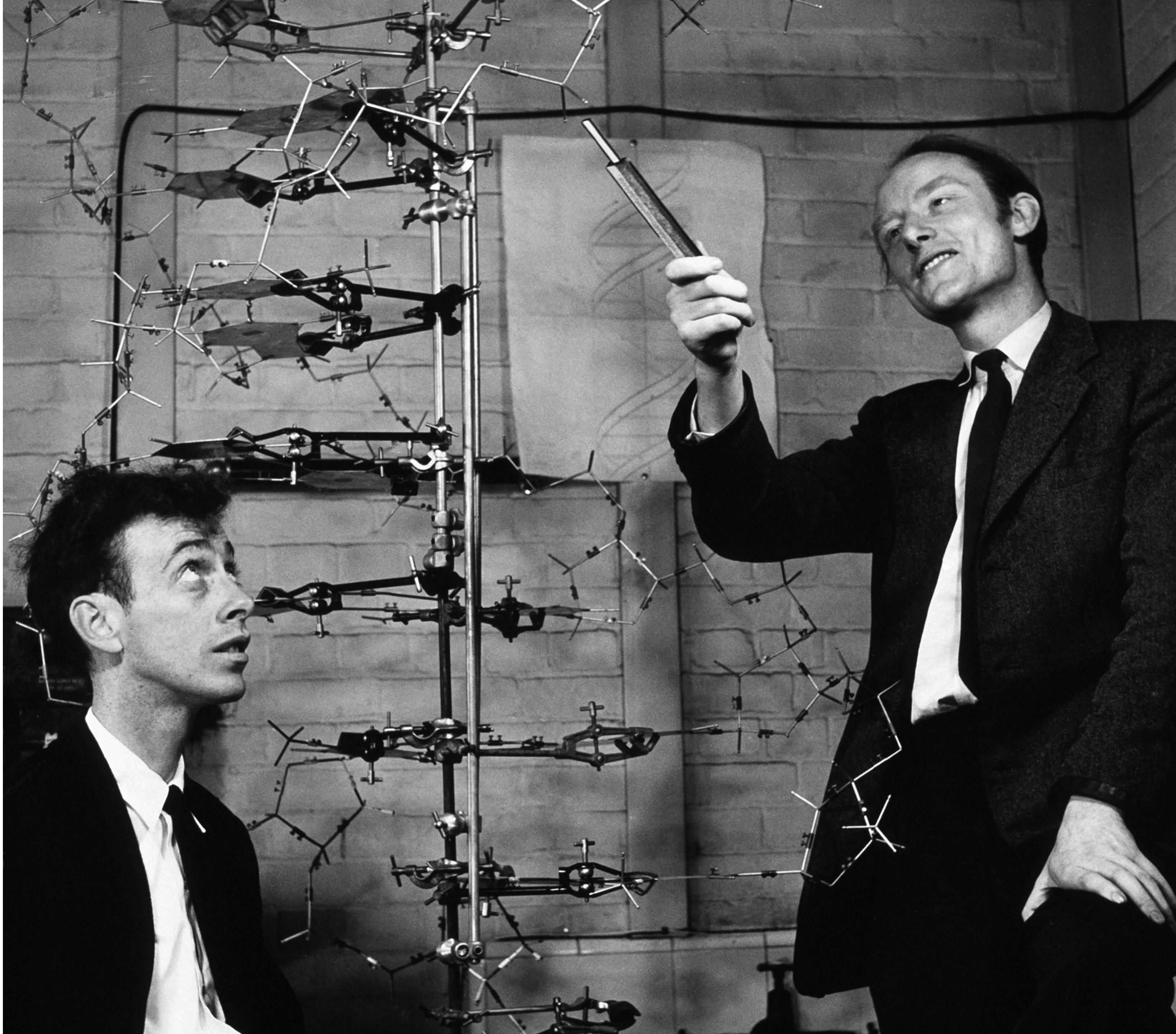
TABLEAU GRAPHIQUE de la température en degrés du thermomètre de Réaumur au dessous de zéro.

Les Cosaques passent au galop le Niemen gelé.

Autog. par Reginier, E. P. S. 5^e Marie St^e G^e à Paris.

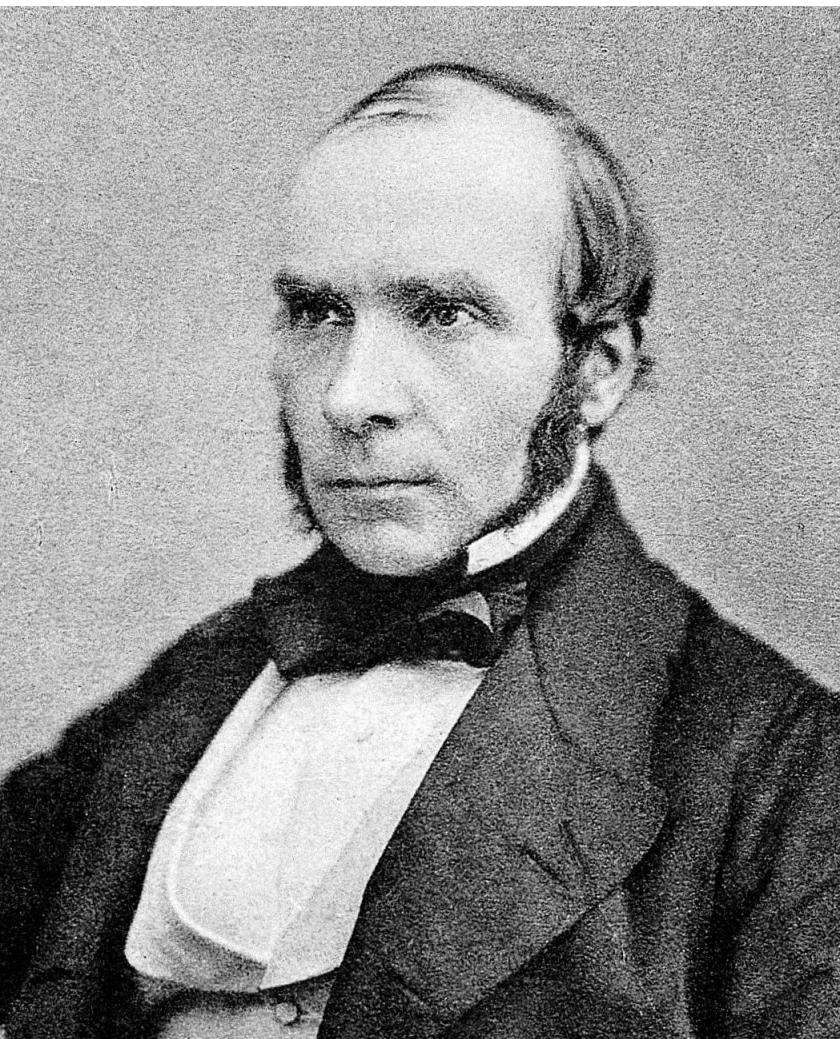
Imp. Lith. Reginier et Bourdet.

Contar Histórias
A Marcha de Napoleão (Charles Minard)



Watson & Crick: Explicar fatos Complexos
[List of Physical Visualizations](#)

Investigação



John
Snow

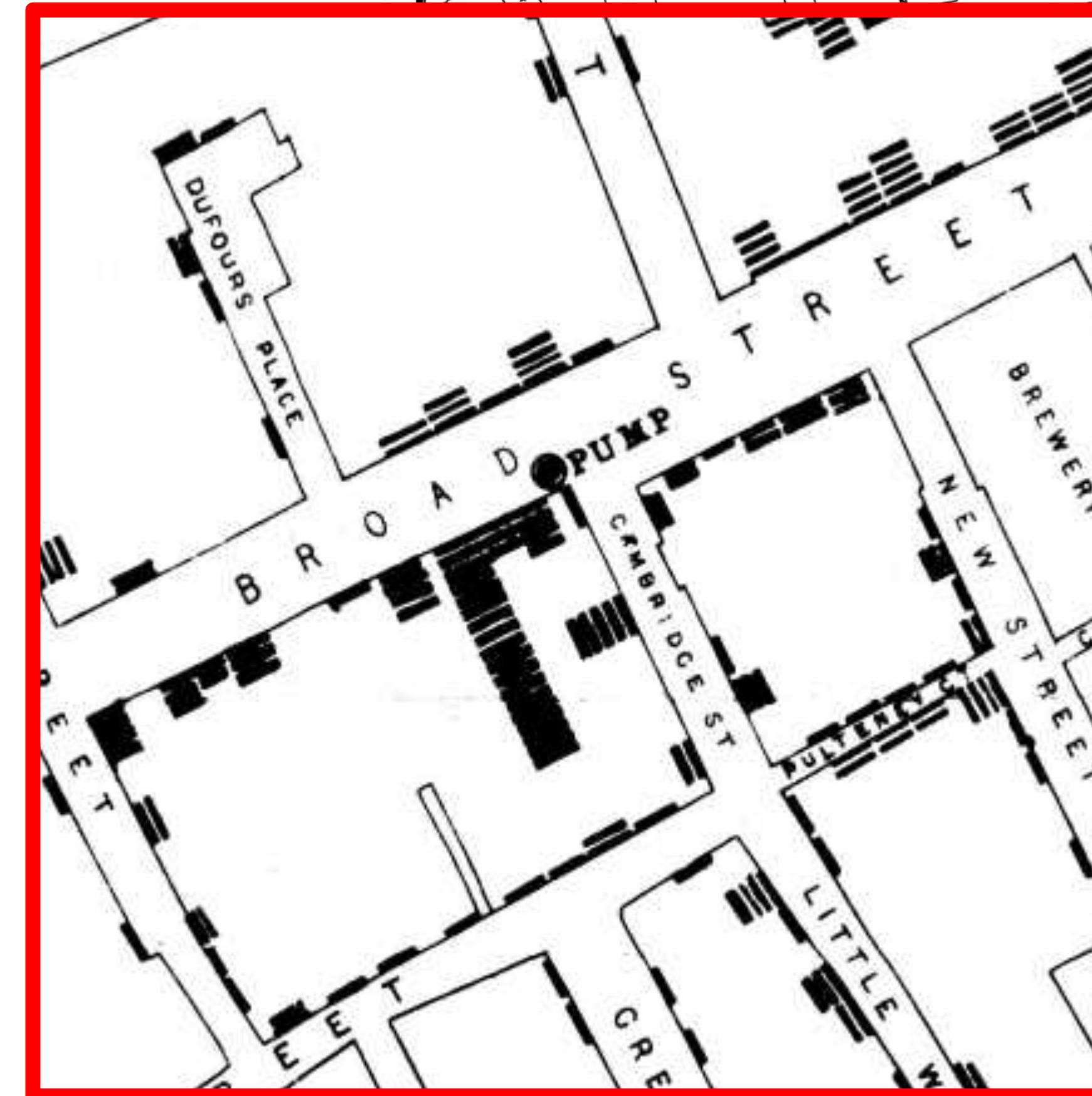
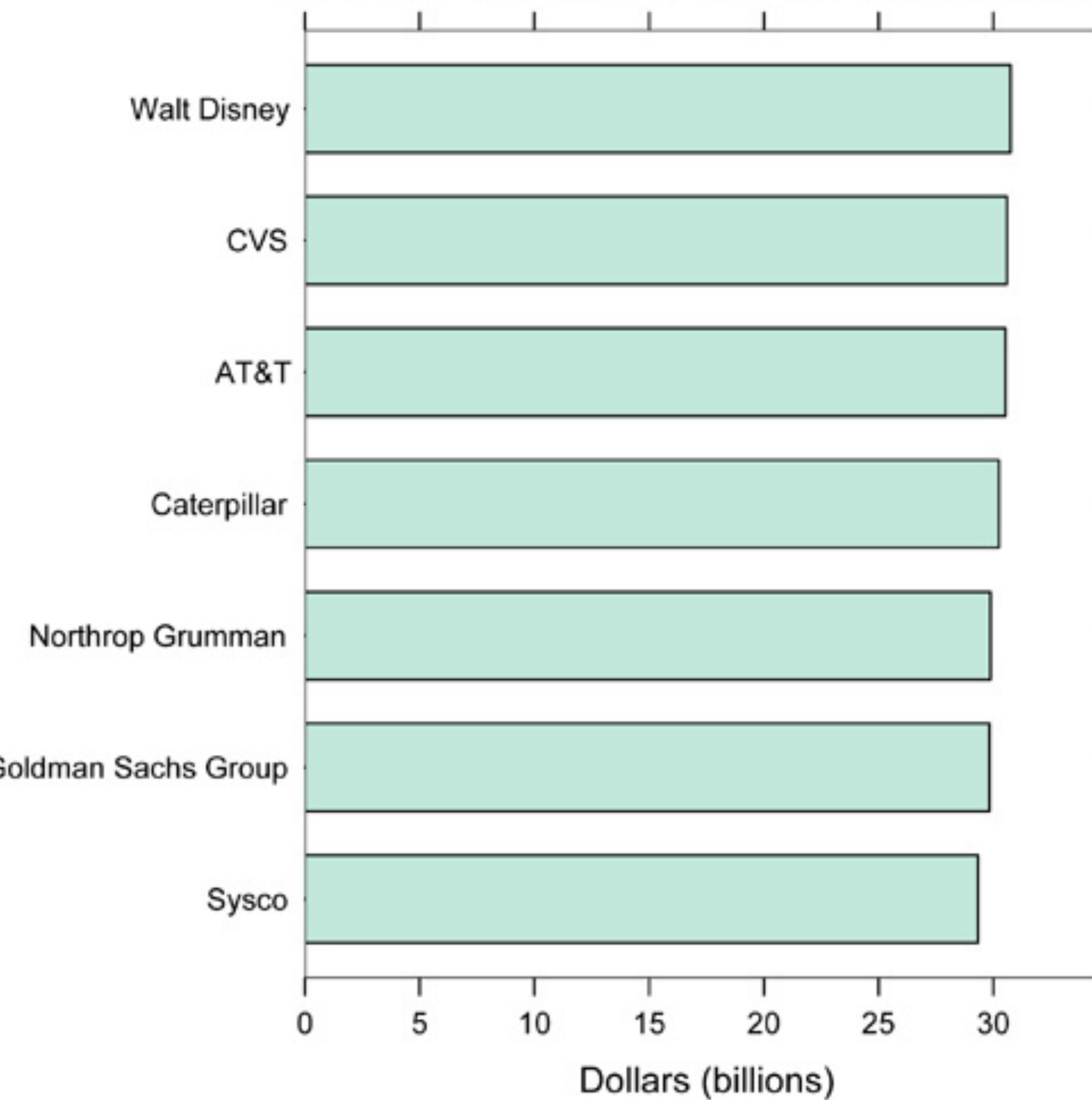


