

Ethical Data Visualization

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Session 5 of the
Planning Workshop: Ethical Visualizaiton in the Age of Big Data

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ETHICAL VISUALIZATION



SCOPE THE VISUALIZATION

IDENTIFY GOAL

What will the goal of your visualization be?
Identify who the visualization is primarily for, and what attitude or action you want it to foster.

What's the best way to treat and share my data?

DEFINE ARGUMENT

Which argument best achieves this goal?
Define an argument on a specific subject that meets your goal, by resonating with the audience.

REVIEW MATERIALS

What does the literature say on this argument?
Find and learn from recent academic and commercial publications on this subject.

COMBINE SOURCES

What sources will you draw from?
Combine reputable datasets and/or documents to create a preliminary, aggregated dataset.



PREPARE THE DATASET

IMPROVE VERACITY

Will the data hold up under scrutiny?
Clean, normalize, and refine the aggregated dataset, remove questionable data points.

DESCRIBE DATA

Is your dataset intelligible and navigable?
Create a working dataset by adding necessary structure, and descriptions in metadata.



VISUALIZE THE DATA

REVIEW ETHICS

What are the latest ethical recommendations?
Find and review the latest ethical visualization literature to learn about best practices.

REFINE ARGUMENT

How will your visualization show the argument?
Choose the media, format, and functionality to best communicate your visualization's argument.

Remember:
Your design choices are just as important as the

**Is it possible to find evidence
of historical power relations
in visual materials?**

**Is it possible to find evidence
of historical power relations
in visual materials?**

Yes

Governmentality

"Studies of governmentality emphasize th[e] visual and spatial dimension of government that they seek to draw attention to these diagrams of power and authority"

—Mitchell Dean

Technologies of government

Technologies of government

— Forces

Technologies of government

- Forces

- **Techniques**

Technologies of government

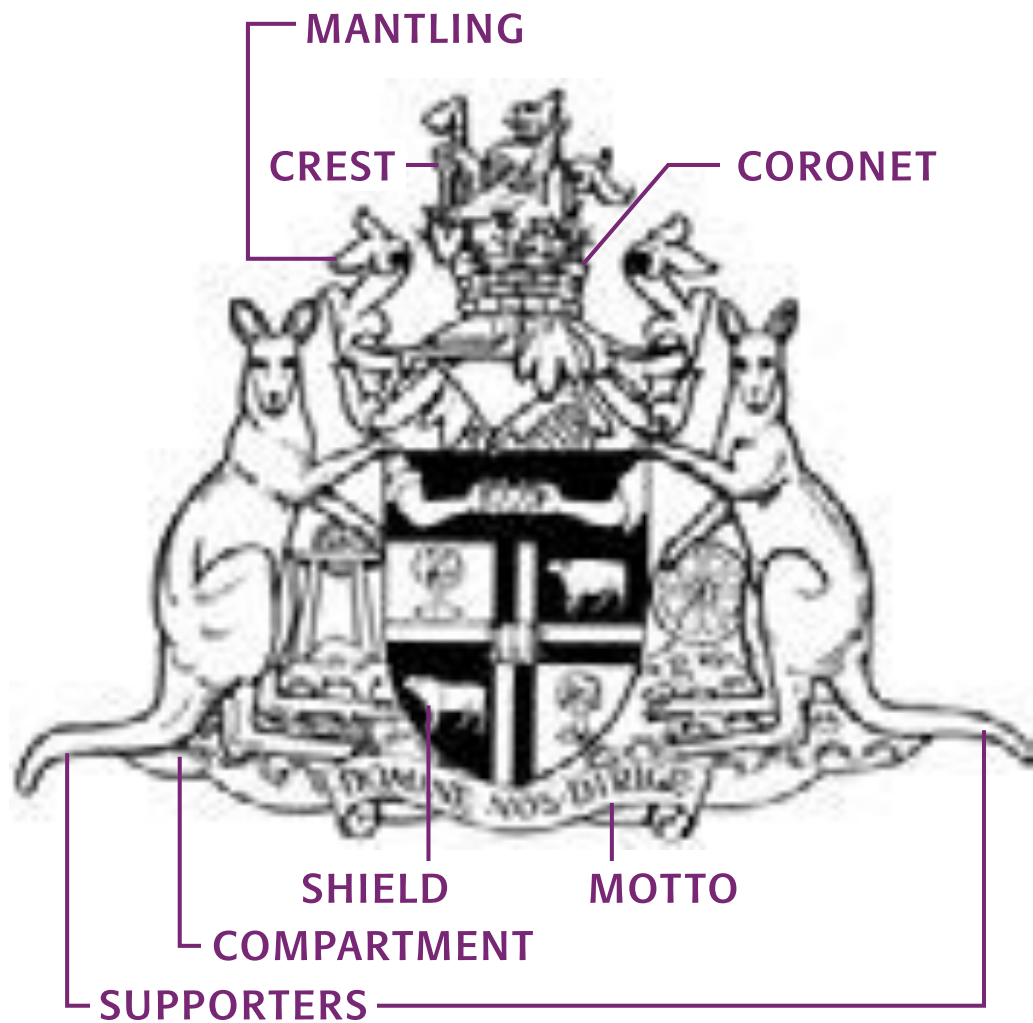
- Forces

- Techniques

- Devices




CARDINIA



EMBODIED TECHNOLOGIES

TECHNOLOGIES OF FORM

EMBLEM FORM

FORCES

TECHNIQUES

DEVICES

IMAGE FORM

FORCES

TECHNIQUES

DEVICES

WORD FORM

FORCES

TECHNIQUES

DEVICES

TECHNOLOGIES OF CONTENT

IMAGE CONTENT

FORCES

TECHNIQUES

DEVICES

WORD CONTENT

FORCES

TECHNIQUES

DEVICES

External technologies

Technologies of government

Profession

Force	Technique	Device
Professional practise	Professional system	Emblem type
Graphic design practise	Corporate identity	Coat of arms Logo
Heraldic practise	Heraldry	Seal
	Para-heraldry	

Embodied technologies

Technologies of form

Emblem form

Force	Technique	Device
Emblem type	Period style	External shape
Coat of arms	Decorative	Landscape
Logo	International	Portrait
Seal	Modern	Rectangular
	Postmodern	Round

Manufacture effect	Colour type	Colour
Bromide	Black & white	Blue
Cast metal	Colour	Brown
Etching	- Primary colour	Green
Pen & ink	- Secondary colour	Orange
Vector	colour	Purple
	- Tertiary colour	Red
		Yellow

Where more than one colour is present, one or more colour facets may be selected per emblem.

Word form (typography)

Technique	Device
Typeface	Typographic system
Type	Asymmetrical
No type	Symmetrical
	Dilatational
Display	Dynamic balance
- Decorative	
- Script	
Sans serif	
- Grotesque	Type accent
- Neogrotesque	Italic
- Humanist	Roman
- Geometric	
Serif	Type case
- Humanist	Lower case
- Transitional	Small caps
- Modernist	Title case
- Slab	Upper case
	Type weight
	Light
	Book
	Bold
	Heavy

Where more than one typeface is present, one or more typeface facet may be selected per emblem.

Production

Force	Technique	Device
Tool	Use	Manufacture effect
Paper	Lithography?	Bromide
Ink	Offset printing	Cast metal
Printing press	Bromide	Etching
Computer	photography	Pen & ink
	Desktop publishing	Vector

Technologies of content

Word content: Motto

Force	Technique	Device
Language	Reference	Allegiance
Motto	Allegiance	Faith
- English	Aspiration	God
- French	Environment	
- Latin	Industry	
No motto		

Aspiration
Rectitude
Light
Good tidings
Honour
Preparation
Justice
Courage

Environment
Haven

Industry
Cornucopia
Work

Word content: Name

Force	Technique	Device
Language	Name	Location
Name	Full name	Australia
- English	Name +	Murray River
No name	- Citizens	Natimuk
	- Location	Victoria
	- Year	No location
	Partial name	
	No name	
		People
		Citizen
		Councillor
		Mayor
		Ratepayer
		No people
		These facets are not mutually exclusive. One or more location facets may be selected per emblem.
		Year
		Year
		No year

Image content

Force	Technique	Device
Meaning	Allegiance	Leisure
Associative	Christianity	Art
Descriptive	Civic	Sport
Found	Law	No leisure
Metaphor	Monarchy	
	Nation	
	No allegiance	

Myth
Biblical
Greek/Roman
Heraldic
Local
No myth

Environment
Architecture
Fauna
- Bird
- Bivalve
- Cetacea
- Marsupial
Flora
- Flower
- Small plant
- Tree
Geography
Weather
No environment

Industry
Primary
- Agriculture
- Fishing/Whaling
- Logging
- Mining
- Viticulture
Secondary
- Manufacturing
- Tertiary
- Education
- Transport
No industry

Force	Technique	Device
Meaning	Allegiance	Leisure
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Metaphor	Monarchy	
	Nation	
	No allegiance	

Internal shape
Rectangle
Ribbon
Shield
Sphere
No internal shape

Allegiance
Civic
Mural crown

Christianity
Bible
Cross

Law
Balance of scales

Monarchy
British royal arms
British royal crown
British royal motto
Queens Victoria

Nation
Australian arms
Australian motto
Southern cross

Environment
Architecture
Part
- Clock tower
- Column
- Castle
- House
Building
- Lighthouse
- Town hall
Structure
- Jetty
- Monument
- Radio tower

Flora
Flower
- Lily
- Pink heath
- Wattle
- Generic flower

Small plant
- Fern
- Grass
- Reeds
- Generic leaf
Tree
- Eucalypt
- Palm tree
- Red gum
- Generic tree

Fauna
Bivalve
- Shell
Cetacea
- Dolphin
Bird
- Cockatoo
- Emu
- Falcon
- Heron
- Honeyeater
- Lyrebird
- Magpie
- Kookaburra
- Pelican
- Seagull
- Swan
- Generic bird
Marsupial
- Kangaroo
- Wombat

Geography
Land
- Cliff
- Hill
- Horizon line
- Mountain
Water
- Lake
- River
- Sea
- Swamp
- Waterfall

