

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

Remember:

Your design choices are
just as important as the

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.

**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

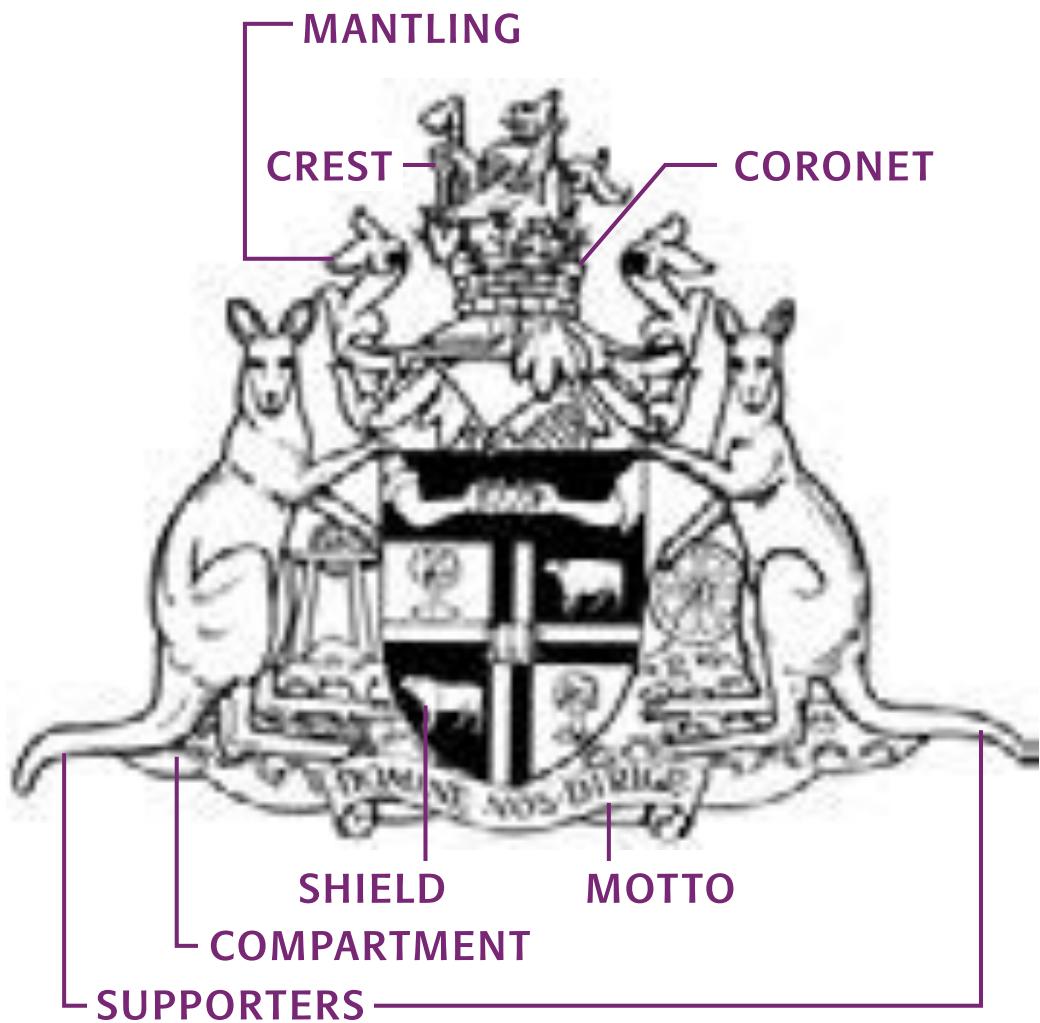
Technologies of government

- Forces
- Techniques

Technologies of government

- Forces
- Techniques
- Devices





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
Heraldic practise	Heraldry	Logo
	Para-heraldry	Seal

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

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

Force	Technique	Colour
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 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

Image content

Force	Technique	Device
Meaning	Allegiance	Leisure
Associative	Christianity	Art
Descriptive	Civic	Sport
Found	Law	No leisure
Metaphor	Monarchy	
	Nation	
	No allegiance	
Environment	Myth	Internal shape
Architecture	Biblical	Rectangle
Ribbon	Greek/Roman	Ribbon
Local	Heraldic	Shield
- Bird	No myth	Sphere
- Bivalve		No internal shape
- Cetacea		
- Marsupial		
Flora		
- Flower		
- Small plant		
- Tree		
Geography		
Weather		
No environment		
Population	Allegiance	Environment
Citizens	Civic	Architecture
Employment	Mural crown	Flora
Ethnicity	No population	Internal shape
Industry	Myth	Industry
Primary	Biblical	Agriculture
Agriculture	Noah's ark	Education
- Fishing/Whaling	Sword of St Paul	Population
- Logging	Dove w branch	Employment
- Mining		Ethnicity
- Viticulture		British
Secondary		- Cornish bird
- Manufacturing		- English lion
- Tertiary		- Scottish unicorn
- Education		- Welsh lion
- Transport		- St George cross
No industry		Indigenous
Law	Allegiance	Industry
Balance of scales	Fauna	Transport
	Bivalve	Carriage lantern
	Shell	Miner
	Cetacea	Tracker
	Dolphin	Ethnicity
	Bird	British
	Cockatoo	- Cornish bird
	Emu	- English lion
	Falcon	- Scottish unicorn
	Heron	- Welsh lion
	Honeyeater	- St George cross
	Lyrebird	Indigenous
	Magpie	- Boomerang
	Kookaburra	- Black person
	Pelican	- Dot painting
	Queens Victoria	- Spear
	Seagull	Irish
	Swan	- Irish harp
	Generic bird	- Clover
Nation	Myth	Industry
Australian arms	Biblical	Agriculture
Marsupial	Noah's ark	Education
Australian motto	Sword of St Paul	Population
Kangaroo	Dove w branch	Employment
Wombat		Ethnicity
Industry	Logging	Industry
Primary	Aequitas	Agriculture
Agriculture	Cornucopia	Education
- Fishing/Whaling	Drinking horn	Population
- Logging	Tree stump	Employment
- Mining	Laurel	Ethnicity
- Viticulture	Lyre	British
Secondary	Mermaid	- Cornish bird
- Manufacturing	Olympic torch	- English lion
- Tertiary	Gold pan	- Scottish unicorn
- Education	Pegasus	- Welsh lion
- Transport	Trident	- St George cross
No industry	Shovel	Indigenous
Law	Mining	Industry
Balance of scales	Aequitas	Agriculture
	Cornucopia	Education
	Drinking horn	Population
	Tree stump	Employment
	Laurel	Ethnicity
	Lyre	British
	Mermaid	- Cornish bird
	Olympic torch	- English lion
	Gold pan	- Scottish unicorn
	Pegasus	- Welsh lion
	Trident	- St George cross
	Shovel	Indigenous
Nation	Viticulture	Industry
Australian arms	Aequitas	Agriculture
Marsupial	Cornucopia	Education
Australian motto	Drinking horn	Population
Kangaroo	Tree stump	Employment
Wombat	Laurel	Ethnicity
Industry	Manufacturing	Industry
Primary	Aequitas	Agriculture
Agriculture	Cornucopia	Education
- Fishing/Whaling	Drinking horn	Population
- Logging	Tree stump	Employment
- Mining	Laurel	Ethnicity
- Viticulture	Lyre	British
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- Education	Pegasus	- Welsh lion
- Transport	Trident	- St George cross
No industry	Shovel	Indigenous
Law	Local	Industry
Balance of scales	Aequitas	Agriculture
	Cornucopia	Education
	Drinking horn	Population
	Tree stump	Employment
	Laurel	Ethnicity
	Lyre	British
	Mermaid	- Cornish bird
	Olympic torch	- English lion
	Gold pan	- Scottish unicorn
	Pegasus	- Welsh lion
	Trident	- St George cross
	Shovel	Indigenous