Gráfico de Barras

Bar Chart of Revenues with Zero Baseline



Bar Chart of Revenues with No Zero Baseline

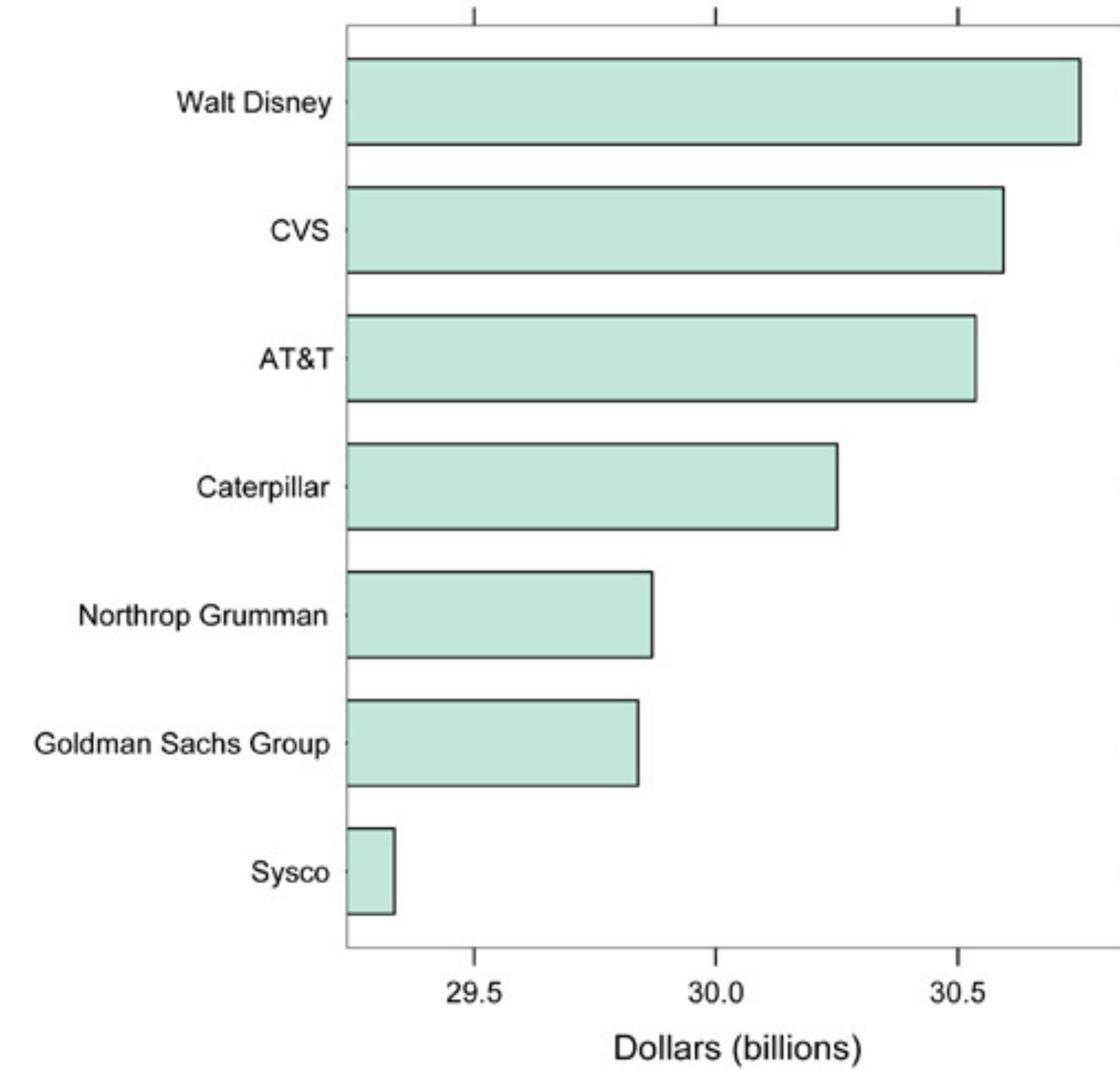


Gráfico de Barras

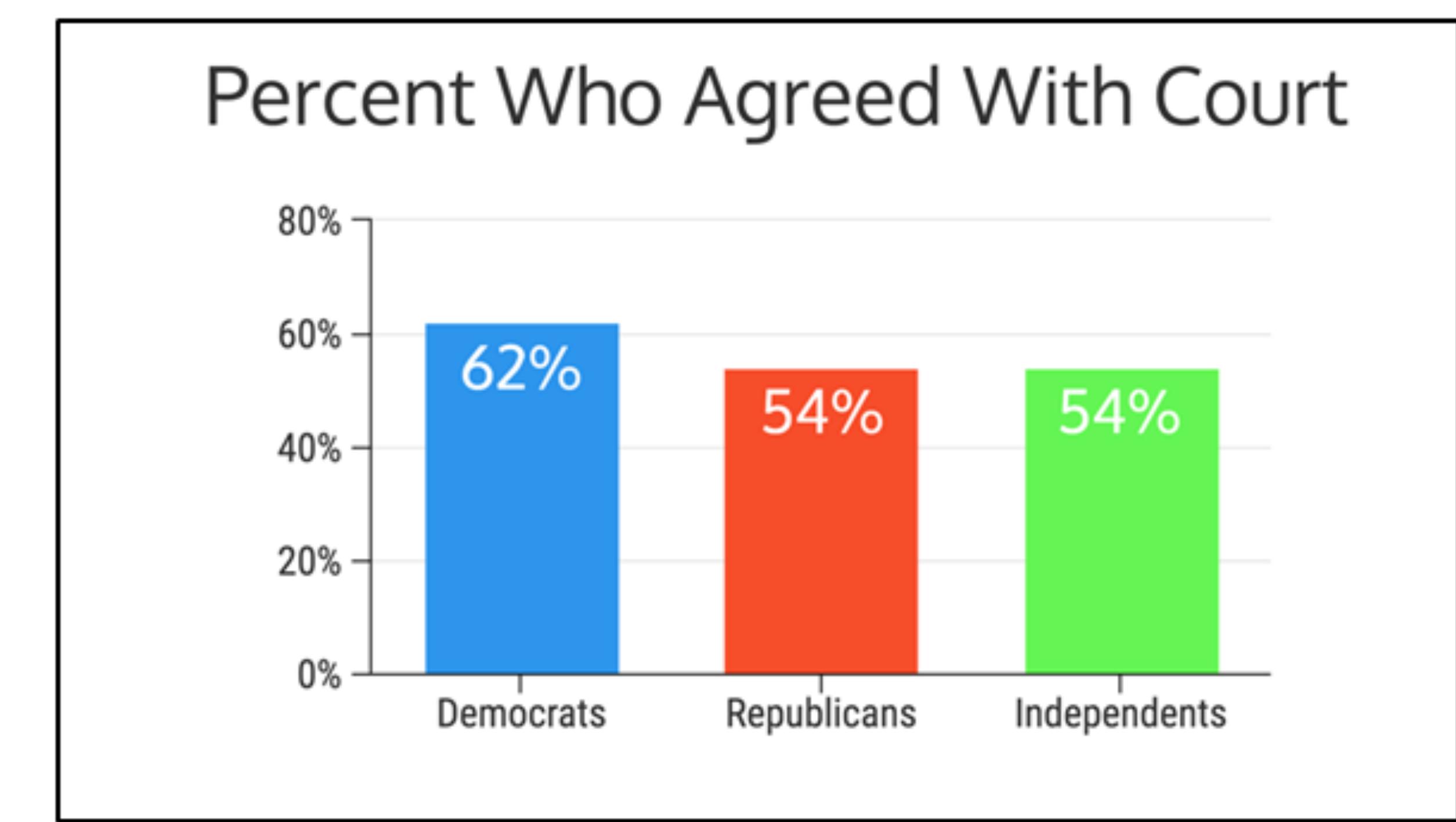
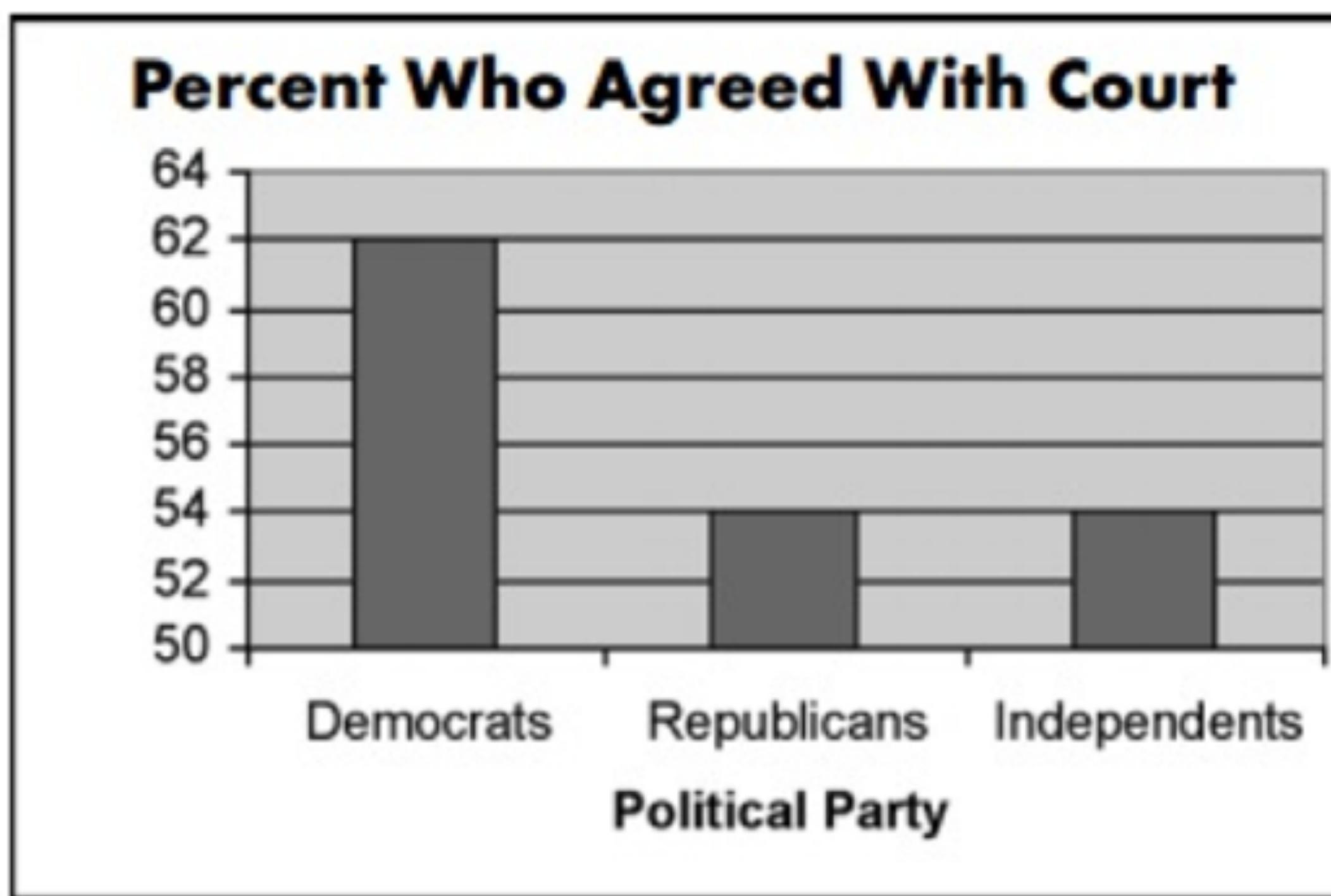
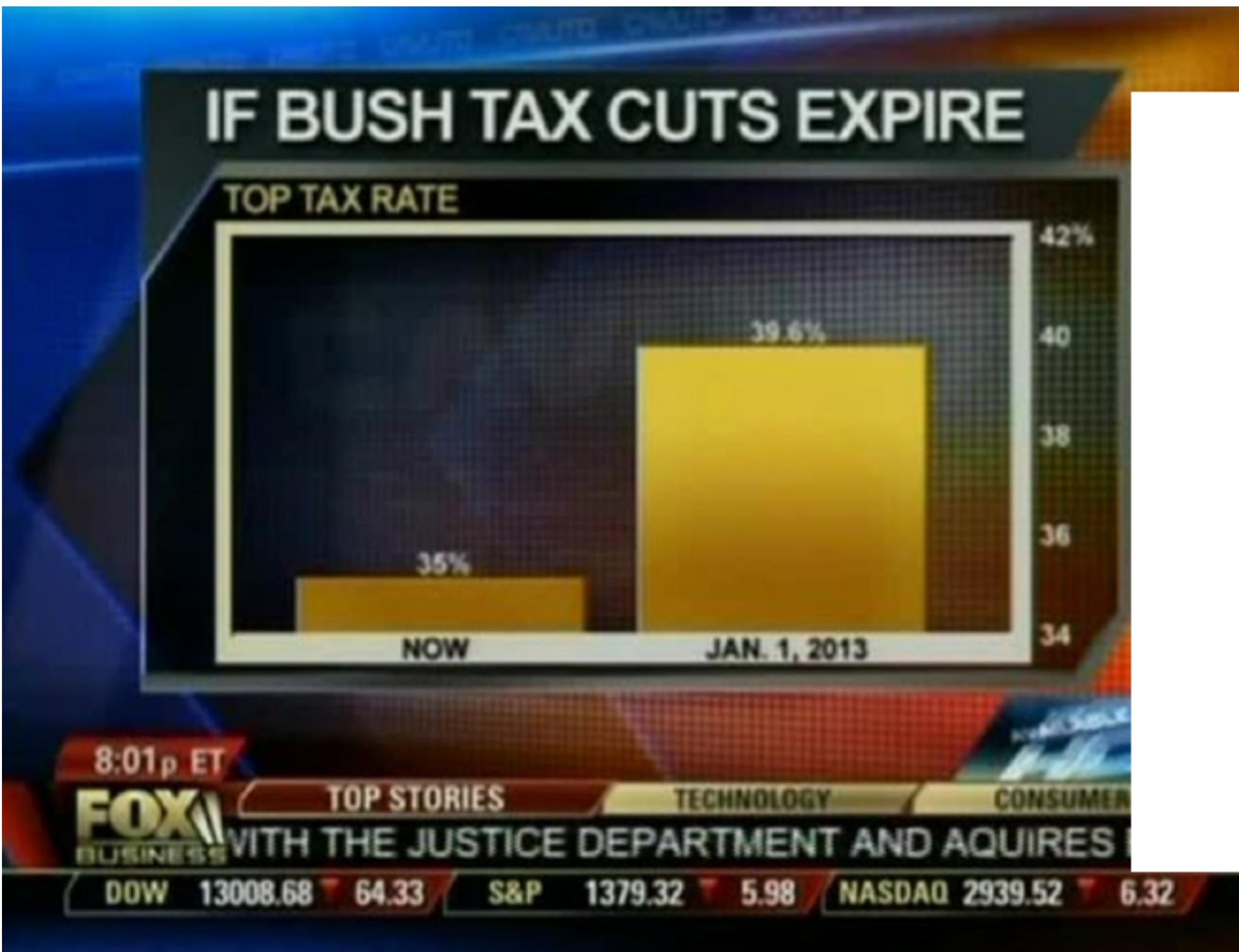
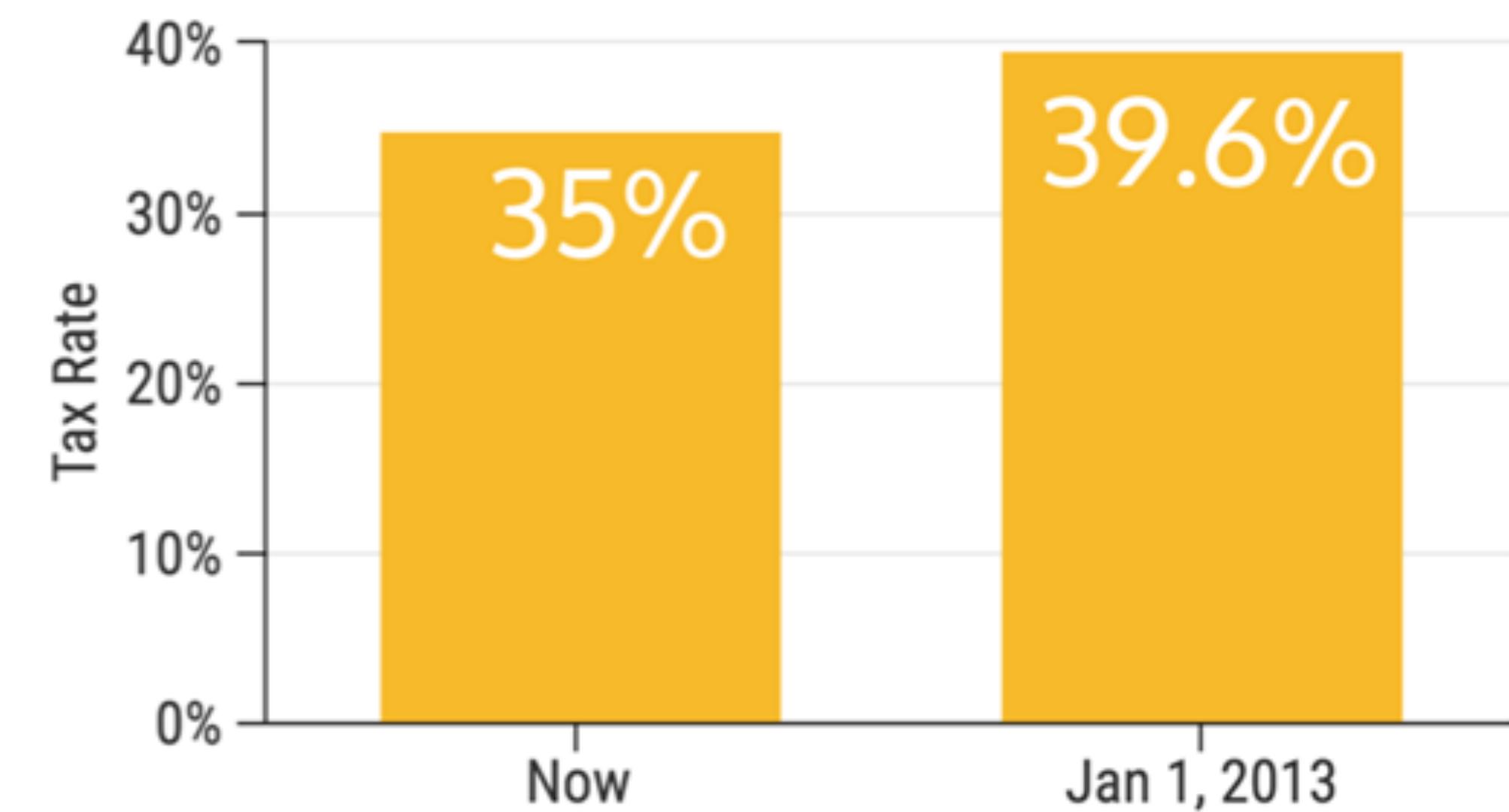