Industry
Agriculture
Farm animals
- Bee
- Beehive
- Cow
- Horns
- Rooster
- Sheep
Crops
- Fruit tree
- Pasture
- Planted crop
Produce
- Fruit
- Bag of grain
- Ear of wheat
- Wheat sheaf
Tools
- Hoe
- Rake
- Sickle
- Thresher
- Windmill

Education
Book
Owl
Quill
Transport
Carriage lantern
Carriage wheel
Horse
Road
Train
Leisure
Art
Paintbrush
Pencil
Sport
Golf
Rowing
Sailboat
Windsurfer

Fishing/Whaling
Anchor
Fish
Semaphore flags
Ship
Whale

Logging
Axe
Saw blade
Tree stump
Mining
Gold pan
Mine
Pickaxe
Shovel

Viticulture
Grapes

Manufacturing
Barrel
Cogged wheel
Factory
Grinding stone

Population
Citizens
Hands clasped
Generic person

Employment
Boatman
Farmer
Miner
Tracker

Ethnicity
British
- Cornish bird
- English lion
- Scottish unicorn
- Welsh lion
- St George cross
Indigenous

- Boomerang
- Black person
- Dot painting
- Spear
Irish
- Irish harp
- Clover

Myth
Biblical
Noah's ark
Sword of St Paul
Dove w branch

Greek/Roman
Aequitas
Cornucopia
Drinking horn
Laurel
Lyre
Mermaid
Olympic torch
Pegasus
Trident
Trireme

Heraldic
Knights templar
Other harp

Local
Eureka stockade

EXTERNAL GOVERNANCE IDEOLOGY	EMBODIED GOVERNANCE DISCOURSE	DISCOURSE TECHNOLOGY
IMPERIALISM	BRITANNIA	POSSESSION GLORY FAITH
CLASSICAL LIBERALISM	TRADE	PASTORALISM PLUNDER TRANSPORT
EXCLUSIONISM	THE OTHER	ABORIGINES WOMEN DIGGERS
NATIONALISM	INDEPENDENCE	ROMANCE PRIDE UNITY
KEYNESIAN WELFAREISM	PROGRESS	ASPIRATION MECHANISATION MODERNITY
NEOLIBERALISM	COMMERCIALISATION	BUSINESS NEUTRALITY JUXTAPOSITION

**Power structures leave distinct,
traceable, and measurable
visual evidence**

Racial Terror Lynchings

Racial terror lynchings were not limited to the South, but the Southern states had the most in the nation: over 4,000 between 1877 and 1950.

RACIAL TERROR LYNCHINGS

MAP OF WHITE SUPREMACY MOB VIOLENCE

Kinds of argument in visualizations

Kinds of argument in visualizations

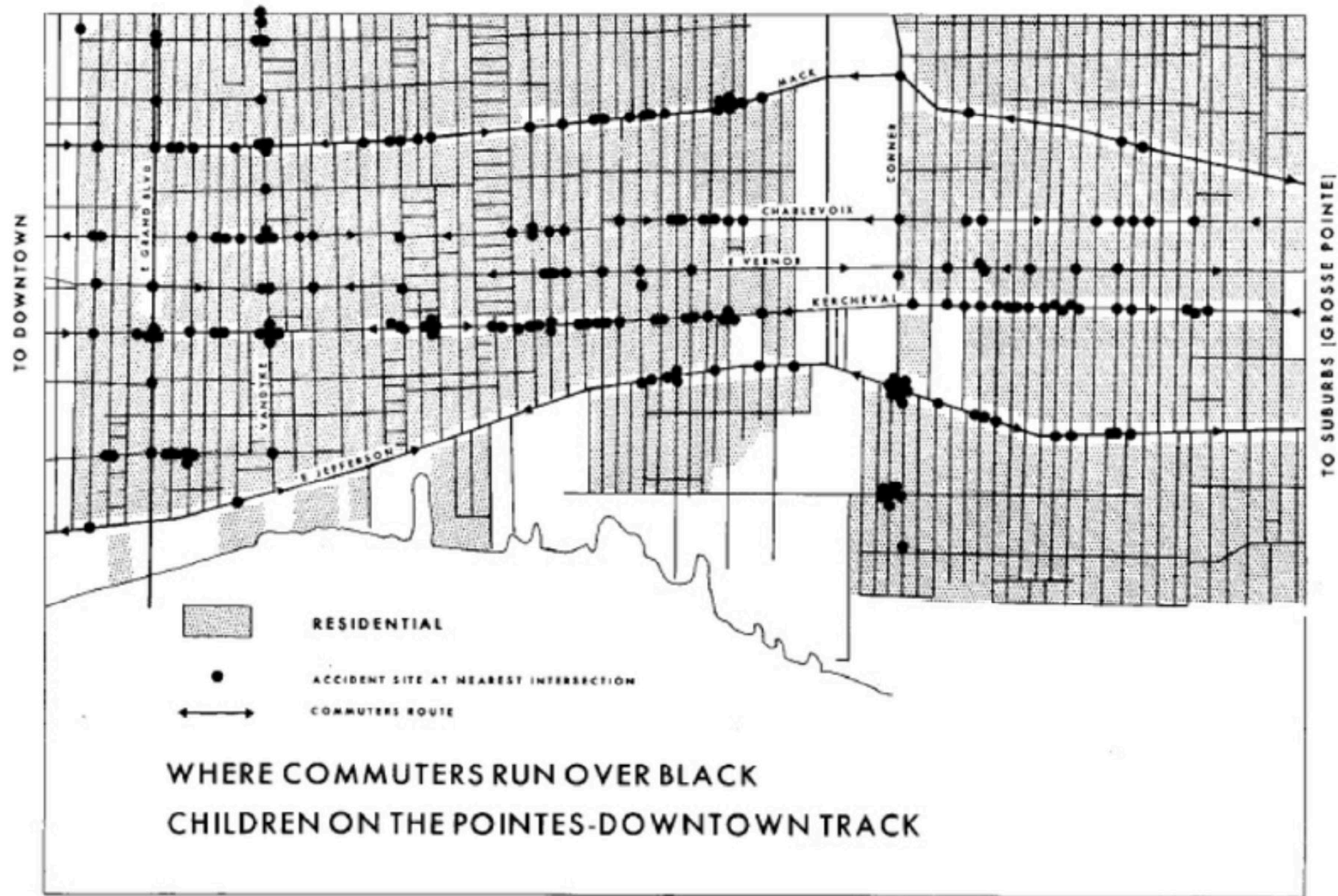
» **Explicit argumentation**

Kinds of argument in visualizations

- » **Explicit argumentation**
- » **Implicit argumentation**

Explicit argumentation

» **Titles**

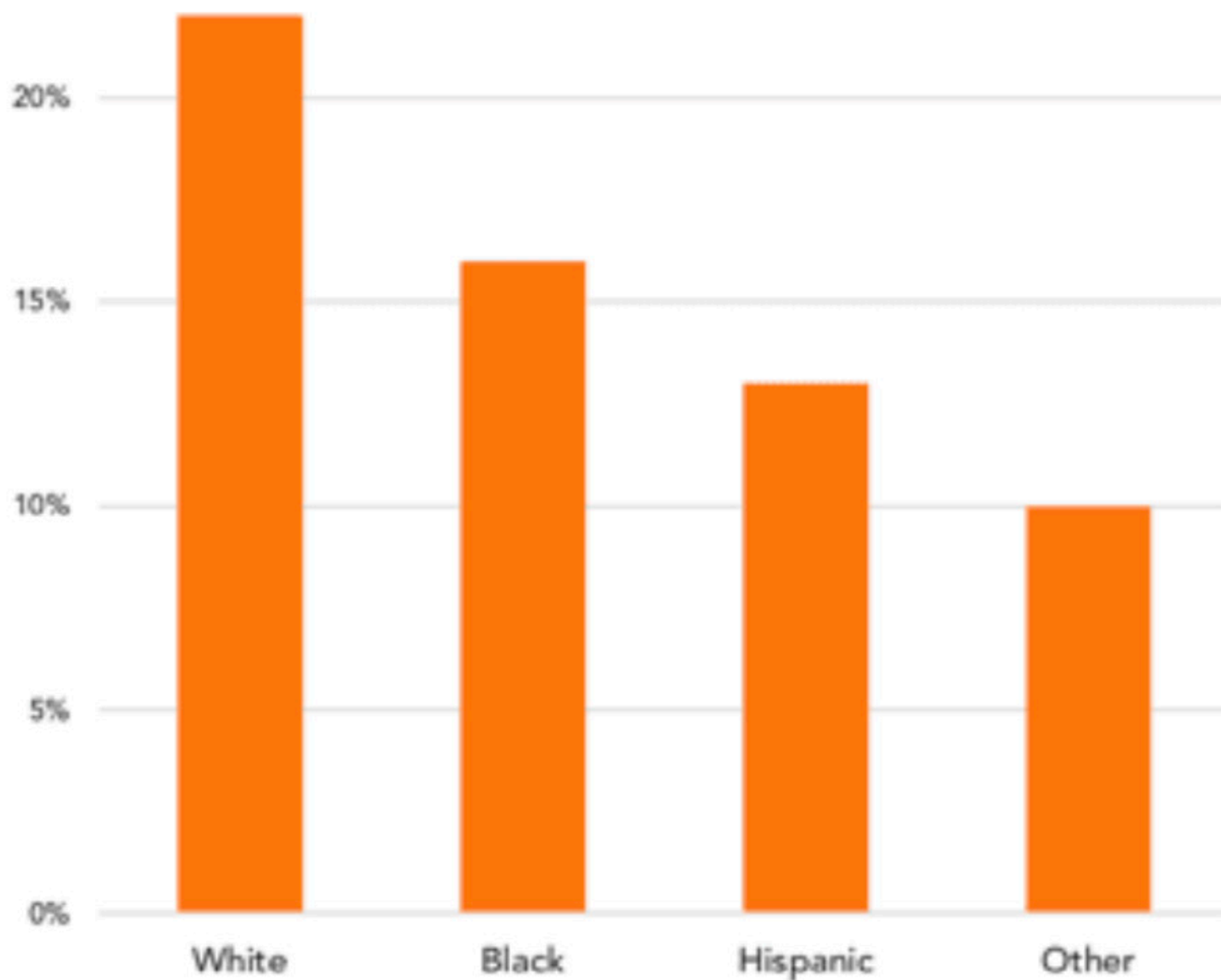


Gwendolyn Warren was the Administrative Director of the Detroit Geographic Expedition and Institute, a collaboration between Black youth in Detroit and white academic geographers that lasted from 1968-1971. The group worked together to map aspects of the urban environment related to children and education. Warren also worked to set up a free school where youth could take college classes in geography for credit.