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

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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 name + facets may be selected per emblem.
Year
No year

EXTERNAL GOVERNANCE	EMBODIED GOVERNANCE	
IDEOLOGY	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 WELFARISM	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

Google

MAP OF WHITE
SUPREMACY
MOB VIOLENCE

Kinds of argument in visualizations

Kinds of argument in visualizations

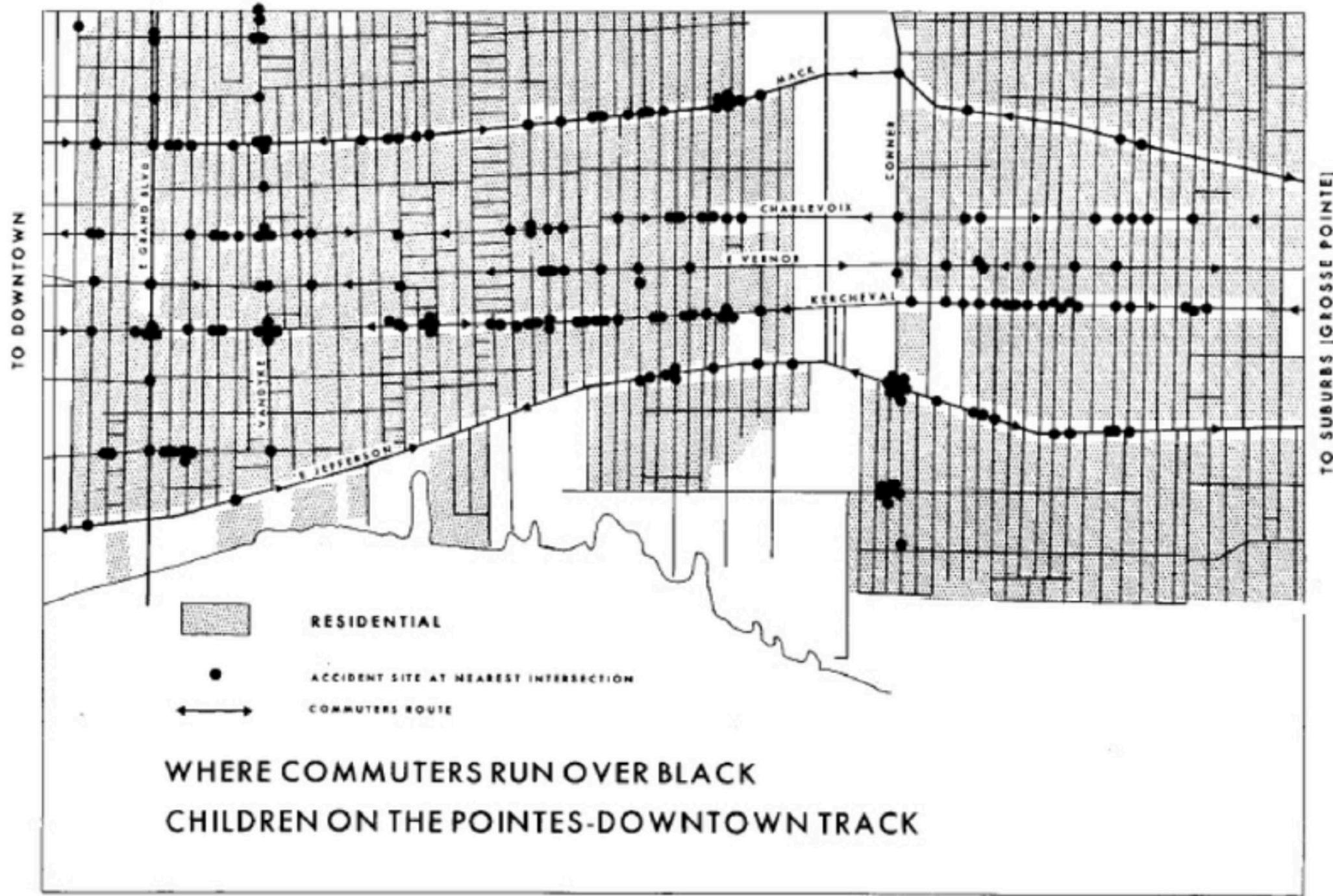
» **Explicit argumentation**

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.

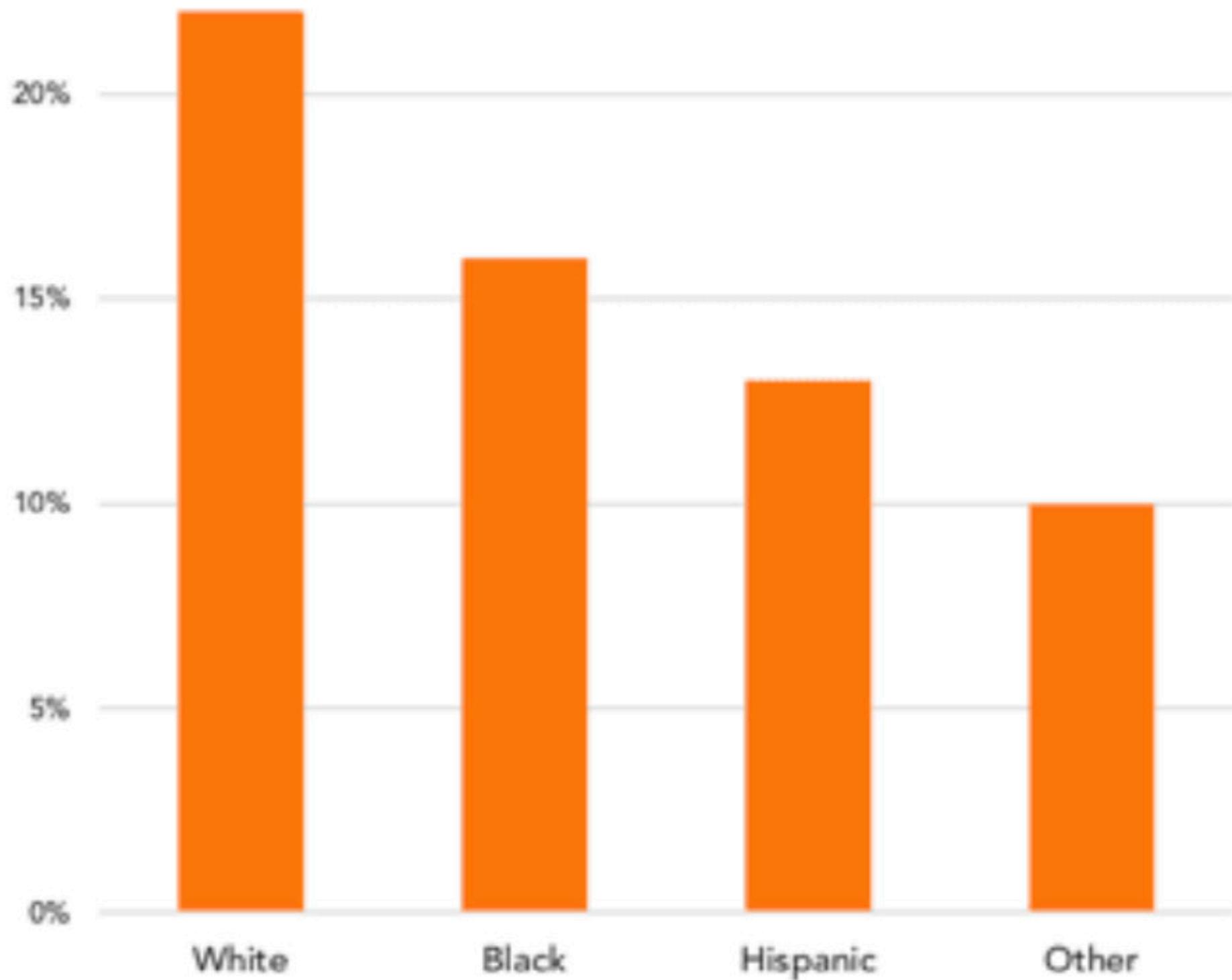
Credit: The Detroit Geographic Expedition and Institute