Gráfico de Barras



If Bush Tax Cuts Expire



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NATIONAL



National Review

@NRO

Standing athwart history, yelling Stop. A magazine founded by the late William F. Buckley Jr. Snapchat & Instagram: NationalReview

② New York

🔗 NationalReview.com

Joined January 2009



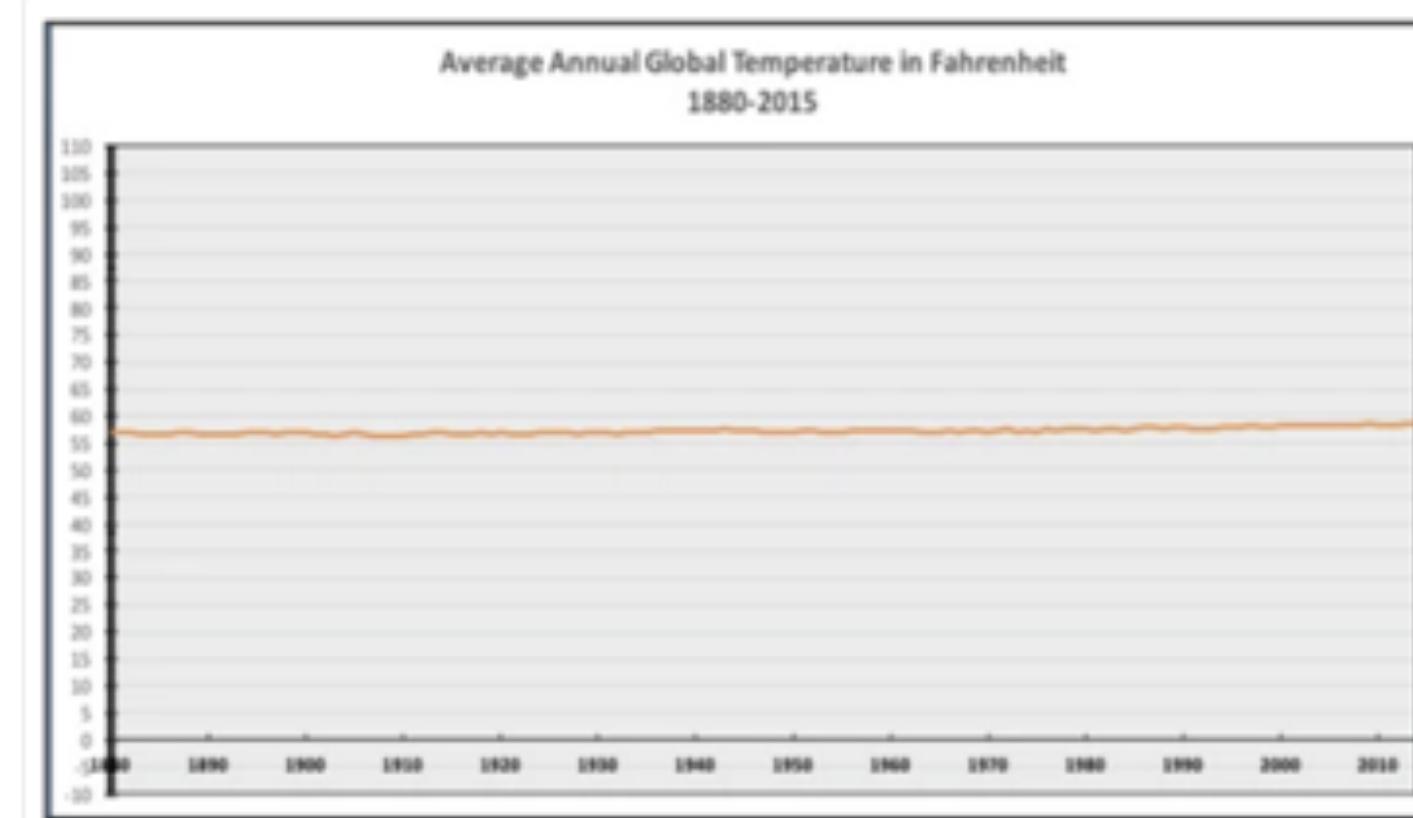
National Review

@NRO

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The only #climatechange chart you need to see. natl.re/wPKpro

(h/t [@powerlineUS](#))



1:36 PM - 14 Dec 2015

381 Retweets 308 Likes



422



381



308



Tweet your reply



sean. @SeanMcElwee - 14 Dec 2015

Replying to @NRO

.@NRO @powerlineUS no need to worry about the national debt then either!

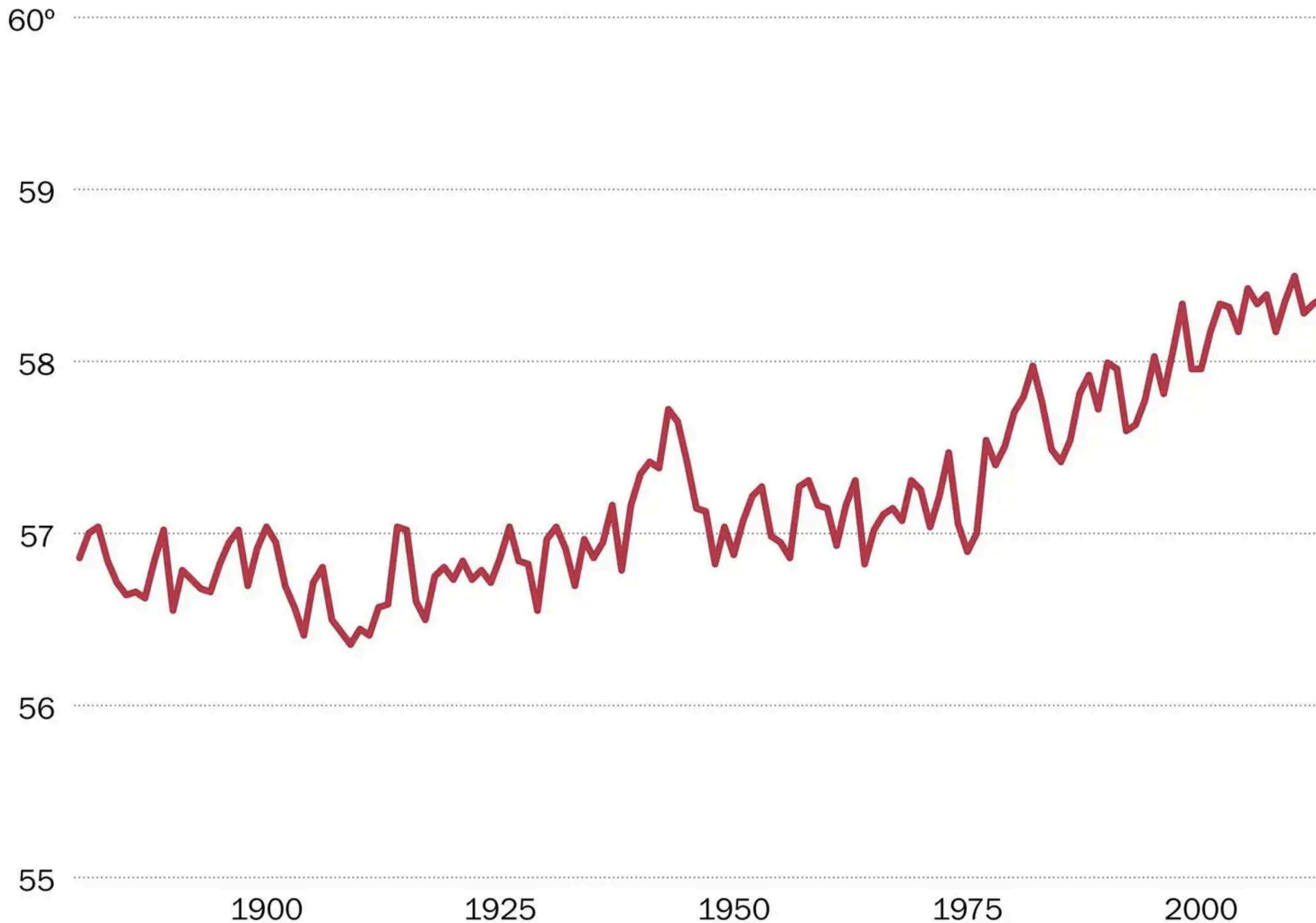
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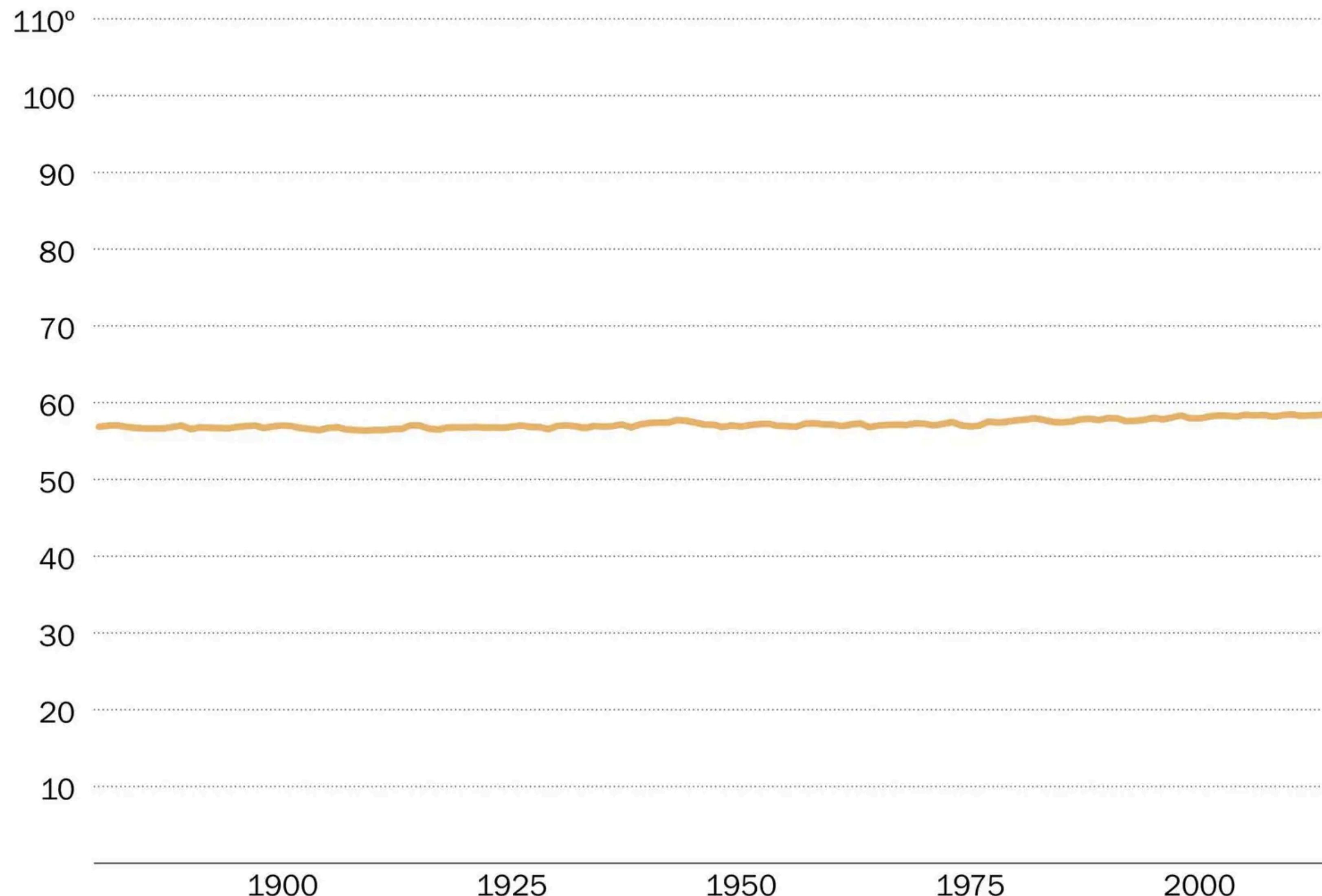
Average global temperature by year

Data from NASA/GISS.



Average global temperature by year, 50x scale

Data from NASA/GISS.