Credit: The Detroit Geographic Expedition and Institute
 Source: Gwendolyn Warren, "Field Notes III: The Geography of Children" (1970)
 Permission: Pending

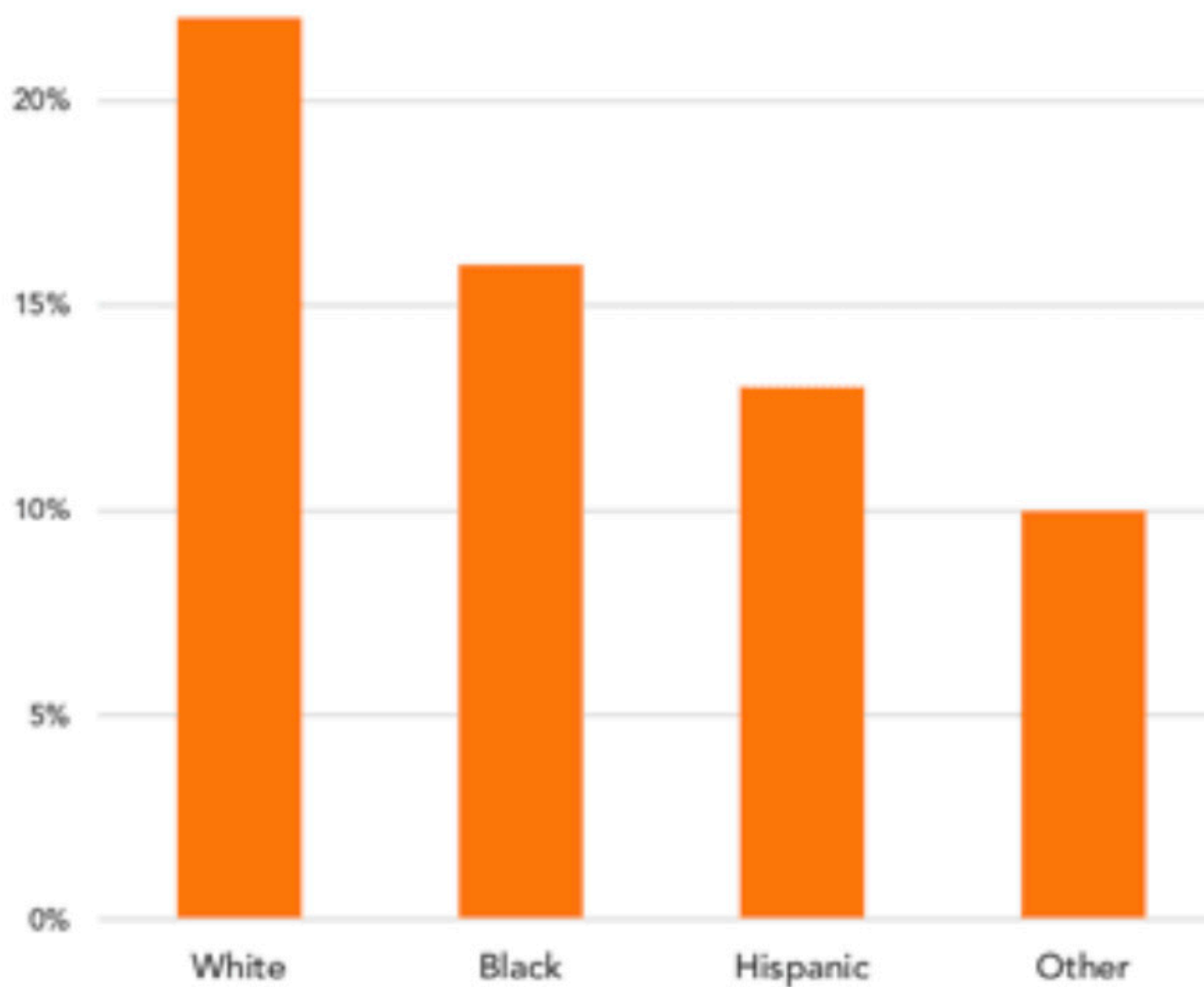
Mental Health in Jail

Rate of mental health diagnosis of inmates



Racism in Jail

People of color less likely to get mental health diagnosis



Explicit argumentation

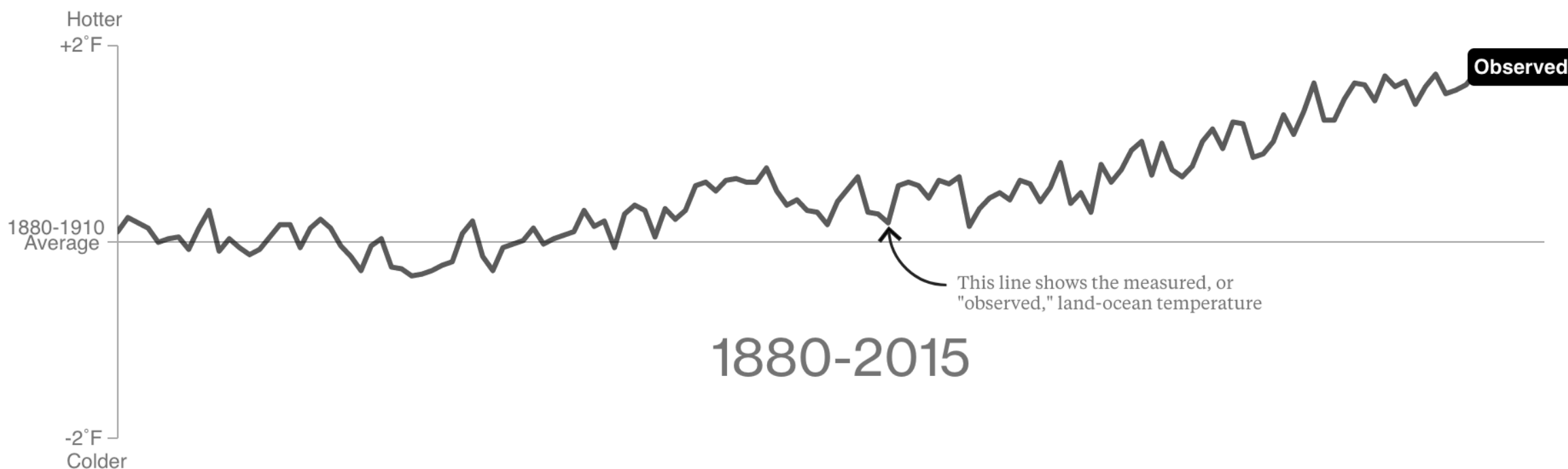
» **Titles**

» **Captions**

What's Really Warming the World?

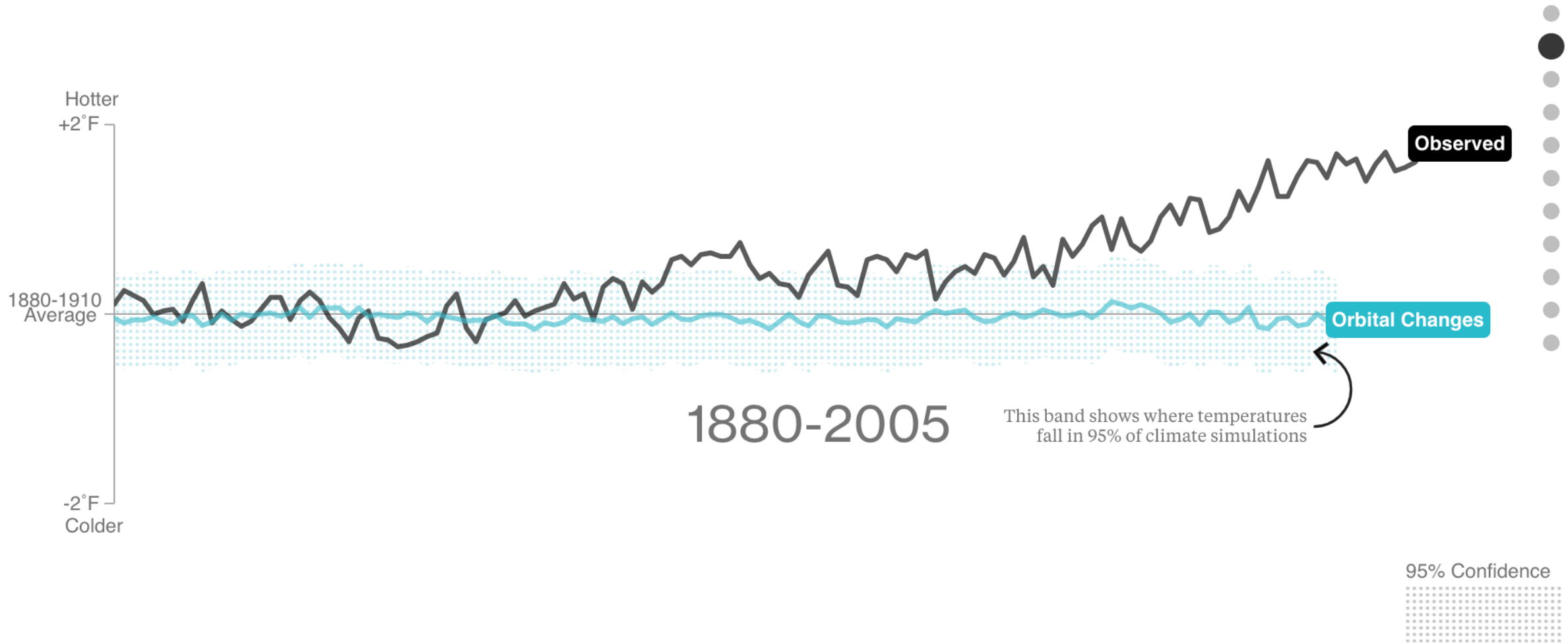
By Eric Roston  and Blacki Migliozi  | June 24, 2015

Skeptics of manmade climate change offer various natural causes to explain why the Earth has warmed 1.4 degrees Fahrenheit since 1880. But can these account for the planet's rising temperature? Scroll down to see how much different factors, both natural and industrial, contribute to global warming, based on findings from NASA's Goddard Institute for Space Studies.