Source: Gwendolyn Warren, "Field Notes III: The Geography of Children" (1970)

Permission: Pending

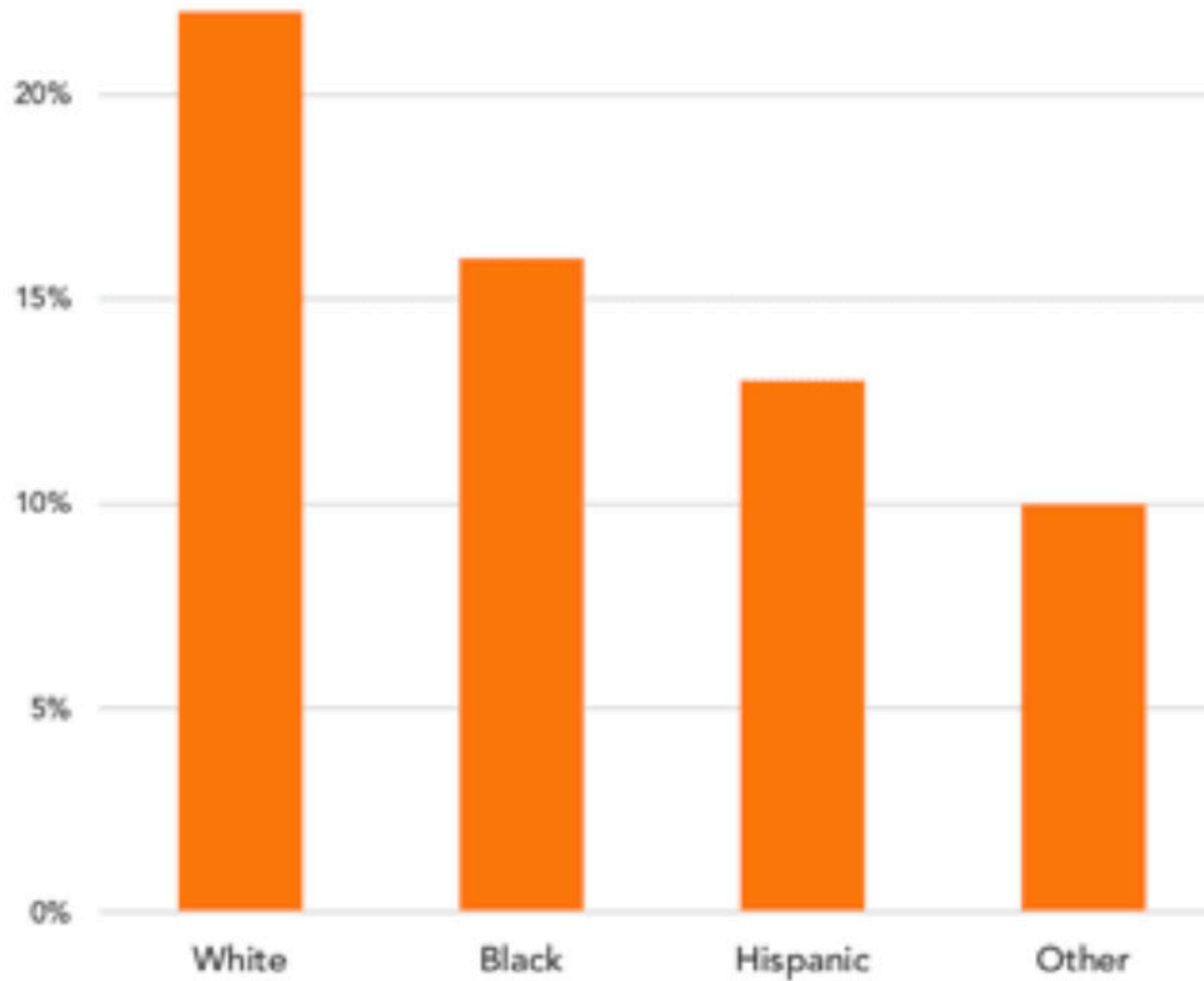
Mental Health in Jail

Rate of mental health diagnosis of inmates



Racism in Jail

People of color less likely to get mental health diagnosis



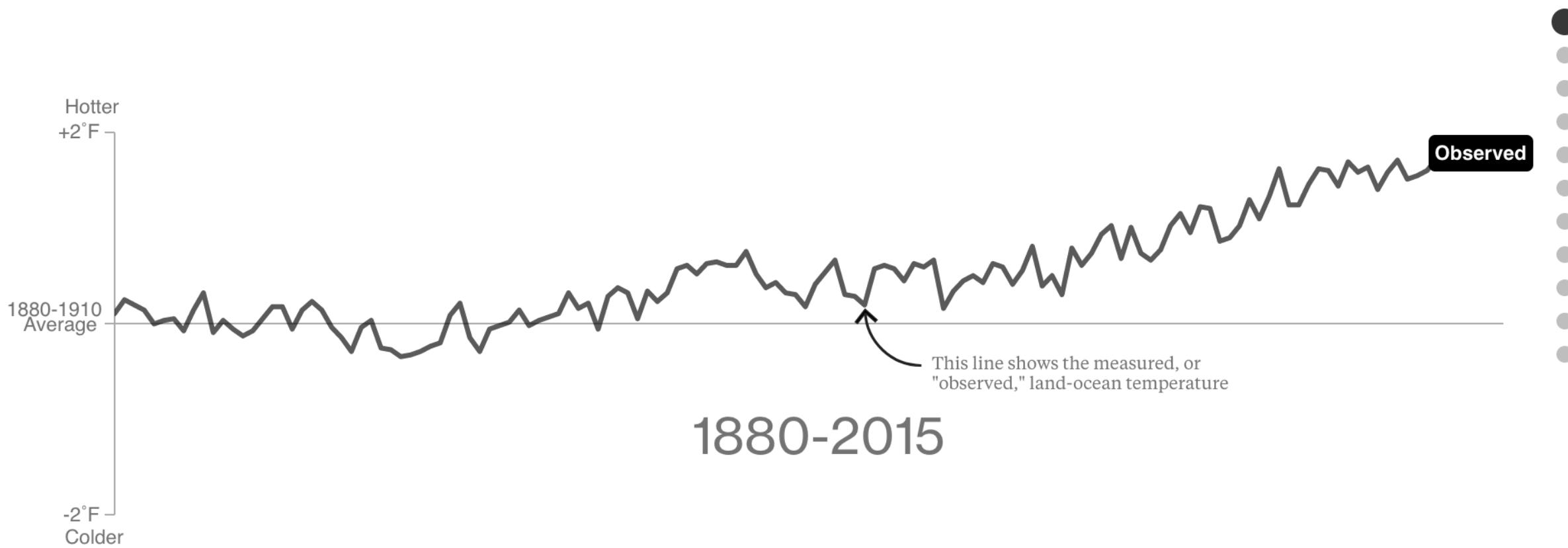
Explicit argumentation

- » Titles
- » Captions

What's Really Warming the World?