Visualização de Dados

*Ajudar pessoas a realizar tarefas de
uma maneira mais efetiva*

*O uso de representações visuais de
dados, suportadas por computadores,
para amplificar a cognição*

Readings in Information Visualization: Using Vision to
Think

By Stuart K. Card, Jock D. Mackinlay, Ben Shneiderman

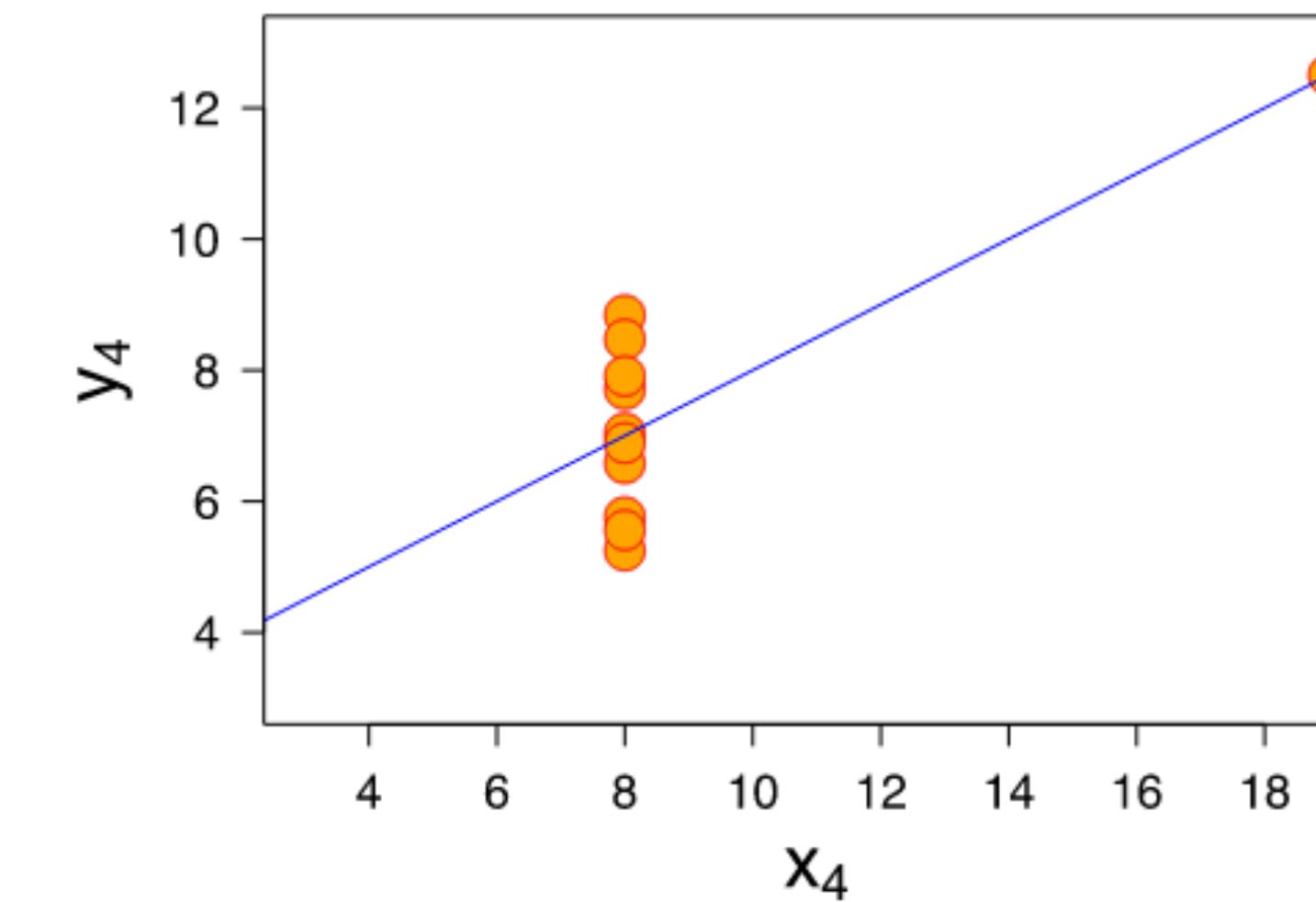
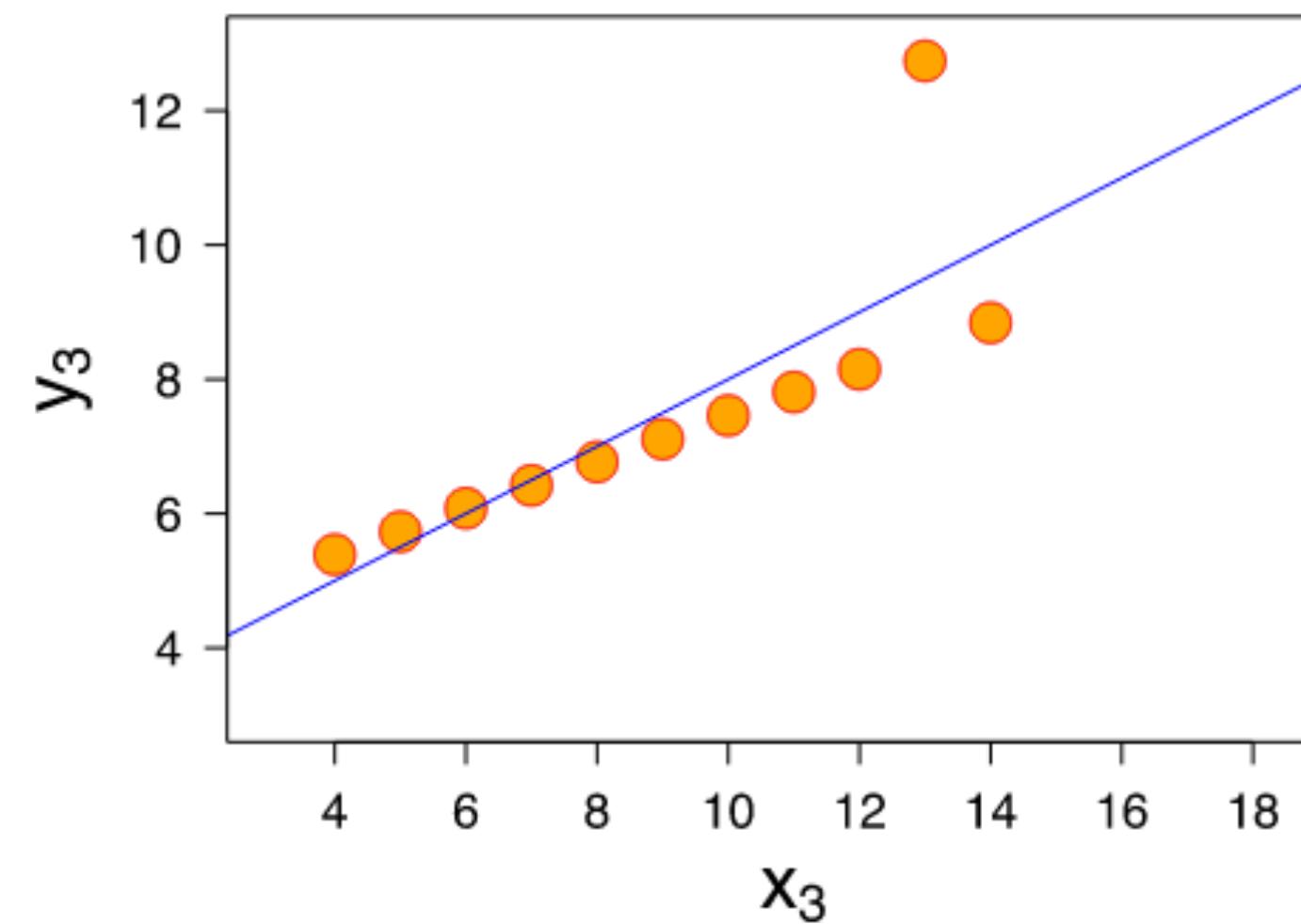
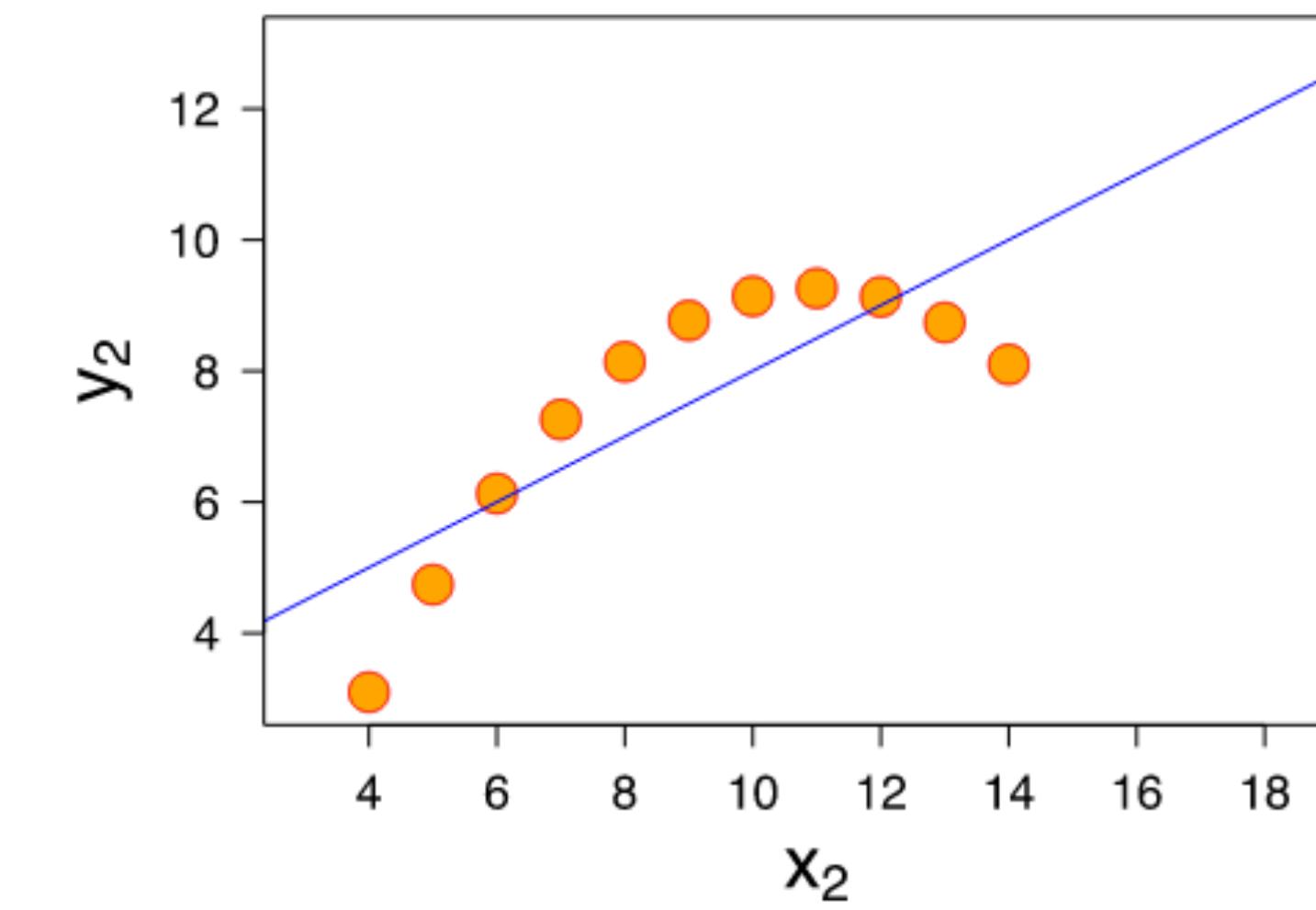
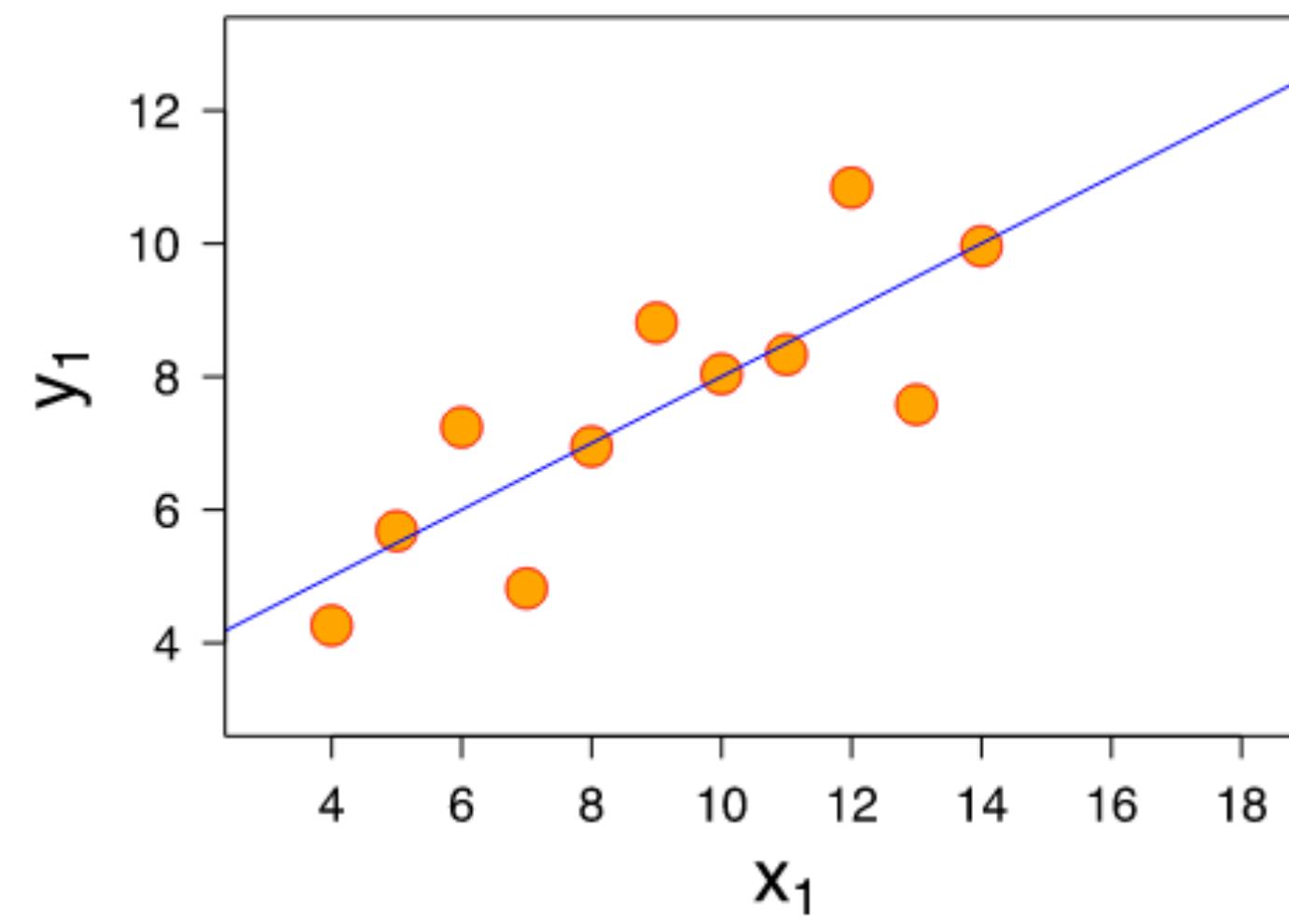
Quarteto de Anscomb

I		II		III		IV	
x	y	x	y	x	y	x	y
10.0	8.04	10.0	9.14	10.0	7.46	8.0	6.58
8.0	6.95					.0	5.76
13.0	7.58					.0	7.71
9.0	8.81					.0	8.84
11.0	8.33					.0	8.47
14.0	9.96					.0	7.04
6.0	7.24					.0	5.25
4.0	4.26					9.0	12.50
12.0	10.84	12.0	9.13	12.0	8.15	8.0	5.56
7.0	4.82	7.0	7.26	7.0	6.42	8.0	7.91
5.0	5.68	5.0	4.74	5.0	5.73	8.0	6.89