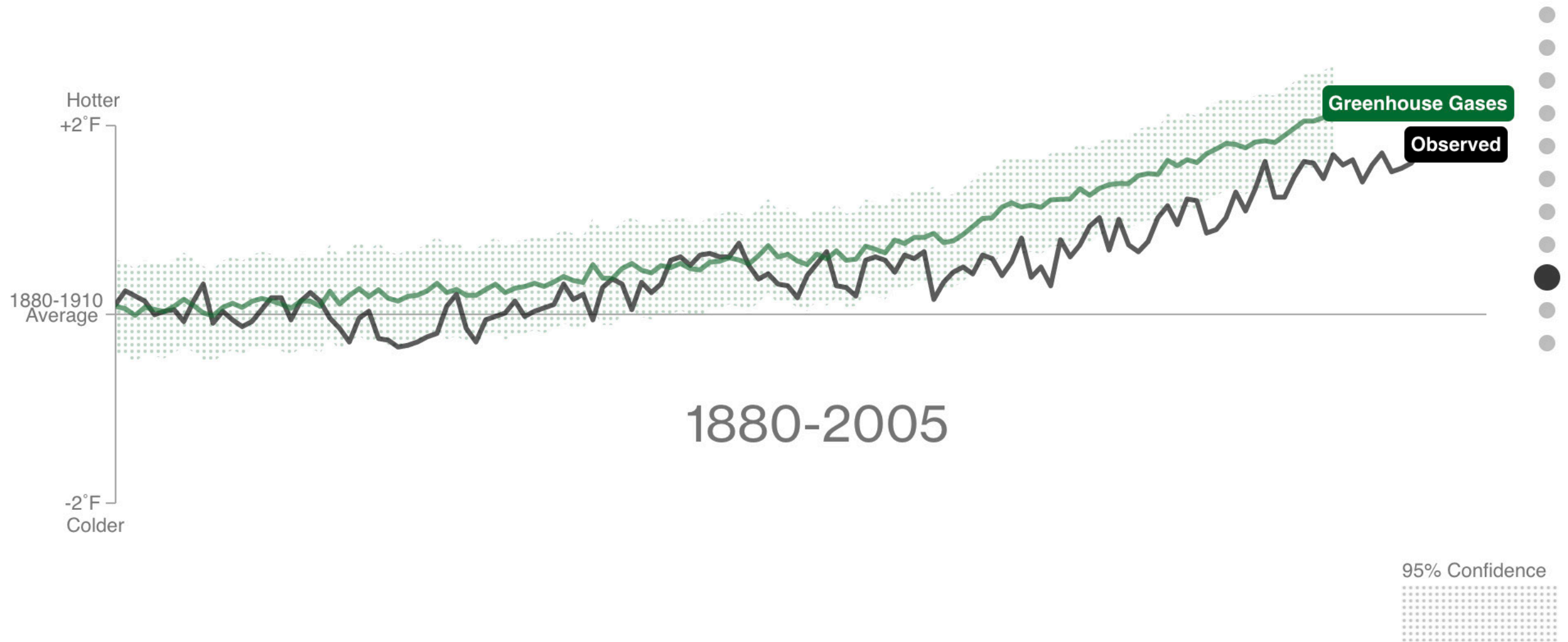
Is It the Earth's Orbit?

The Earth wobbles on its axis, and its tilt and orbit change over many thousands of years, pushing the climate into and out of ice ages. Yet the influence of orbital changes on the planet's temperature over 125 years has been negligible.



No, It Really Is Greenhouse Gases.

Atmospheric CO₂ levels are 40 percent higher than they were in 1750. The green line shows the influence of greenhouse gas emissions. It's no contest.

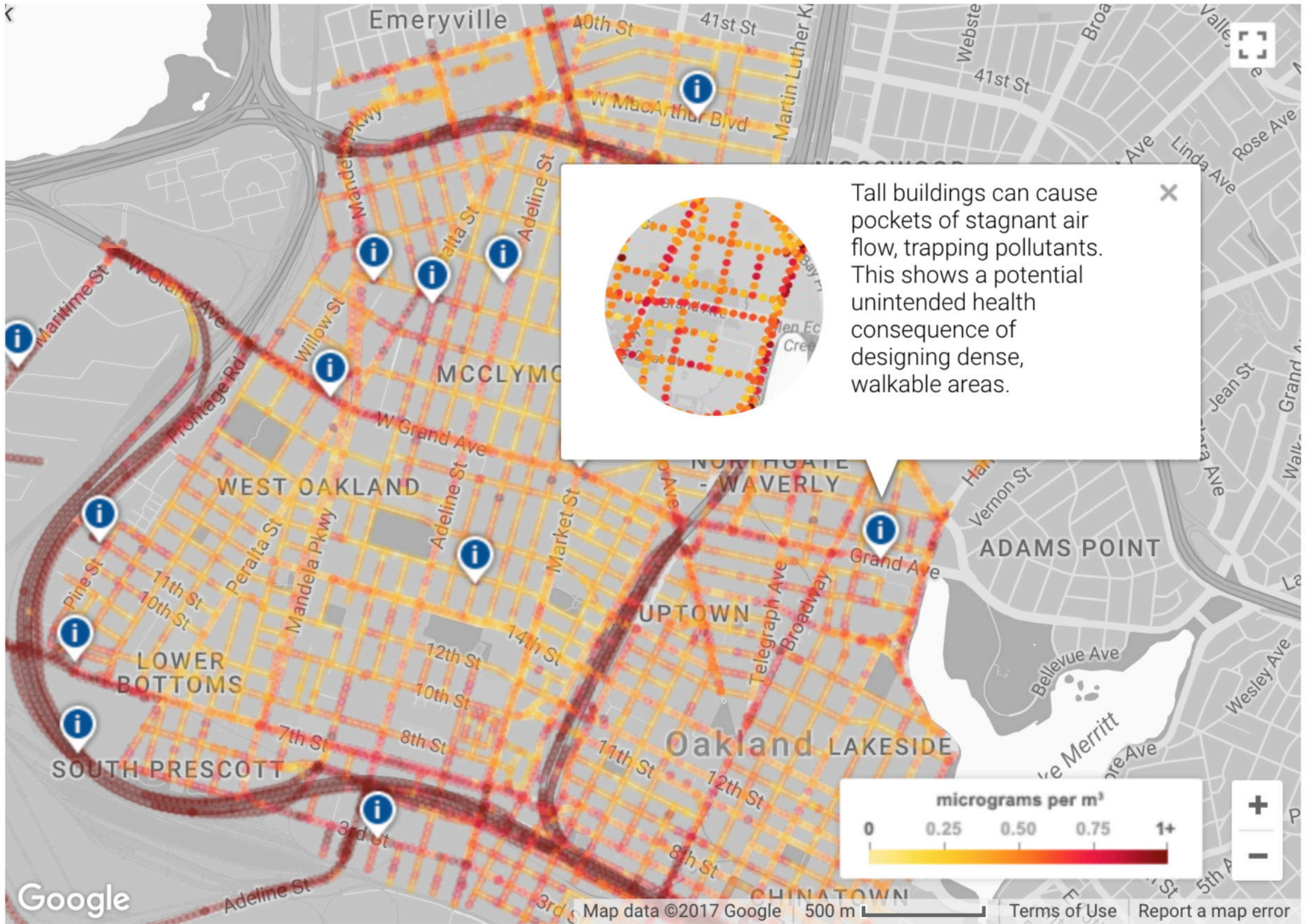


Explicit argumentation

» **Titles**

» **Captions**

» **Annotations**



Air quality data from Google/Aclima; analysis by [Apte et al](#) / EDF. Colors on the map do not correlate to colors on the Air Quality Index.