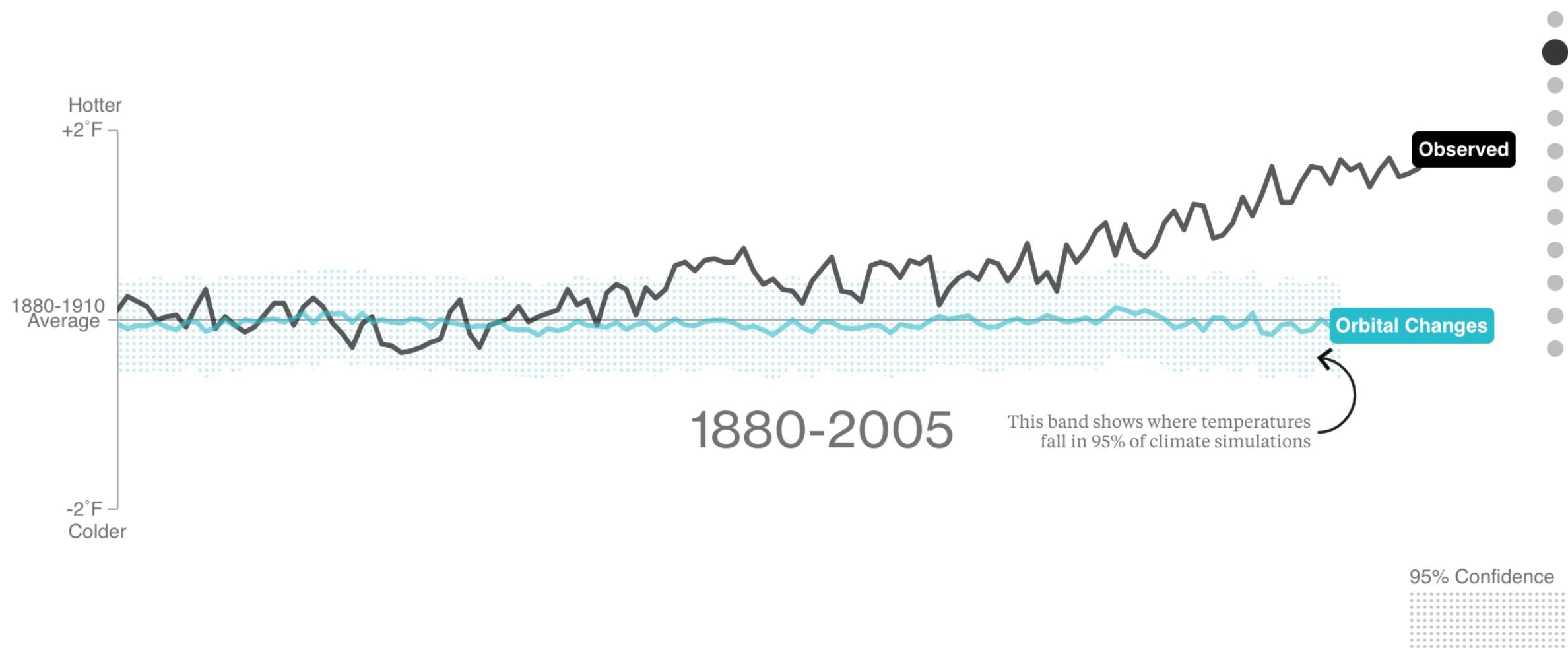
By Eric Roston  and Blacki Migliozzi  | June 24, 2015

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.



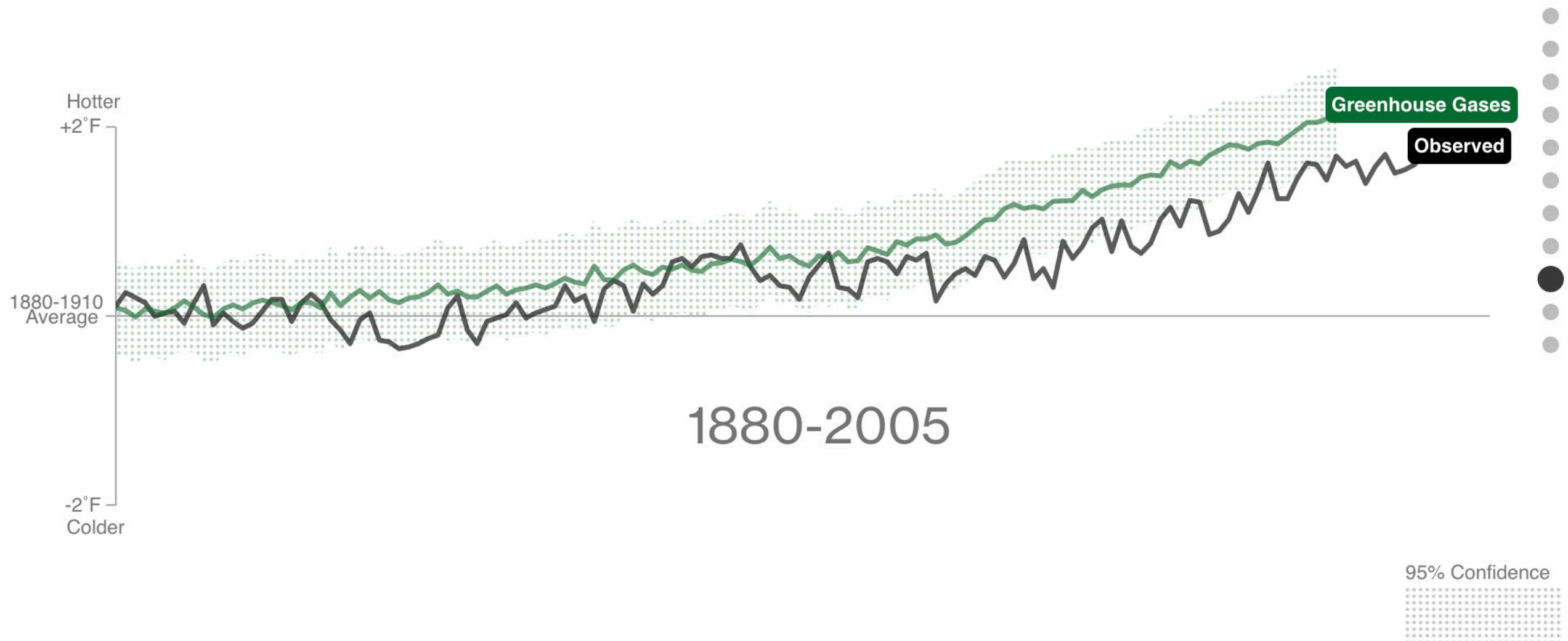
Is It the Earth's Orbit?

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.