Para cada conjunto de dados:

Média(x) = 9
Média(y) = 7,5
Var(x) = 11
Var(y) = 4,12
Cor(x,y) = 0,816
Regressão Linear: $y = 0.5x + 3$

Quarteto de Anscomb



Visualização de Dados

O uso de representações visuais de dados, suportadas por computadores, para amplificar a cognição

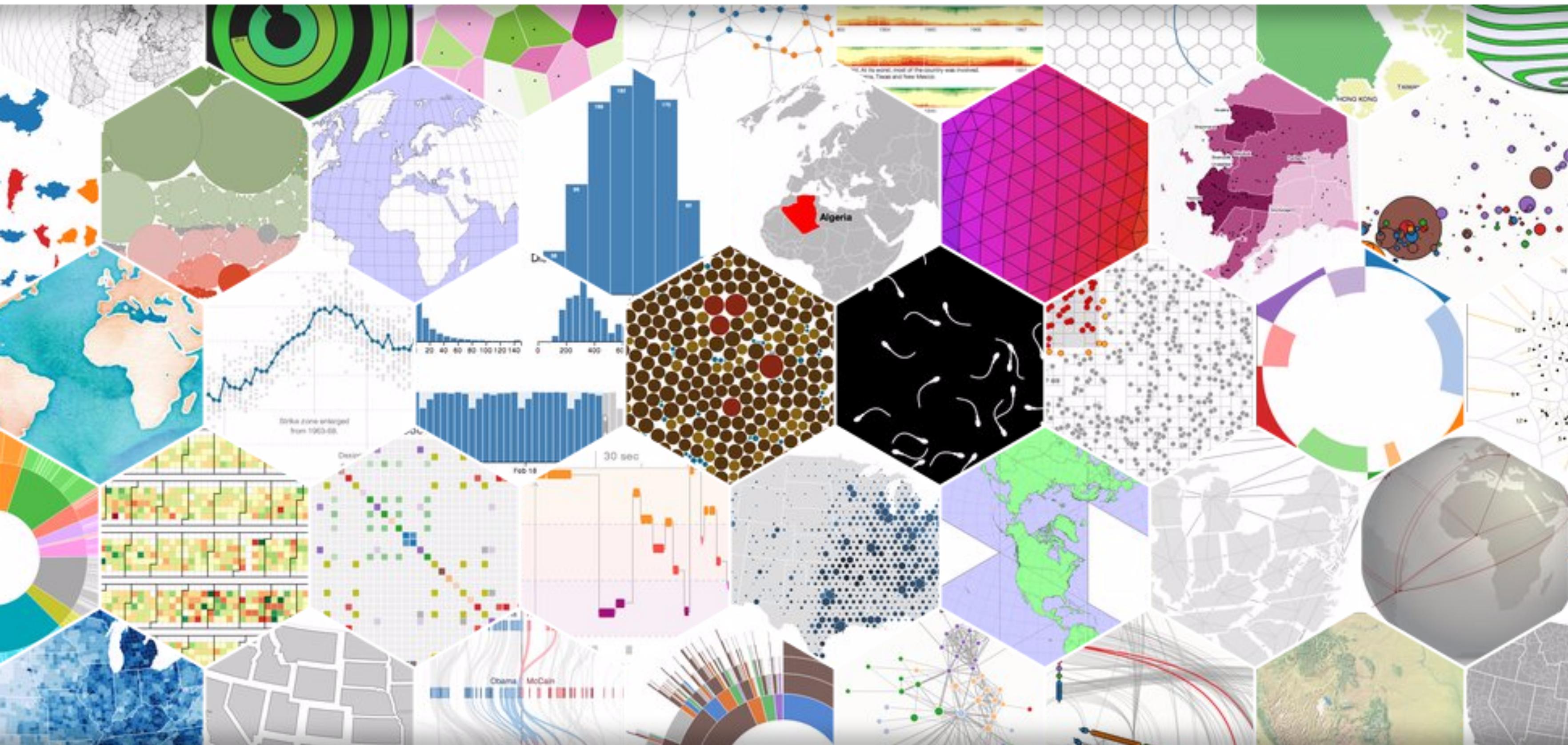
Readings in Information Visualization: Using Vision to Think

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Data-Driven Documents



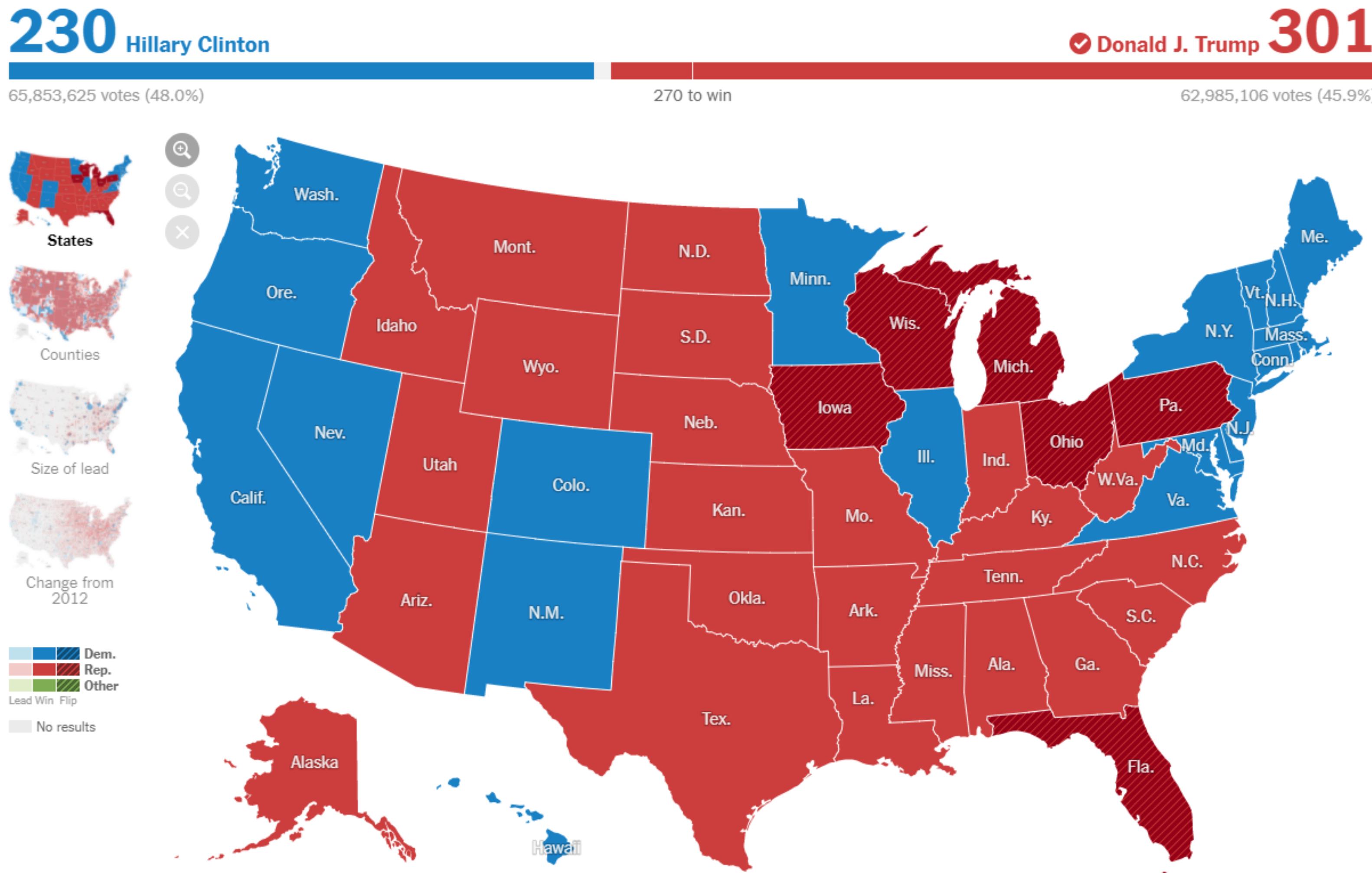
D3.js is a JavaScript library for manipulating documents based on data. **D3** helps you bring data to life using HTML, SVG, and CSS. D3's emphasis on web standards gives you the full capabilities of modern browsers without tying yourself to a proprietary framework, combining powerful visualization components and a data-driven approach to DOM manipulation.

[See more examples.](#)

Presidential Election Results: Donald J. Trump Wins

AUG. 1, 2017, 11:22 AM ET

Donald J. Trump won [the Electoral College](#) with 304 votes compared to 227 votes for Hillary Clinton. Seven electors voted for someone other than their party's candidate.



Usos da Visualização de Dados

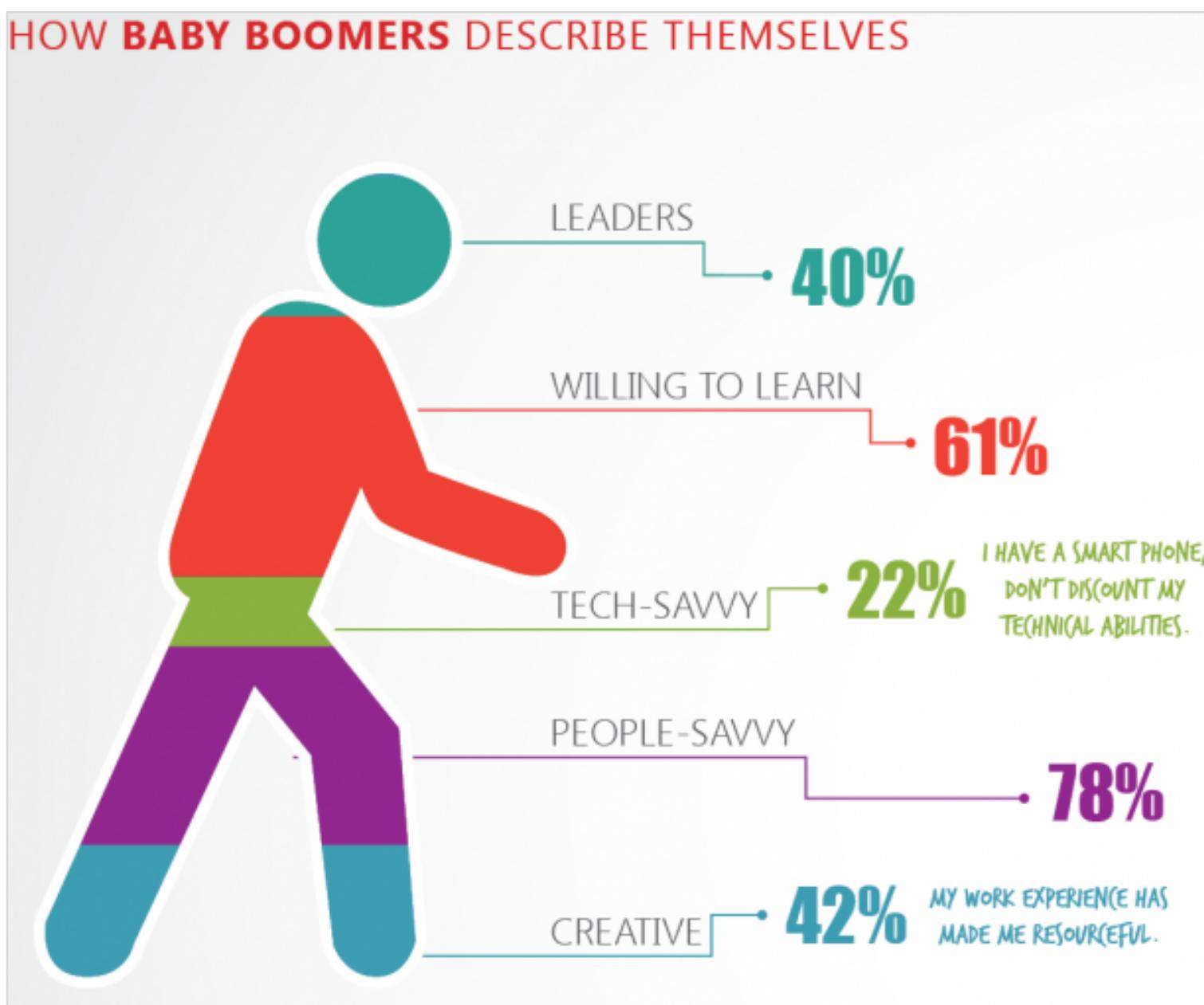
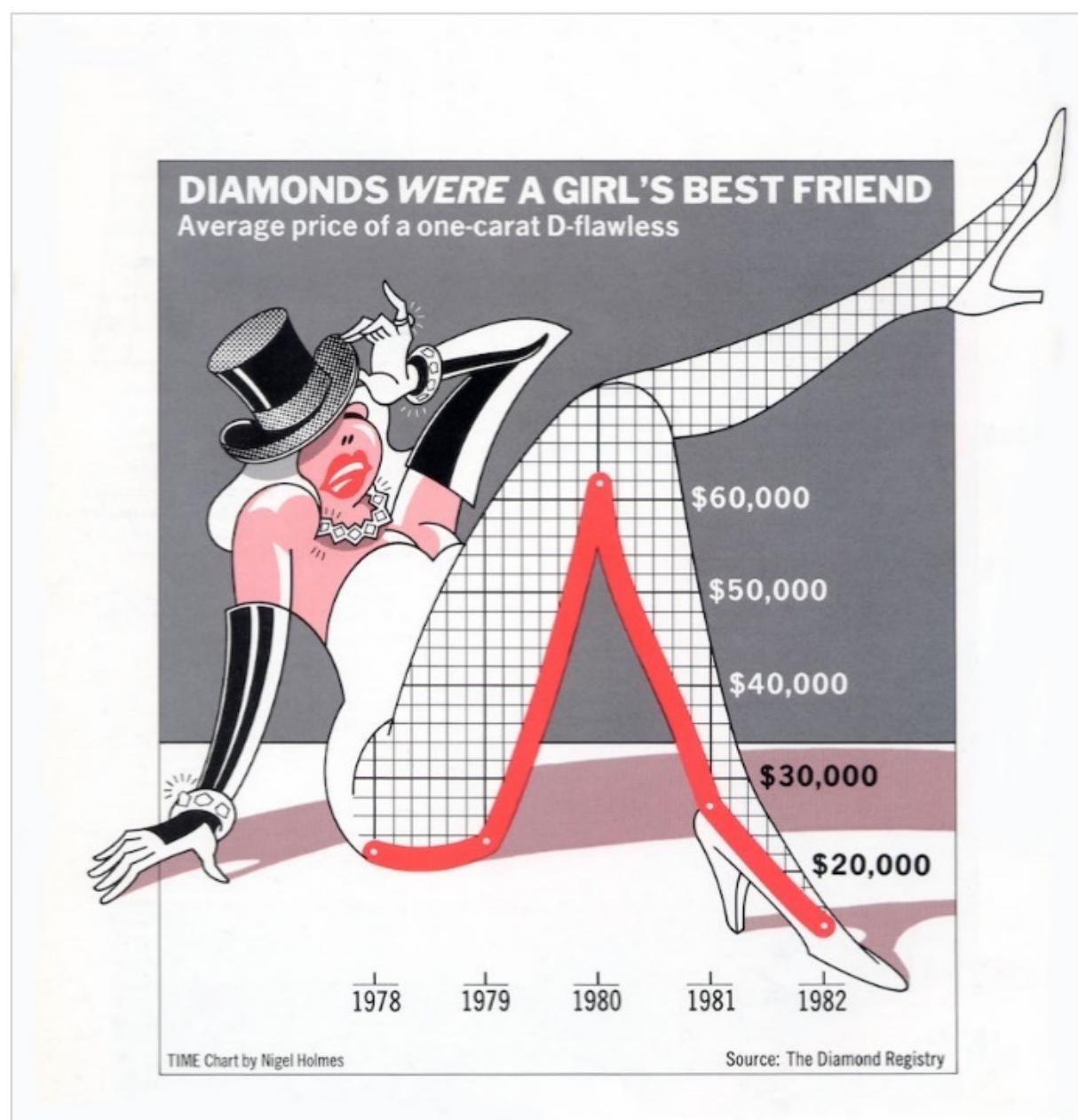