Explicit argumentation

» **Titles**

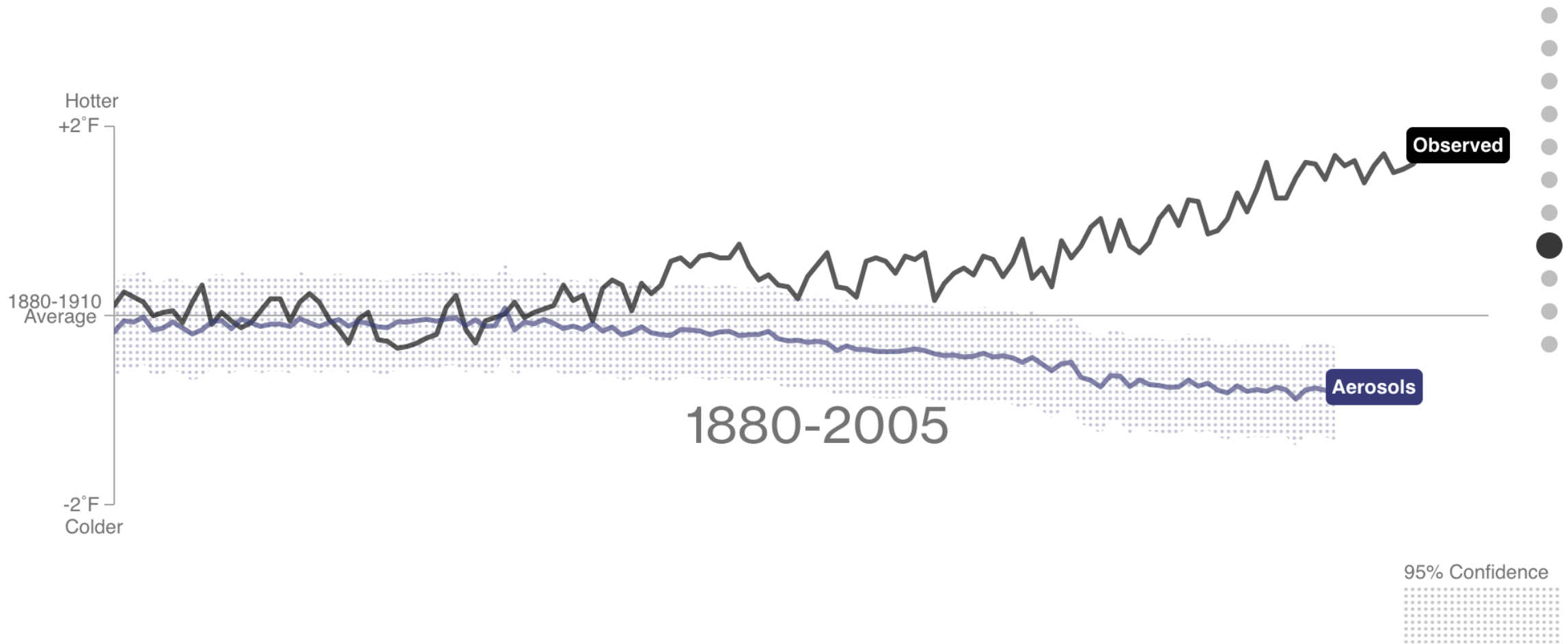
» **Captions**

» **Annotations**

» **Emphases**

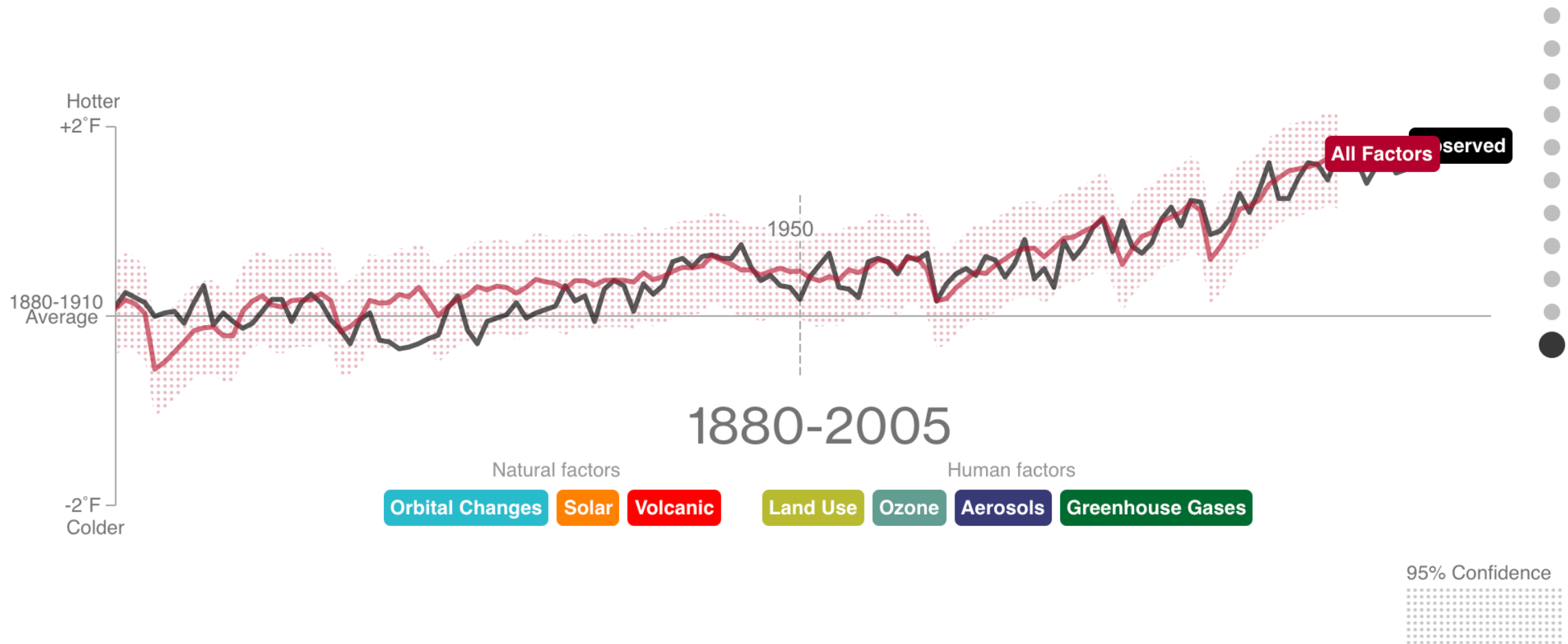
Or Aerosol Pollution?

Some pollutants cool the atmosphere, like sulfate aerosols from coal-burning. These aerosols offset some of the warming. (Unfortunately, they also cause acid rain.)



Compare and Contrast

Putting the possible natural and human causes of climate change alongside one another makes the dominant role of greenhouse gases even more plainly visible. The only real question is: What are we going to do about it?