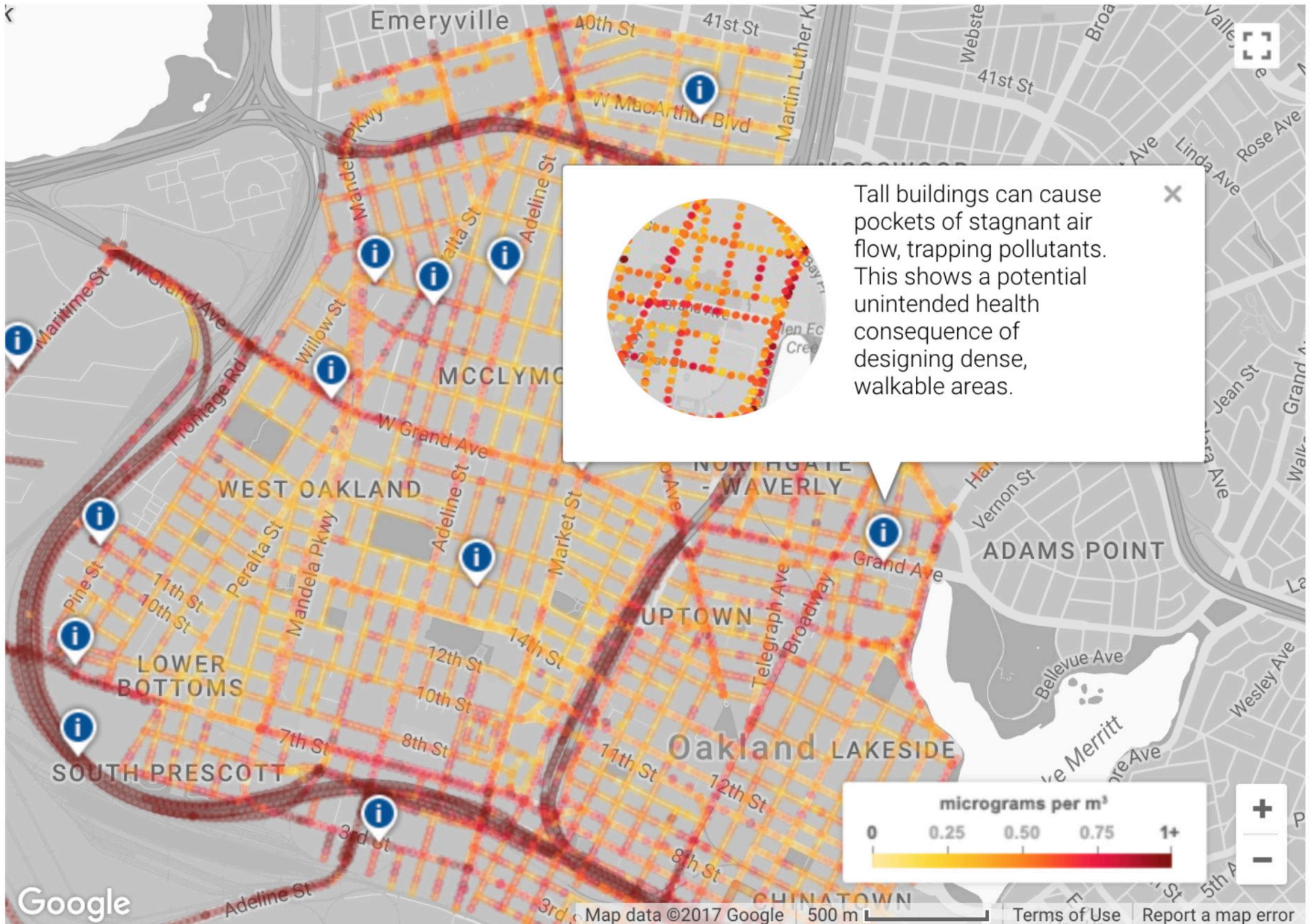
No, It Really Is Greenhouse Gases.

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



Tall buildings can cause pockets of stagnant air flow, trapping pollutants. This shows a potential unintended health consequence of designing dense, walkable areas.

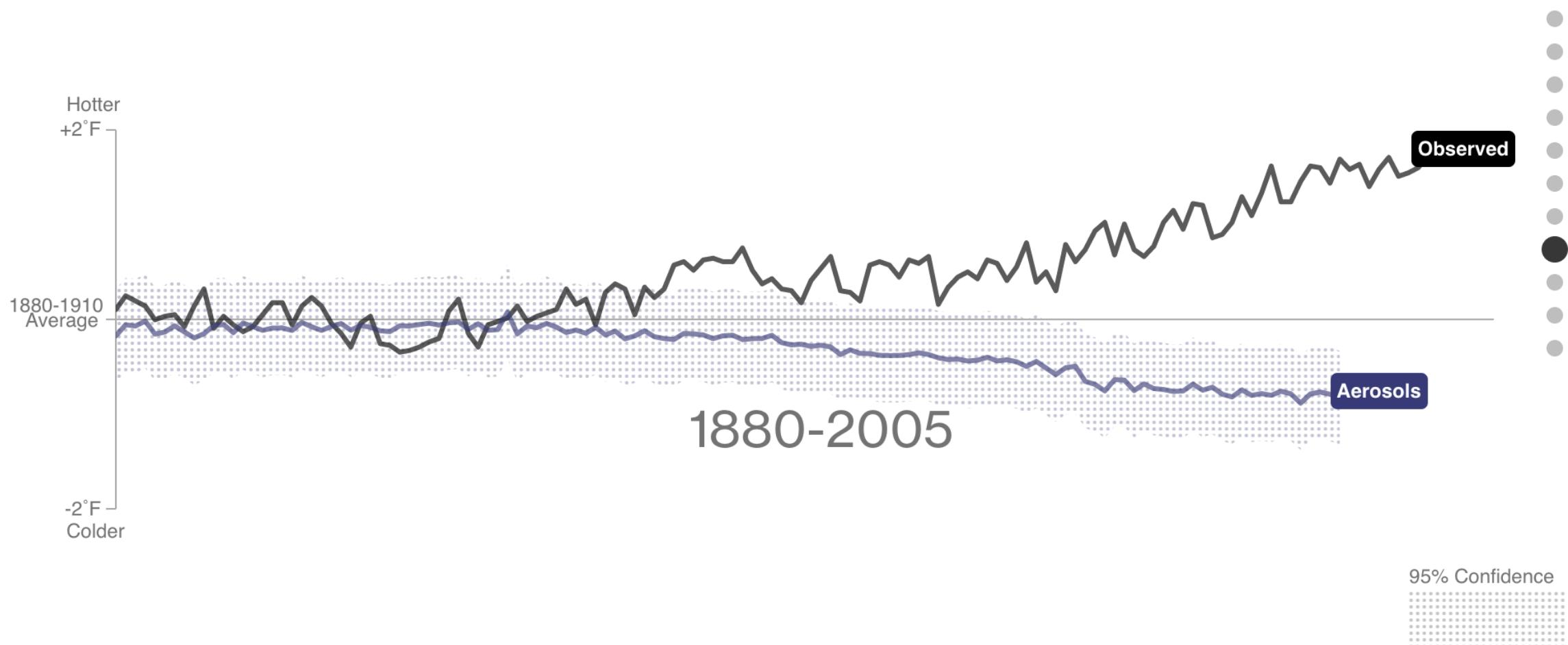
Air quality data from Google/Aclima; analysis by [Apte et al](#) / EDF. Colors on the map do not correlate to colors on the Air Quality Index.