Usos da Visualização de Dados

Insight

Comunicação

Insight

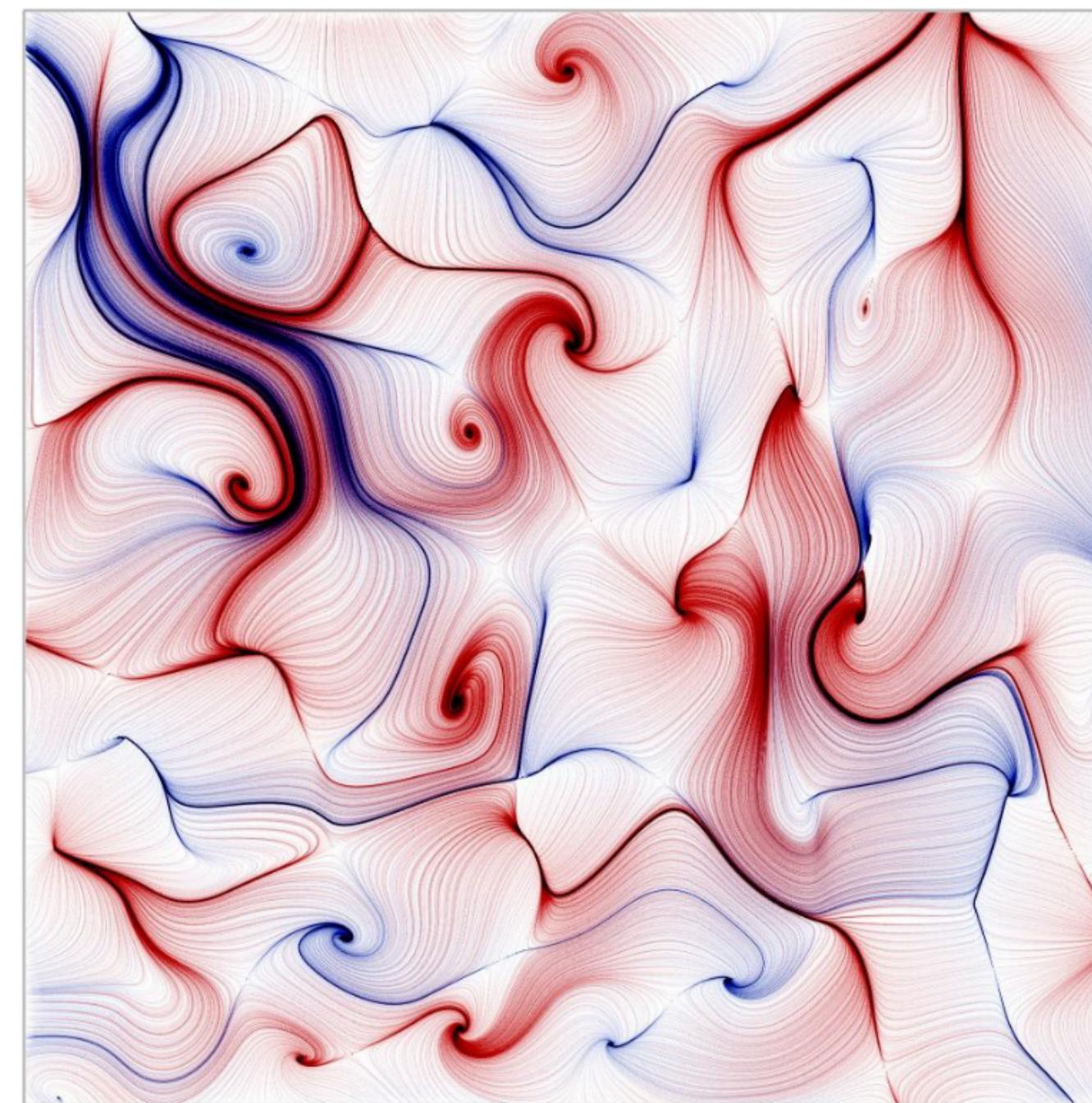


Usos da Visualização de Dados

Exploração/
Análise

Data

Insight

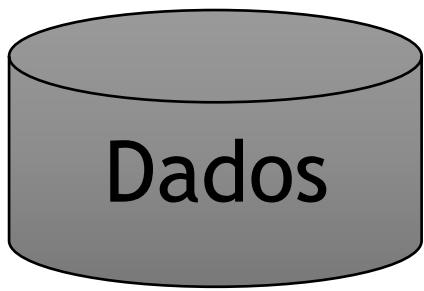


FlareVis		LinearScale		QuantileScale		Scale		Quantitative	
LineSprite	RectSprite	RootScale	LogScale	ScaleType	OrdinalScale	TimeScale			
DirtySprite	TextSprite	AspectRatioBanker	MergeEdge	CommunityStructure		SpanningTree		Betweenness	
IForc	DragI	Gravi	Sprin	AgglomerativeCluster		ShortestPaths		LinkDistance	
		HierarchicalCluster		Count	Sum	Minimu	Maximi	Averag	Distinc
				Or	And	Xor	Variable		
Spring	Particle	Literal	Not	Range	Aggregate	Variance	IsA	If	
Simulation	NBodyForc	BinaryExpressi	Fn	ExpressionItera		CompositeExpr	Match		
Arithme	Expression	Data	Data	Data	Data	Query			
		–		select	variance	mod	neq	sub	gt
StringU		count		where	xor				
DataUtil	DataSource	sum		update	stddev				
DateUti		max		orderby	not				
Conver	IDataC	min		min					
Compar	JSONC	average		or	fn				
	DelimitedTextConverter	distinct		and	isa				
	GraphMLConverter			lt	gte				

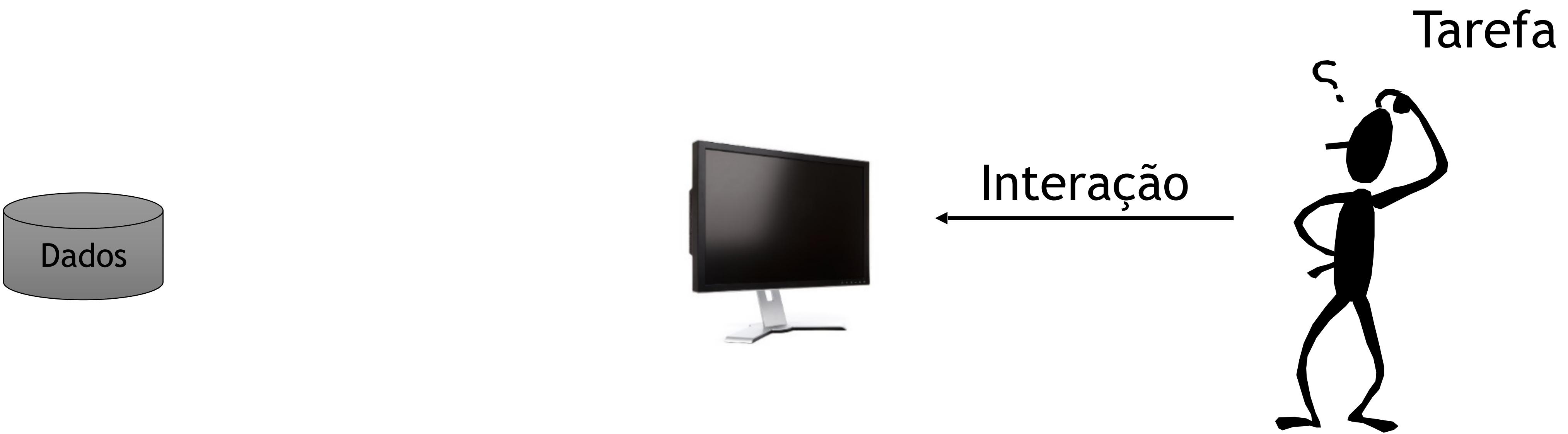
Exemplos

<https://visualizacao-ufpe.github.io/projects/>

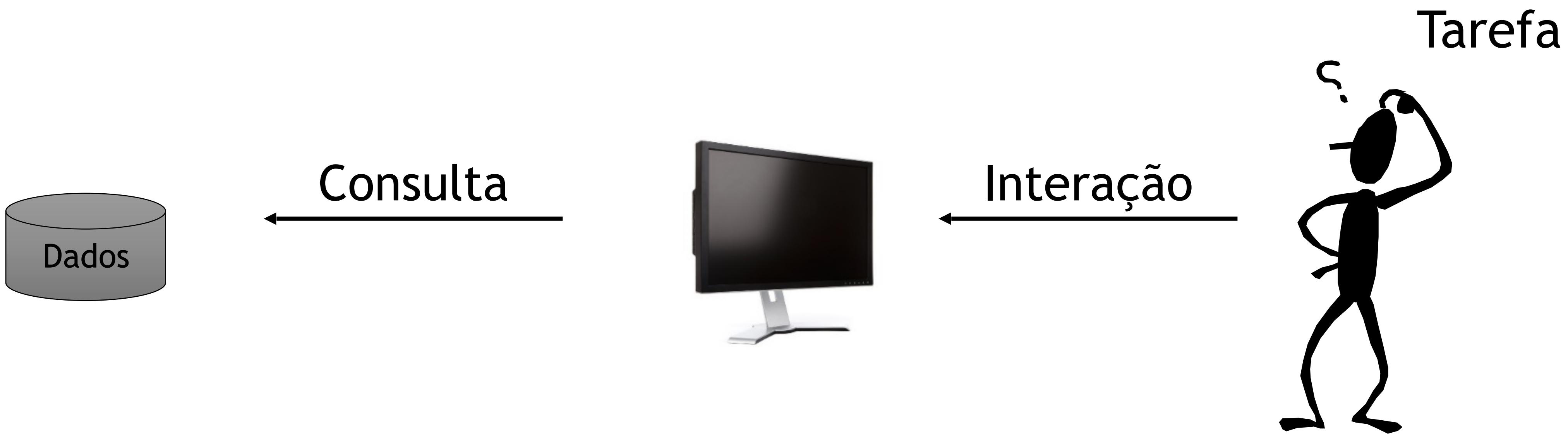
Processo de Visualização Interativa de Dados



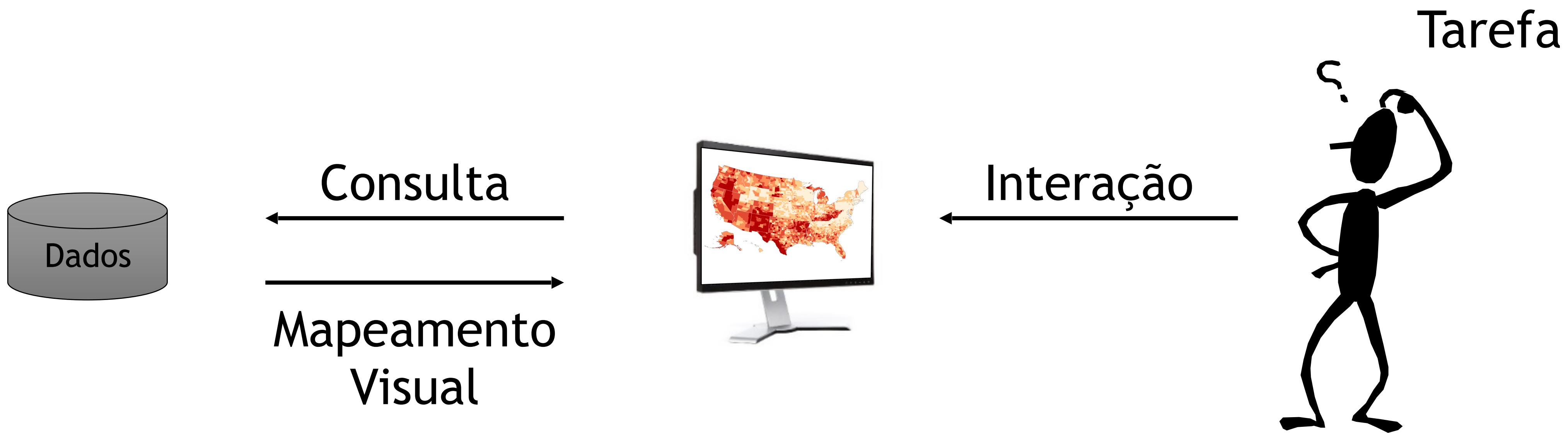
Processo de Visualização Interativa de Dados



Processo de Visualização Interativa de Dados



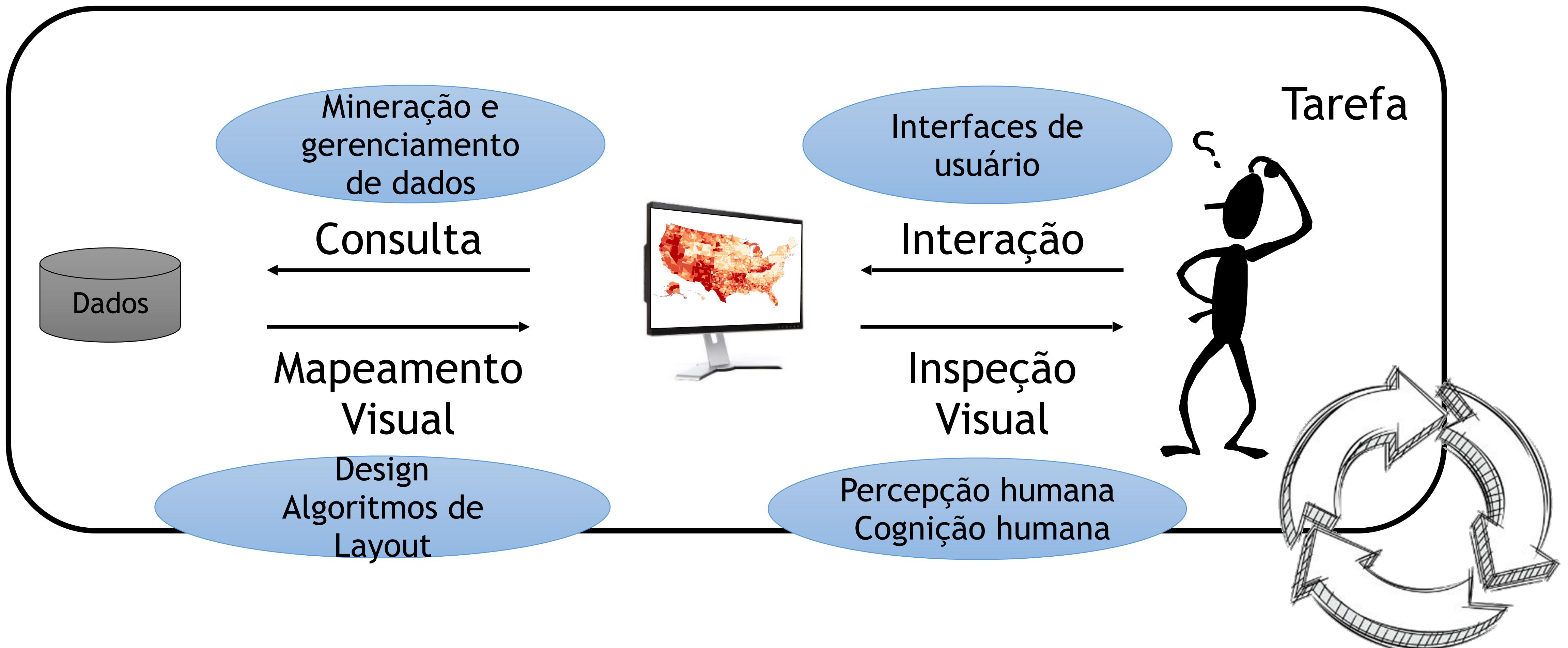
Processo de Visualização Interativa de Dados