Implicit argumentation

Implicit argumentation

» **Scale**



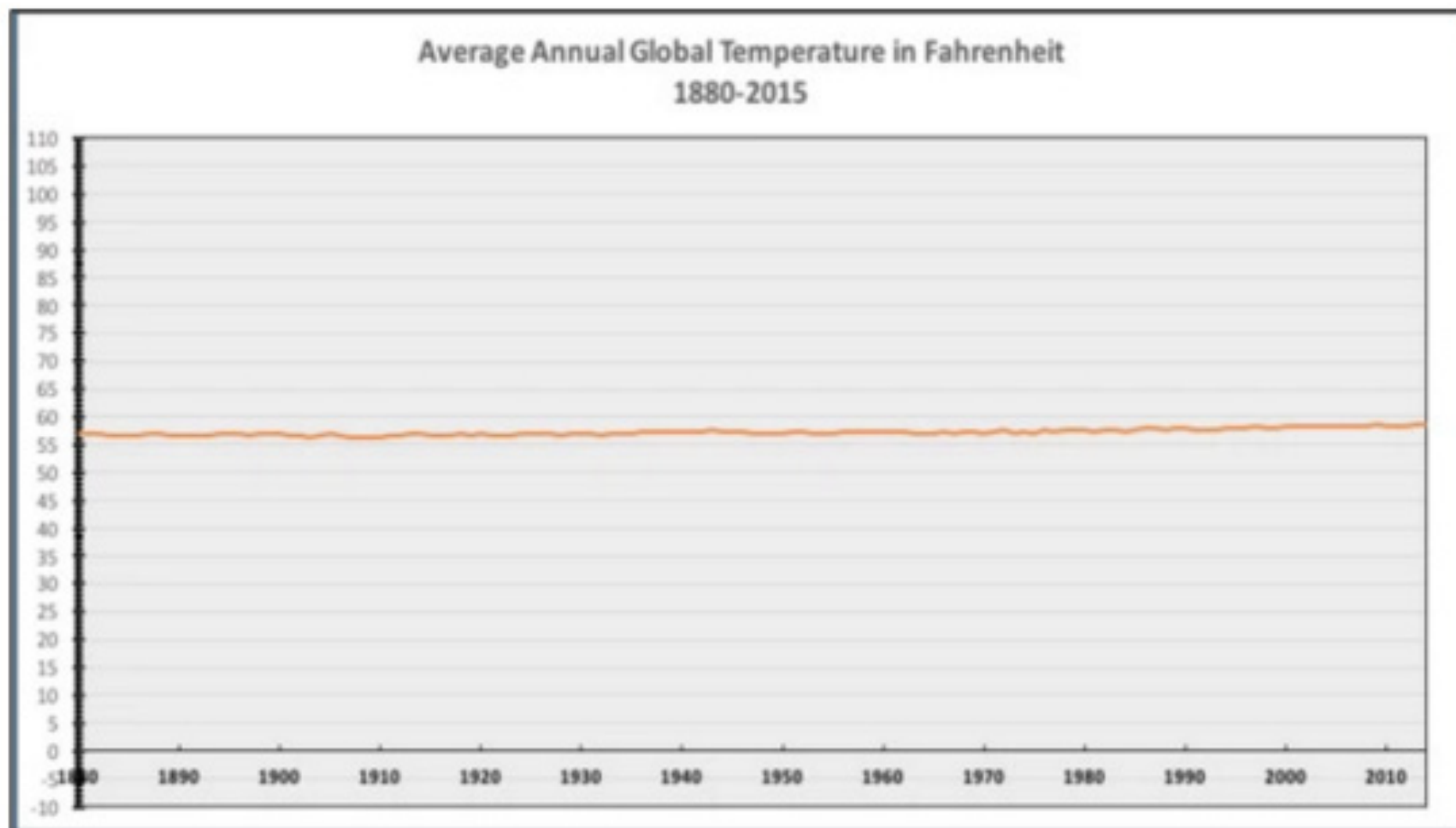
National Review 
@NRO

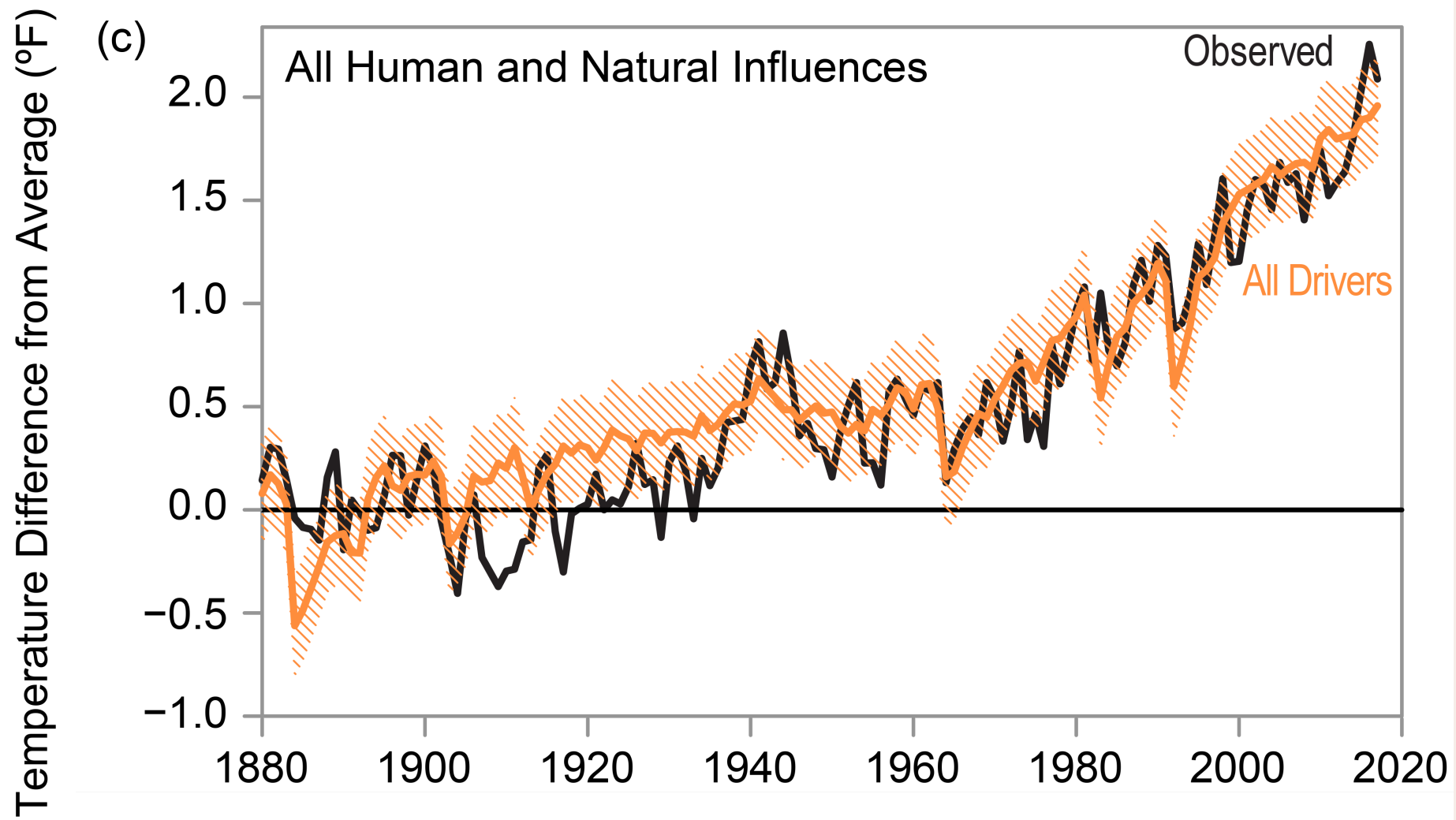


 Follow

The only [#climatechange](#) chart you need to see. natl.re/wPKpro

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





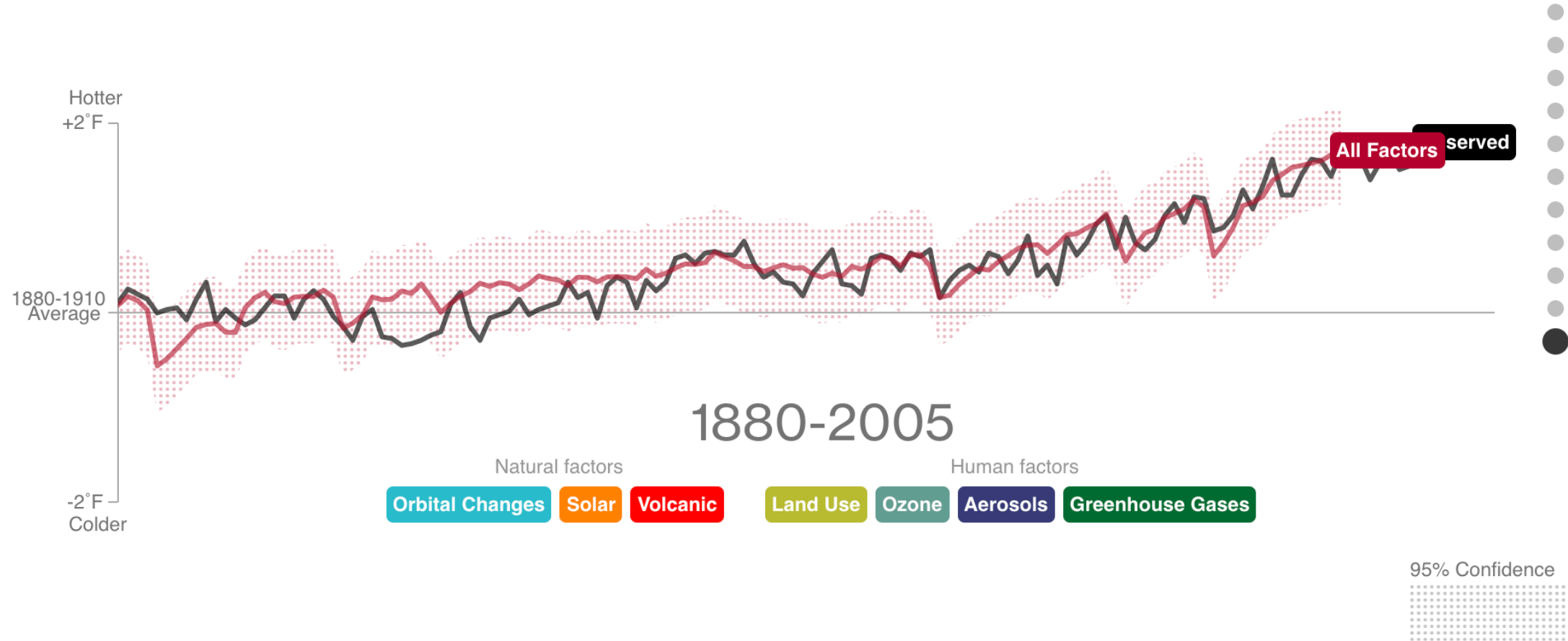
Implicit argumentation

» Scale

» **Categorizations**

Compare and Contrast

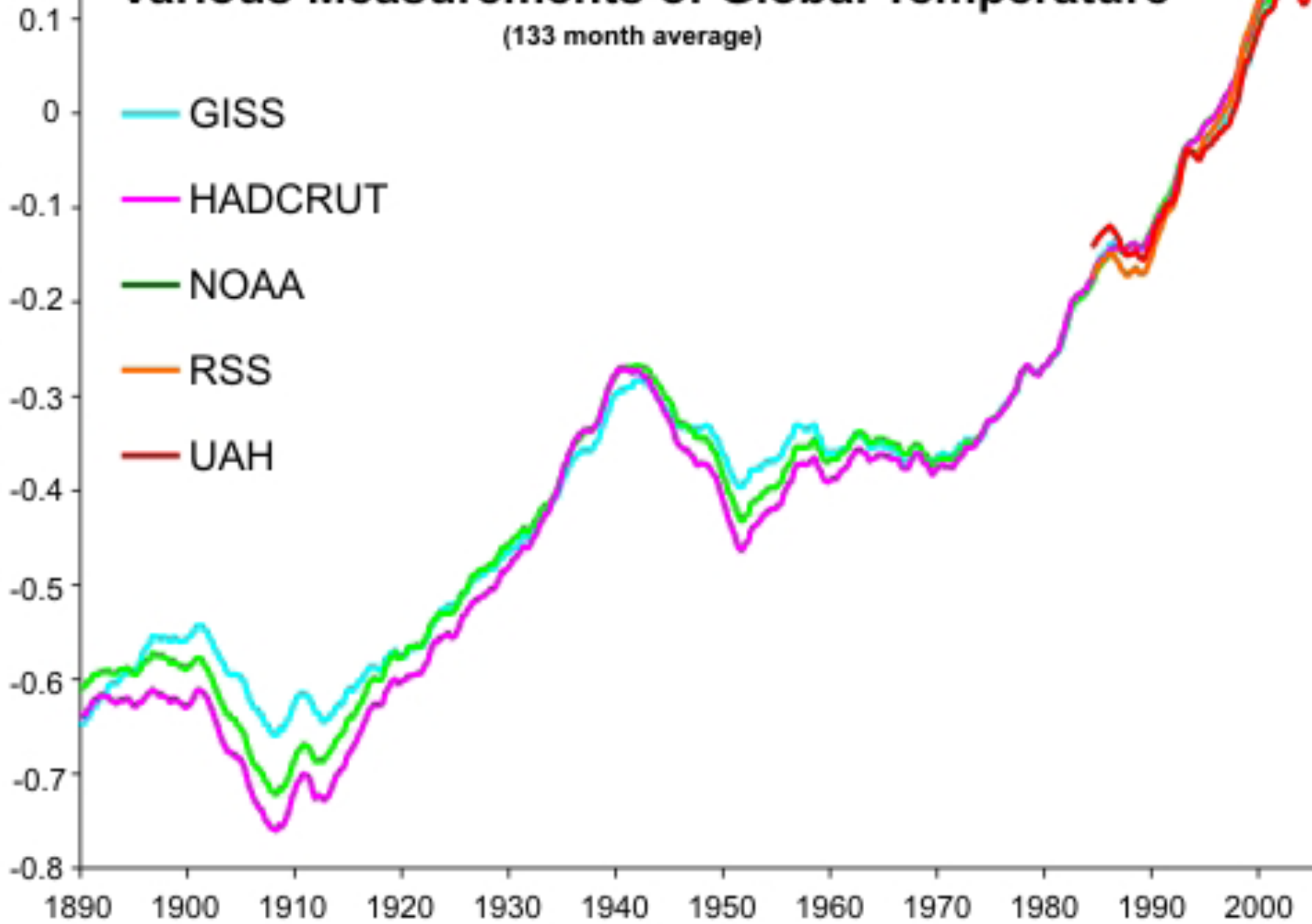
Putting the possible natural and human causes of climate change alongside one another makes the dominant role of greenhouse gases even more plainly visible. The only real question is: What are we going to do about it?