Explicit argumentation

- » Titles
- » Captions
- » Annotations
- » Emphases

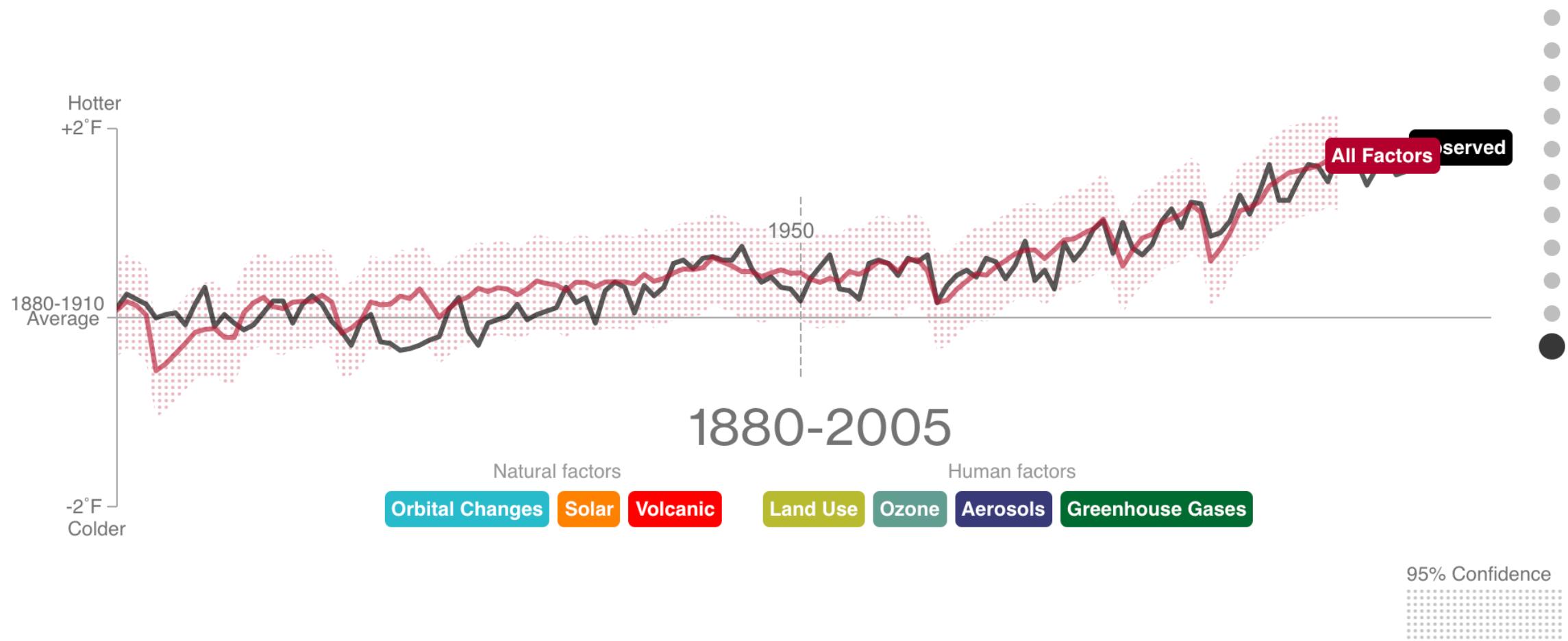
Or Aerosol Pollution?