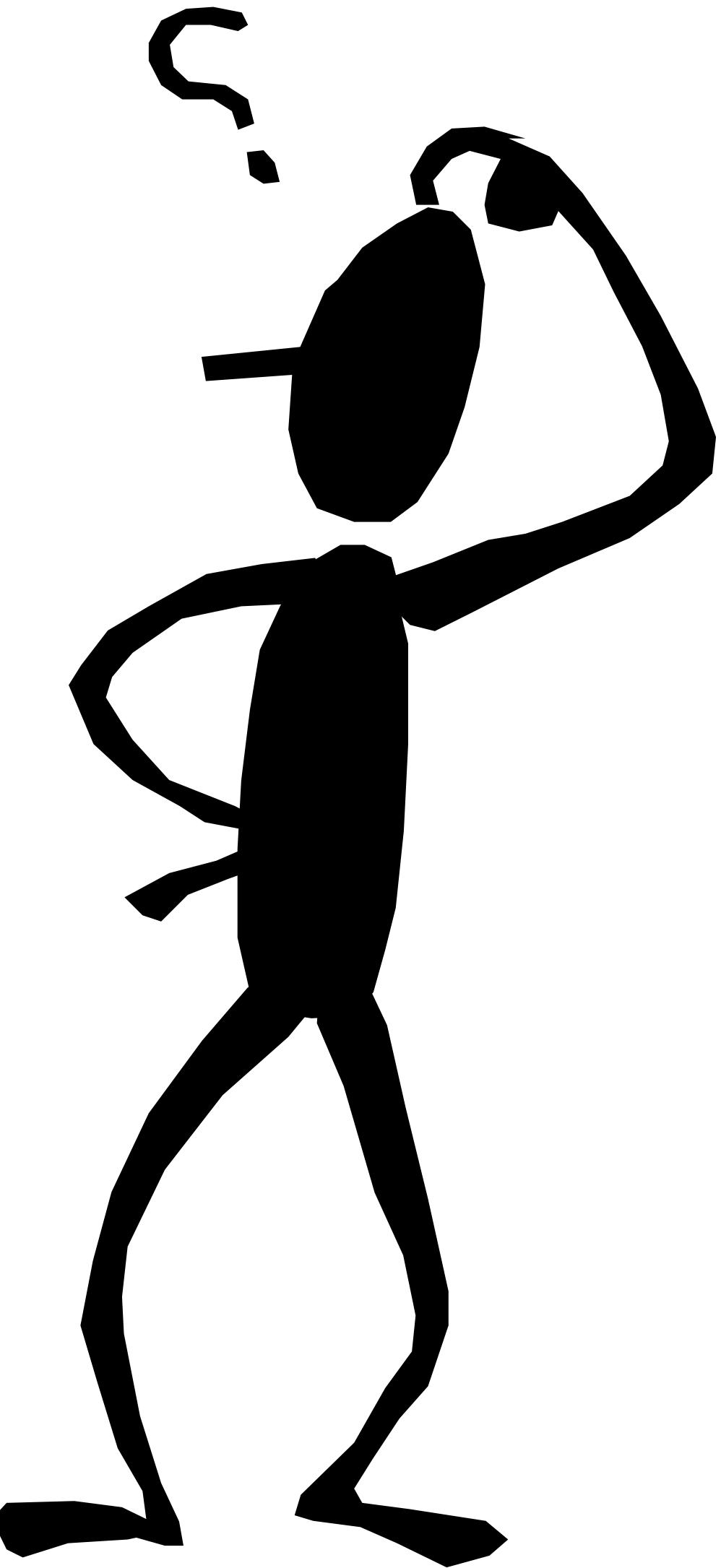
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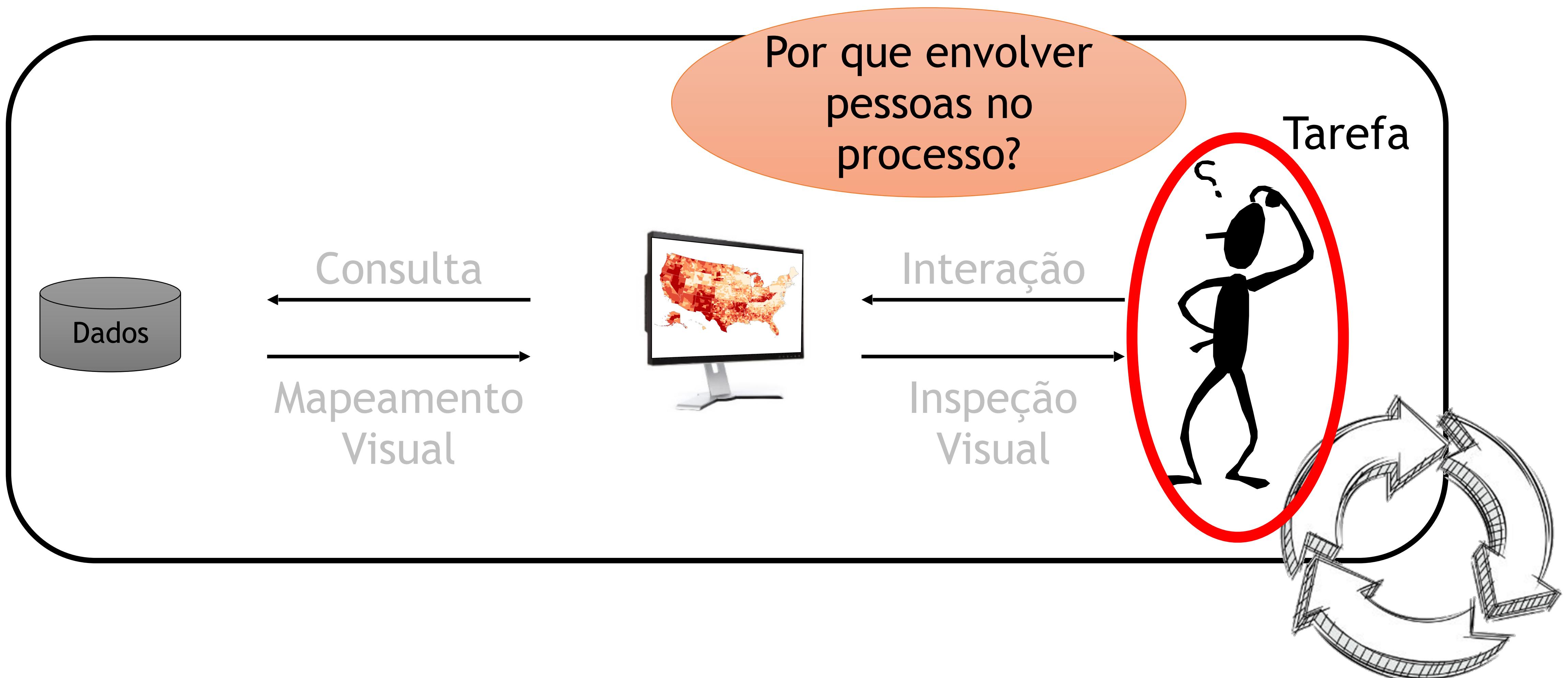
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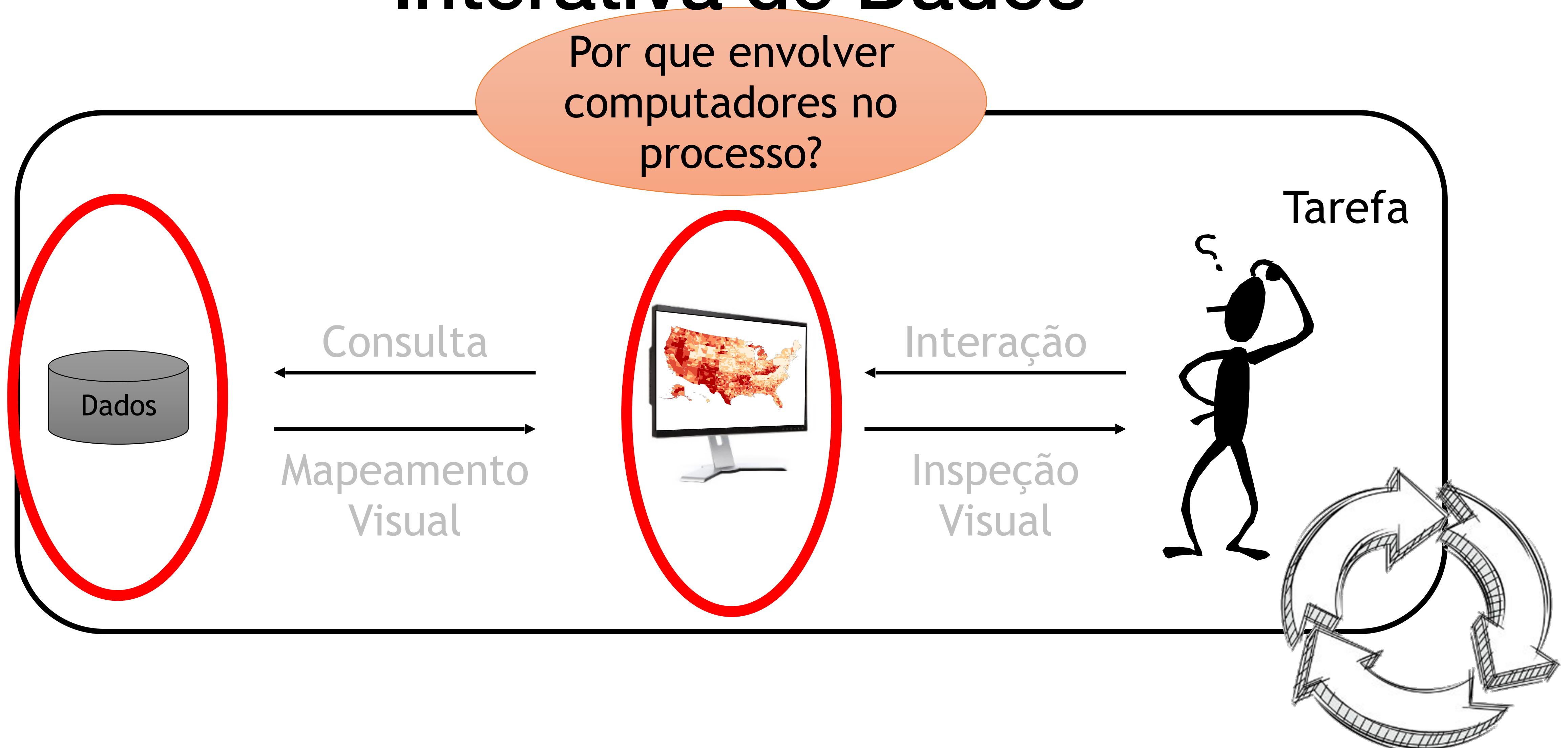
Mas... por quê?



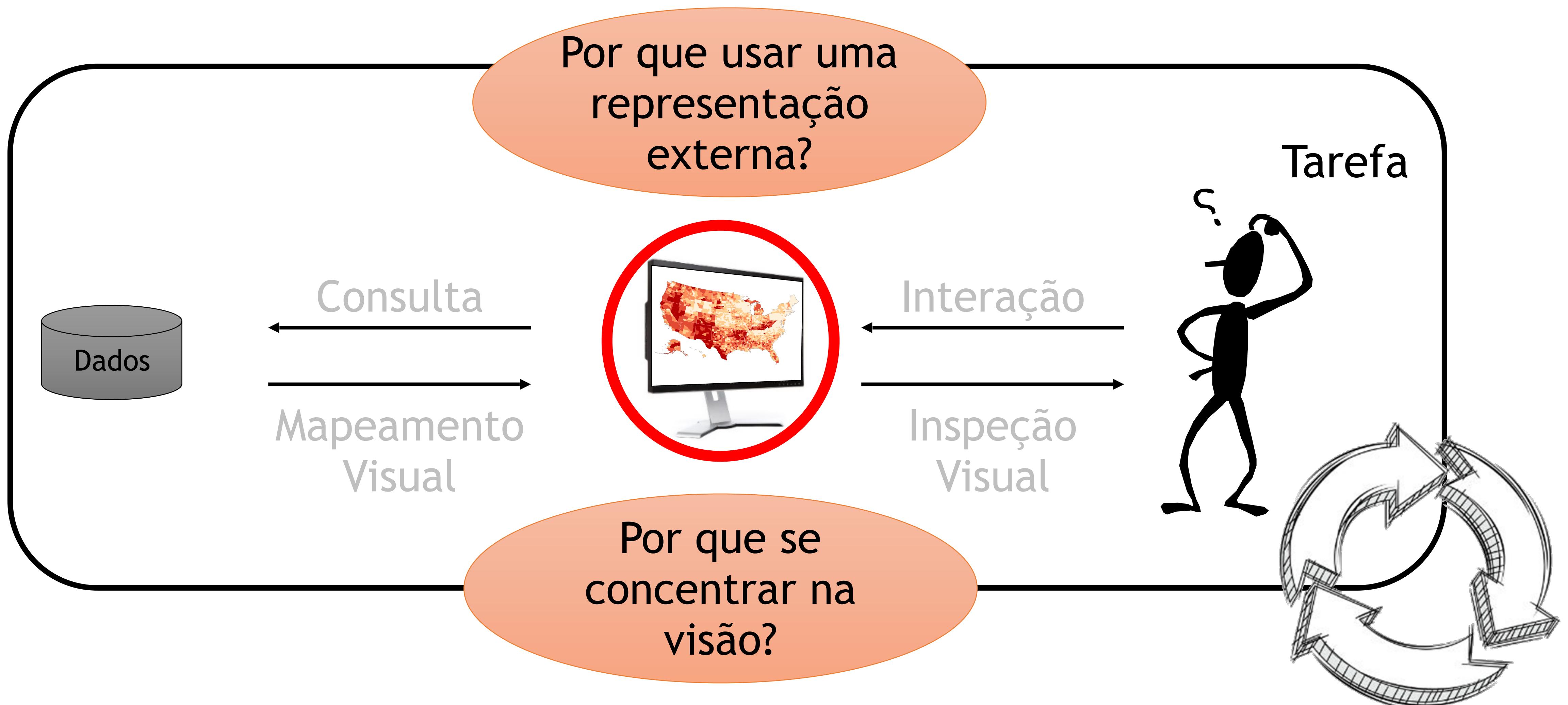
Processo de Visualização Interativa de Dados