Various Measurements of Global Temperature

(133 month average)

Temperature Anomaly in Degrees C

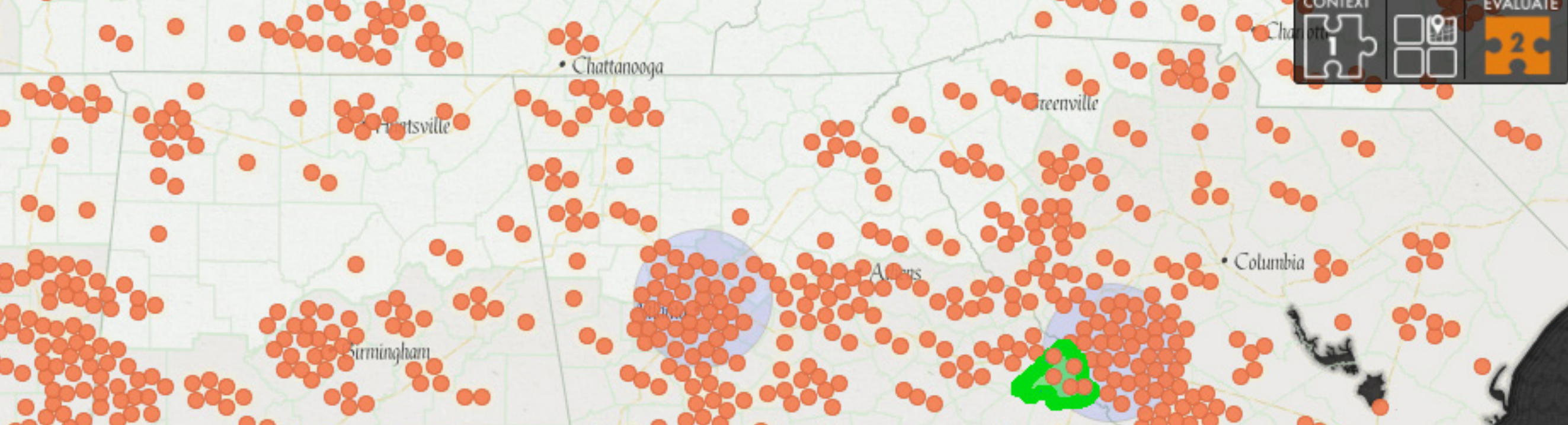


Implicit argumentation

» **Scale**

» **Categorizations**

» **Data breaks**



names on your screen:

- + 1865
- + 1865
- + 1865
- + 1866
- + 1866
- + 1866
- + 1866
- + 1866
- + 1866
- ON + 1866
- + 1866
- + 1866
- ER + 1866
- RDSON + 1866
- FAULT + 1866
- ELL + 1866
- ATCHER + 1866
- ARRETT + 1866
- PERSON + 1866
- D + 1866



1835 - 1964

SHOW TIME-LAPSE



Drag on timeline to change dates

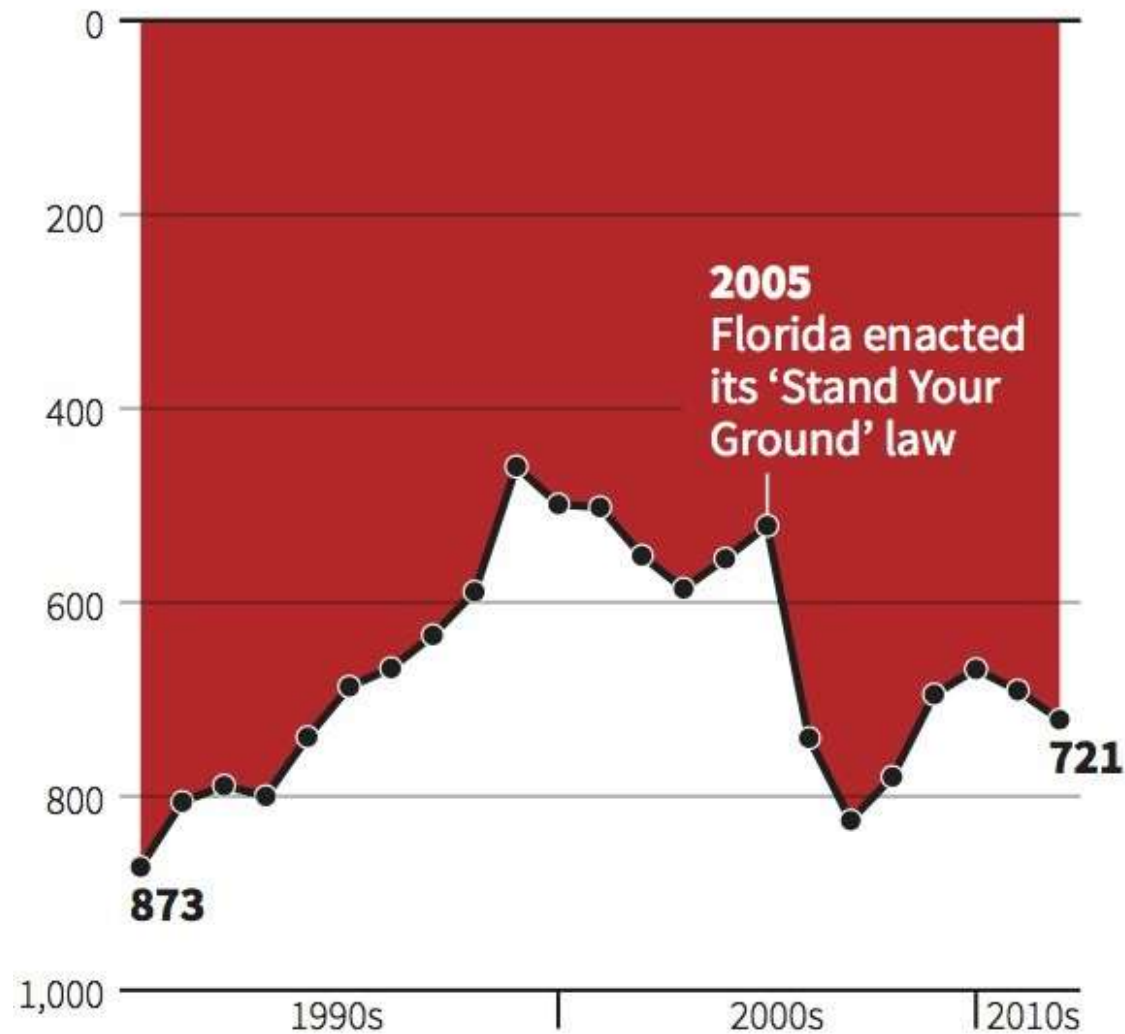
Should I believe this...? Find auut

Implicit argumentation

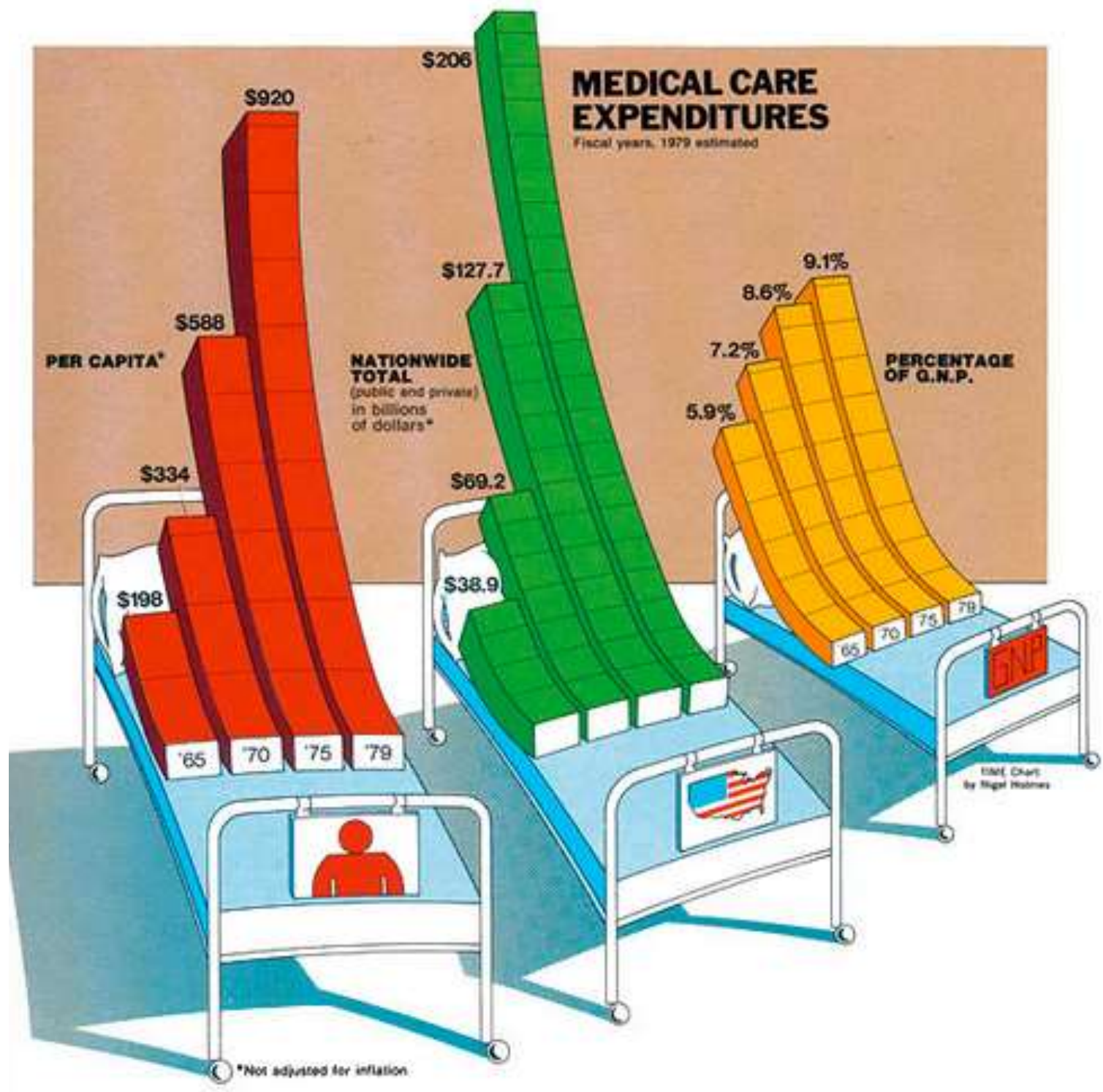
- » **Data breaks**
- » **Scale**
- » **Categorizations**
- » **Priming - image & color associations**