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

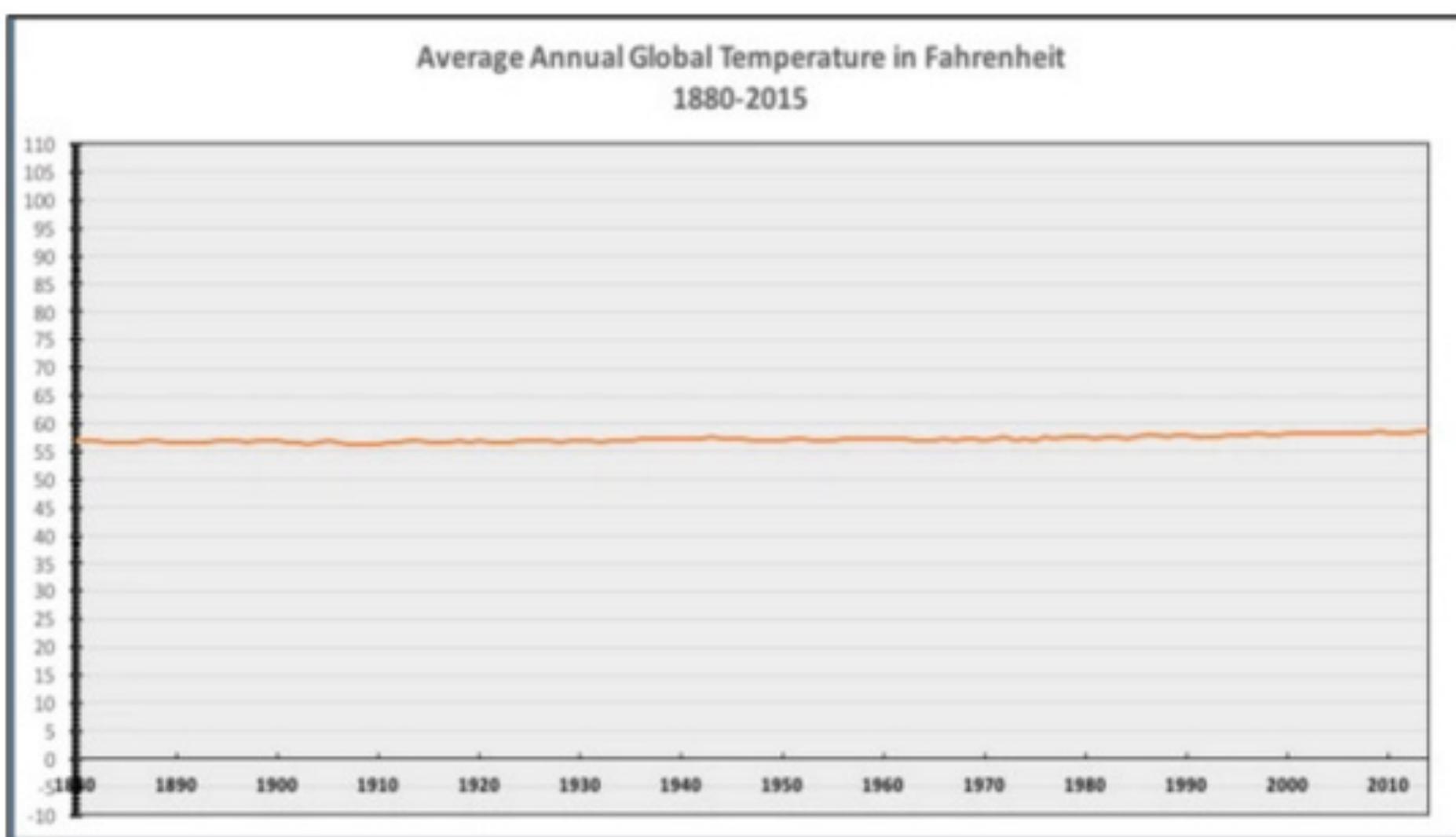
Implicit argumentation

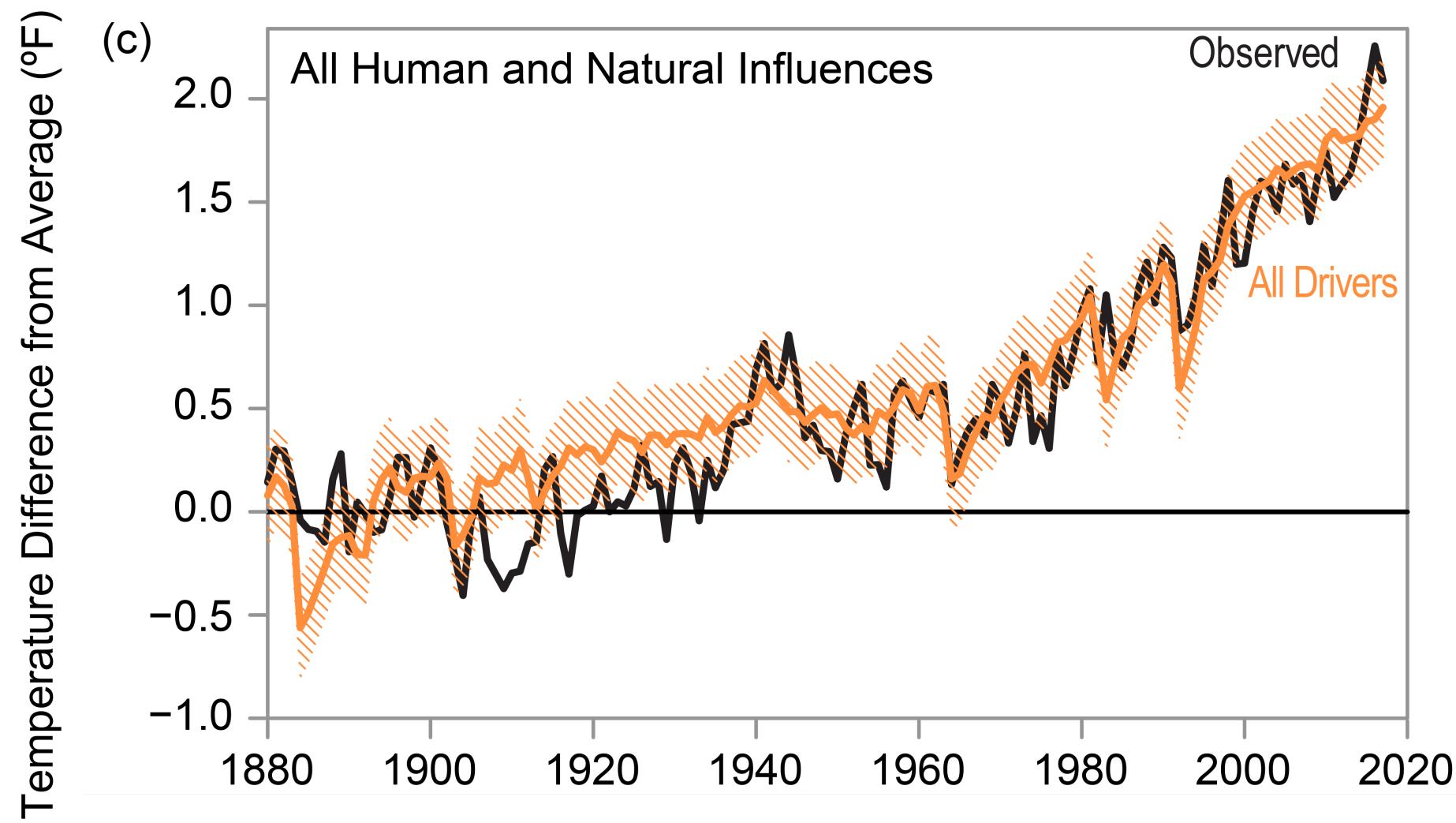
» **Scale**



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

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



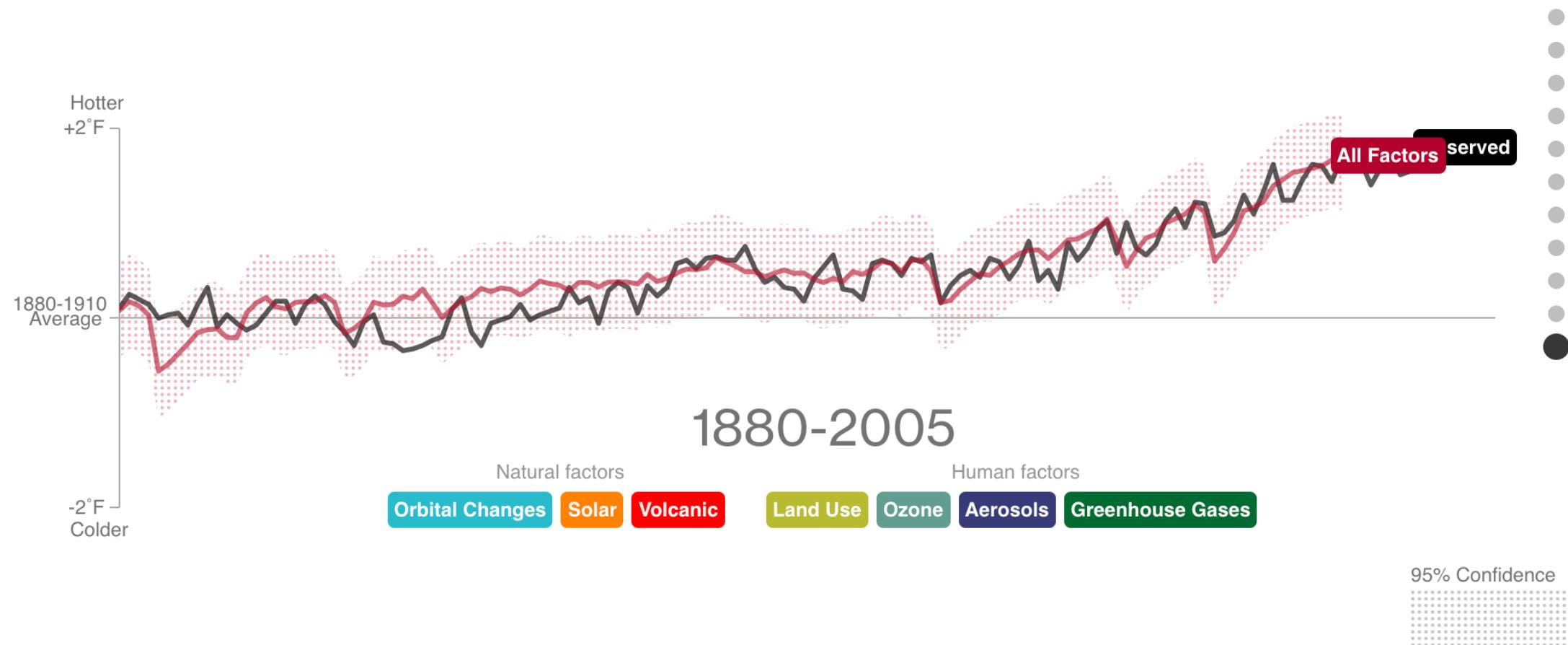


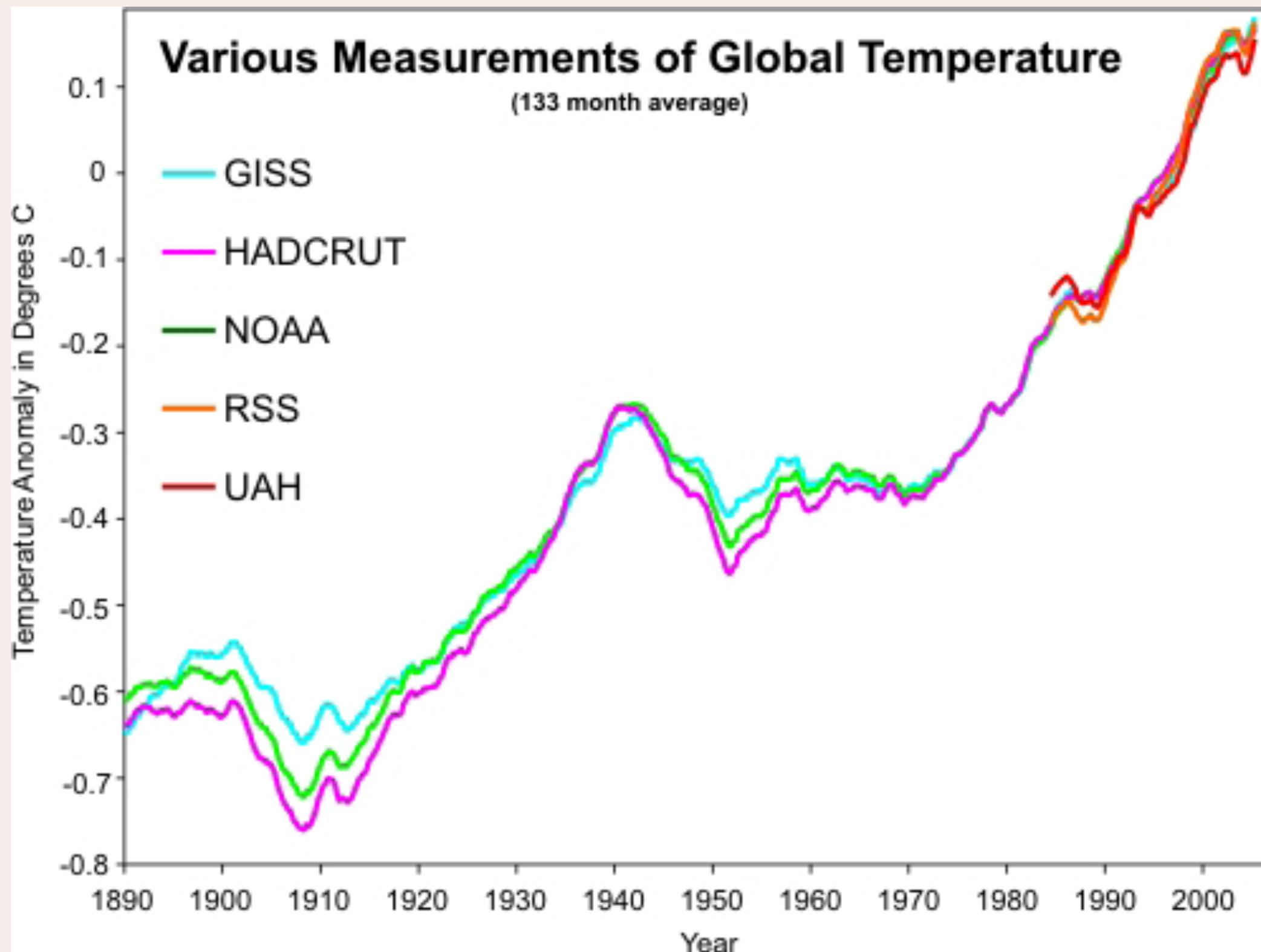
Implicit argumentation