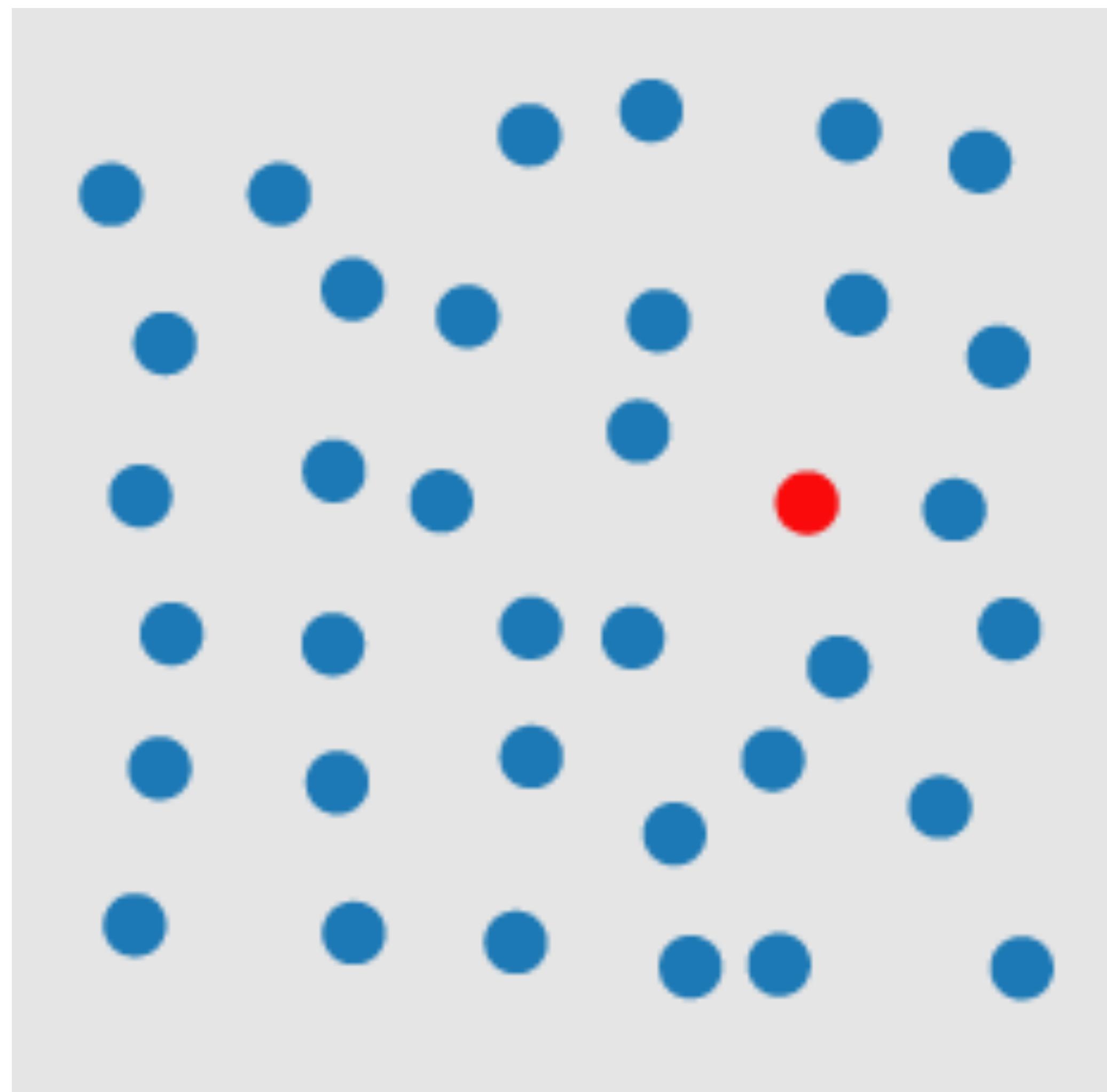
Processo de Visualização Interativa de Dados



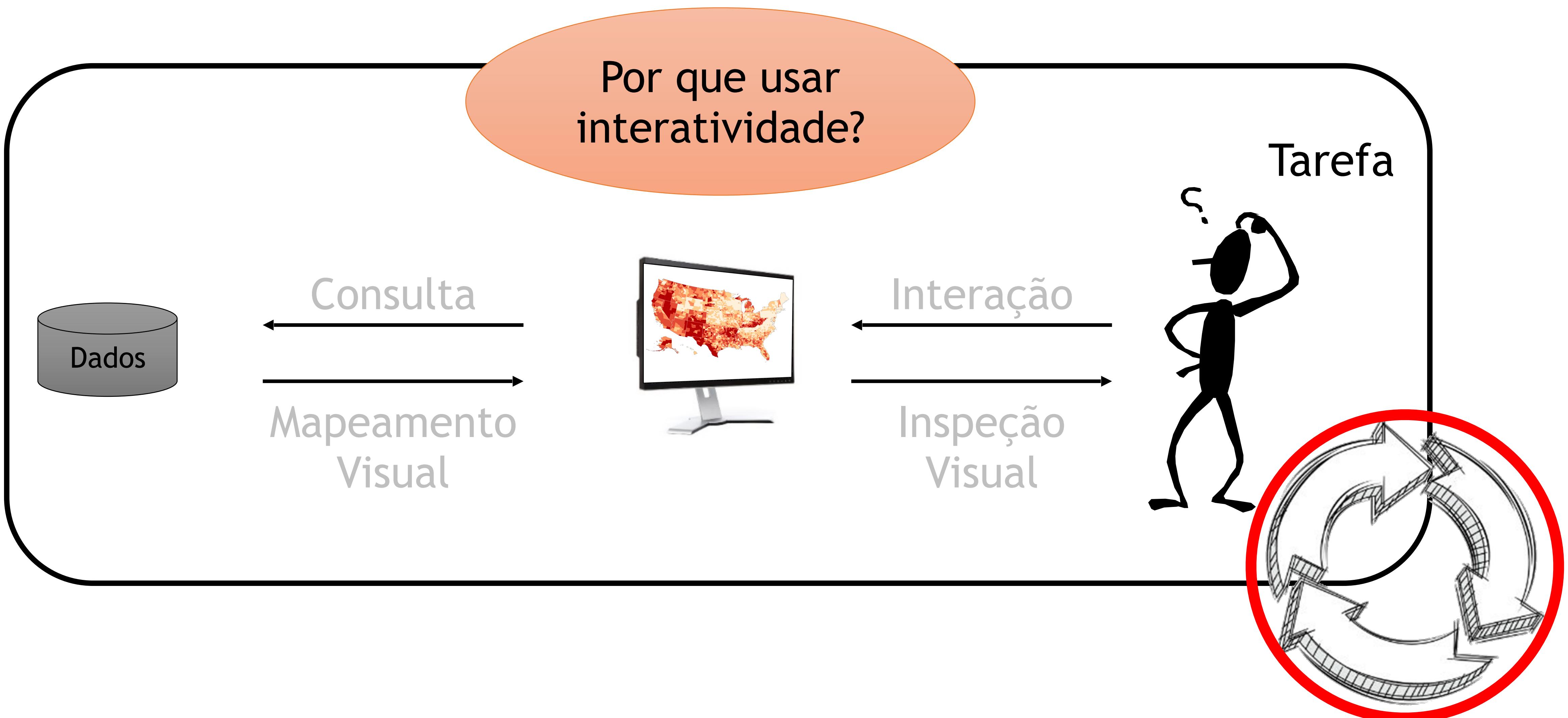
Processo de Visualização Interativa de Dados



“Visual Pop-Out”



Processo de Visualização Interativa de Dados



Objetivo

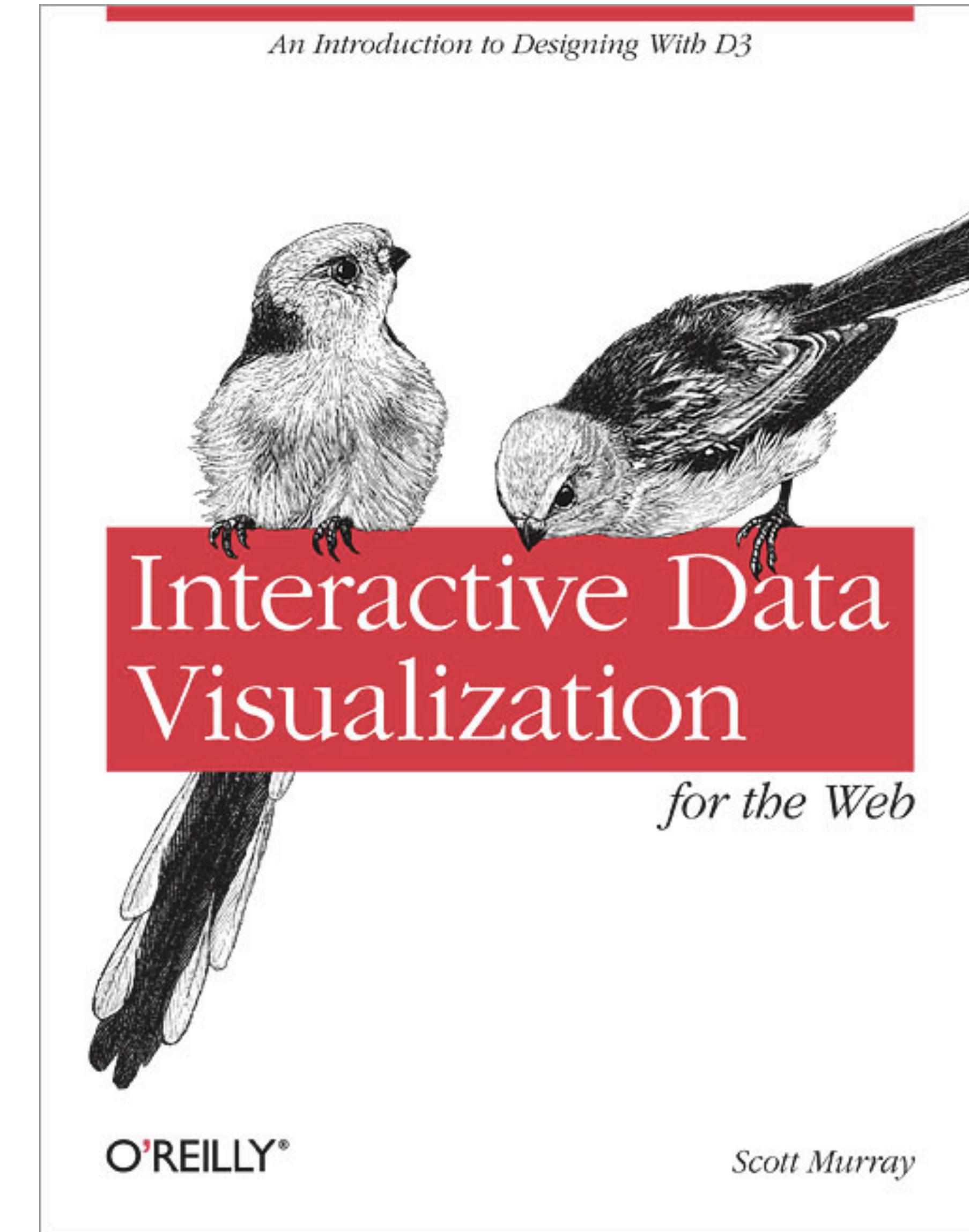
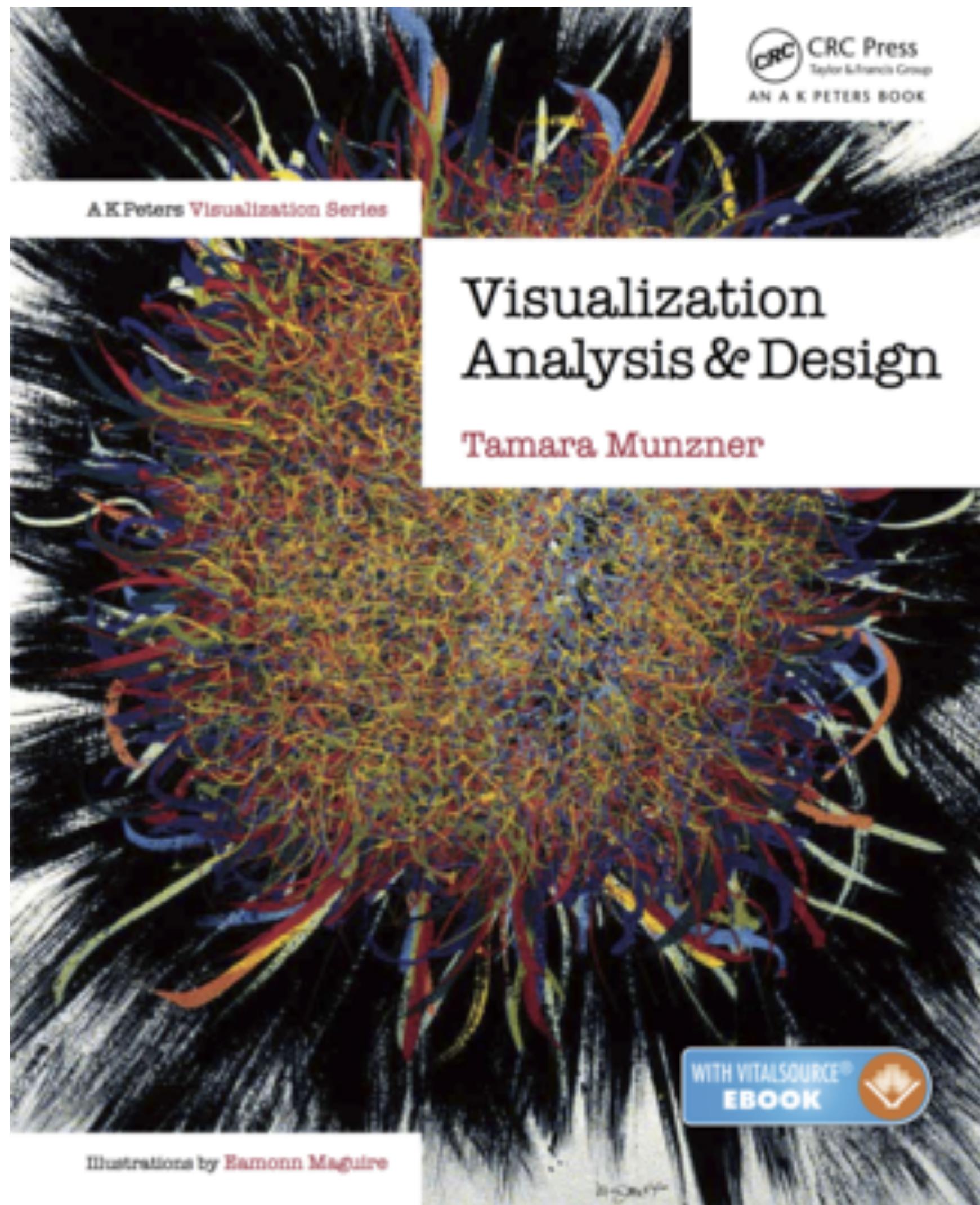
- Aprender técnicas para visualização de dados complexos
- Princípios básicos para avaliar visualizações
- Tecnologias para implementar visualizações (JS)

Plano do Curso

- Princípios de Design de Visualizações
- Crossfilter.js
- Visualização de Dados Multi-dimensionais
- Visualização de Dados Geográficos e a Biblioteca Leaflet.js
- Introdução a D3.js
- Exemplos

Referências

Livros





Visualization and Visual Communication

What's happening in information visualization? Robert Kosara digests new and emerging developments and explores what we know and don't know – so we can be less wrong about visualization.



Visualization
Research
Explained

SUPPORT

DATA STORIES