Gun deaths in Florida

Number of murders committed using firearms



Source: Florida Department of Law Enforcement



Implicit argumentation

- » **Data breaks**
- » **Scale**
- » **Categorizations**
- » **Priming - image & color associations**
- » **Nudges - interaction effects**

LYNCHING IN AMERICA

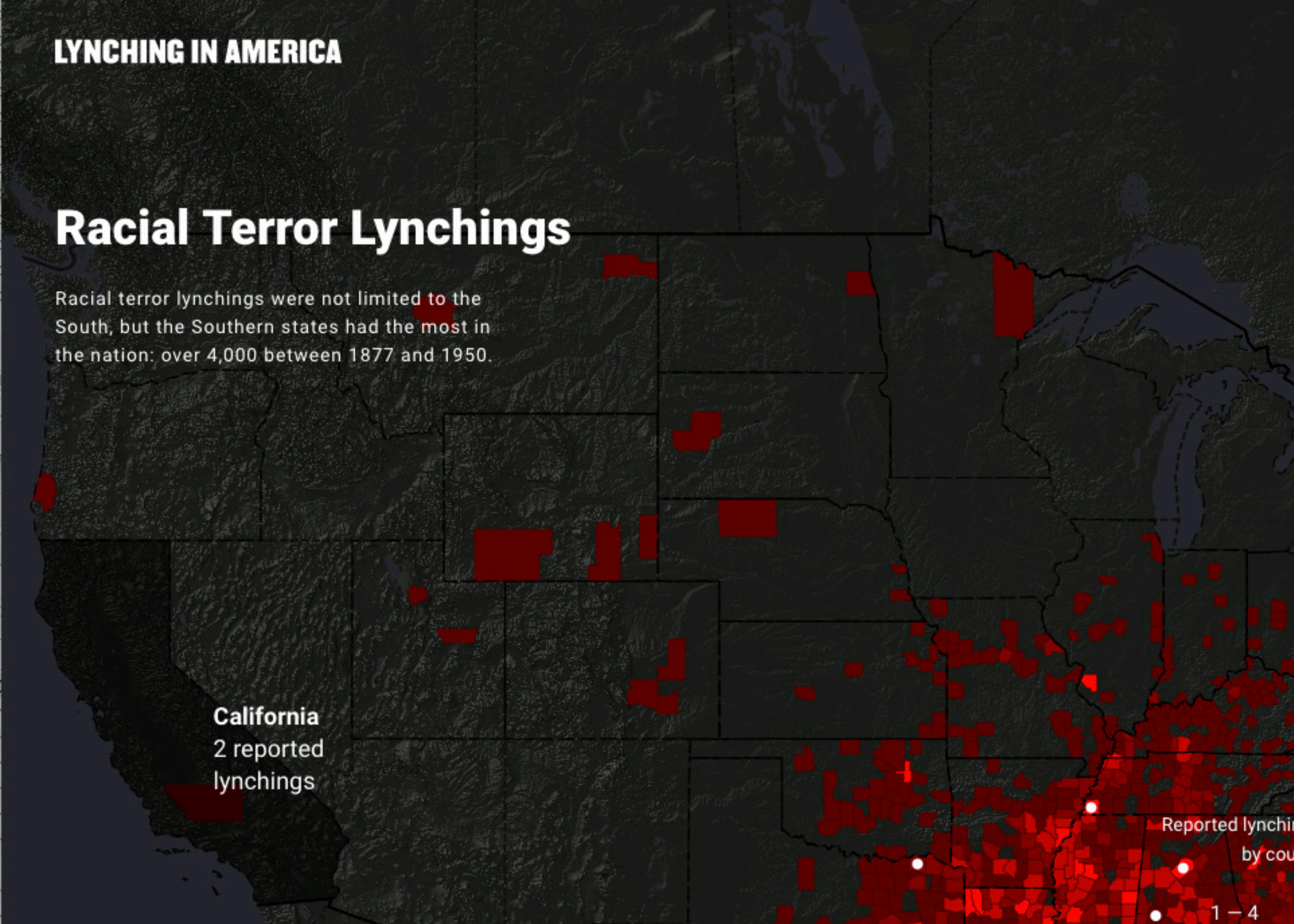
Racial Terror Lynchings

Racial terror lynchings were not limited to the South, but the Southern states had the most in the nation: over 4,000 between 1877 and 1950.

California
2 reported
lynchings

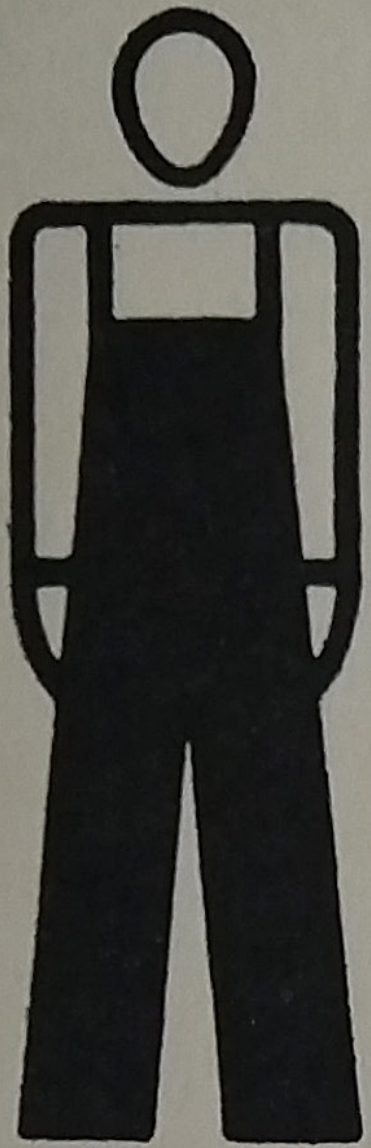
Reported lynchings
by county

1 - 4



Implicit argumentation

- » **Data breaks**
- » **Scale**
- » **Categorizations**
- » **Priming - image & color associations**
- » **Nudges - interaction effects**
- » **Sizing & proportional ink**



506,209



198,618



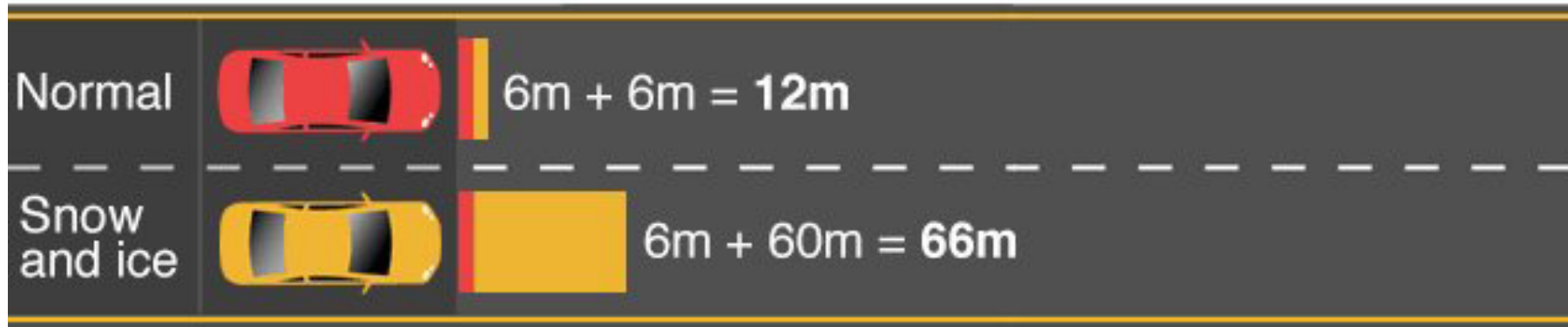
361,252

Stopping distances in snow and ice

30 mph

Thinking distance

Braking distance



50 mph

Metres

0

50

100

150

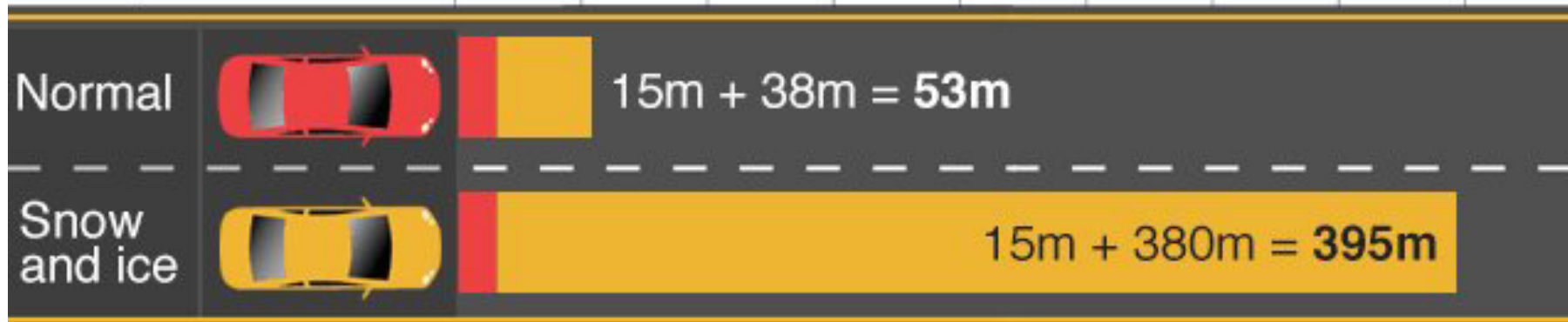
200

250

300

350

400



Source: Gov UK, AA

BBC

**"Practice two things
in your dealings
with disease:**

**either help
or do not harm the patient."**

— Epidemics, Book 1

**Practice two things
in your dealings
with visualizations:**

**either help
or do not harm the user.**

– Suggested oath for ethical visualizers

**Practice two things
in your dealings
with visualizations:**

**either help
or do not harm the user.**

— Suggested oath for ethical visualizers

Do no harm to

» **viewers/users**

Do no harm to

» viewers/users

» **represented subjects**

Do no harm to

- » viewers/users
- » represented subjects
- » **subjects impacted by the representation**

**Practice two things
in your dealings
with visualizations:**

**either help
or do not harm the user.**

— Suggested oath for ethical visualizers

Embracing the argument