- » 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?





Implicit argumentation

- » Scale
- » Categorizations
- » Data breaks



names on your screen:



1835 - 1964

SHOW TIME-LAPSE



Should I believe this...? Find out

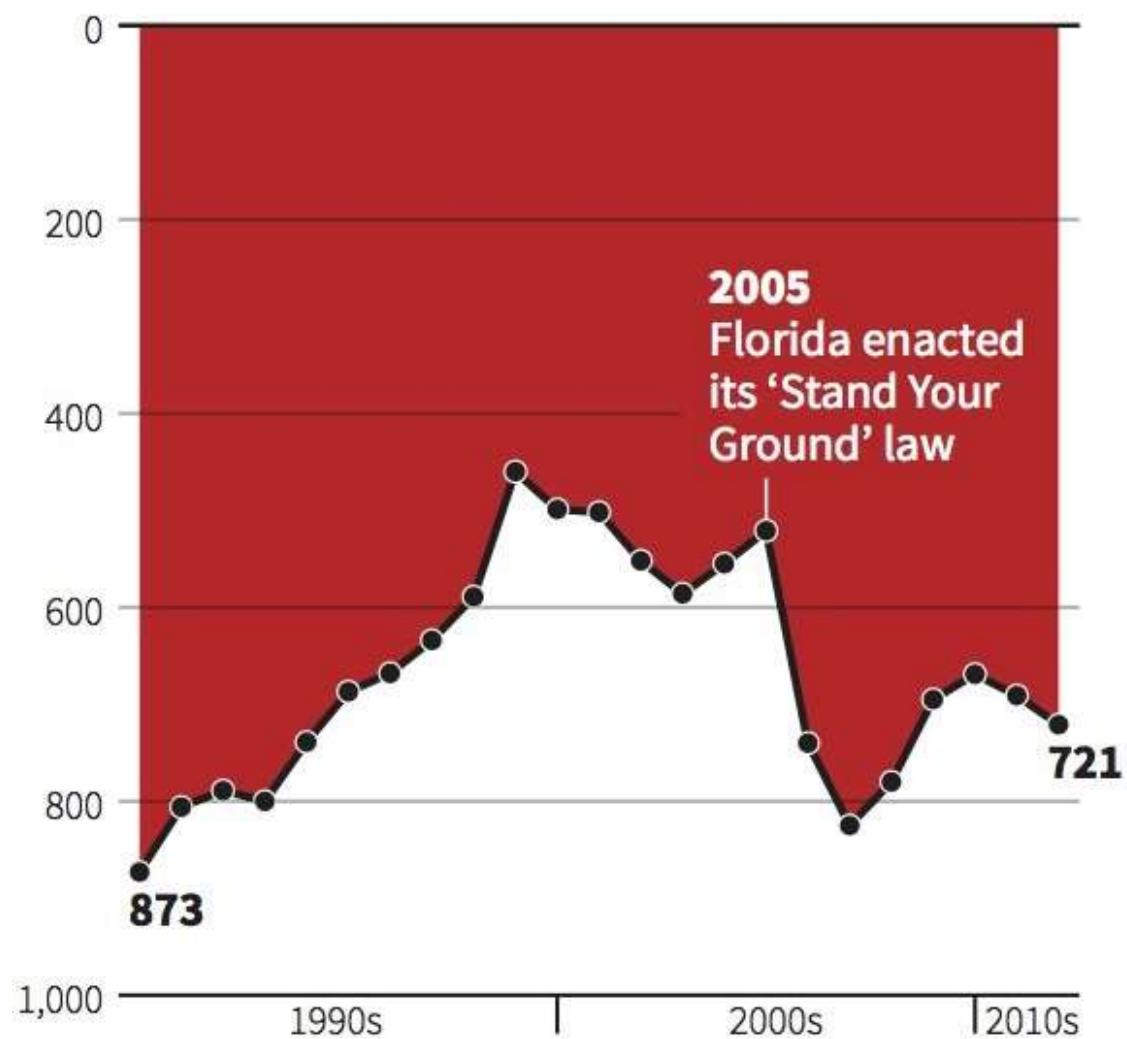
Map by avut studio using some data © Mapbox © OpenStreetMap | License

Implicit argumentation

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

Gun deaths in Florida

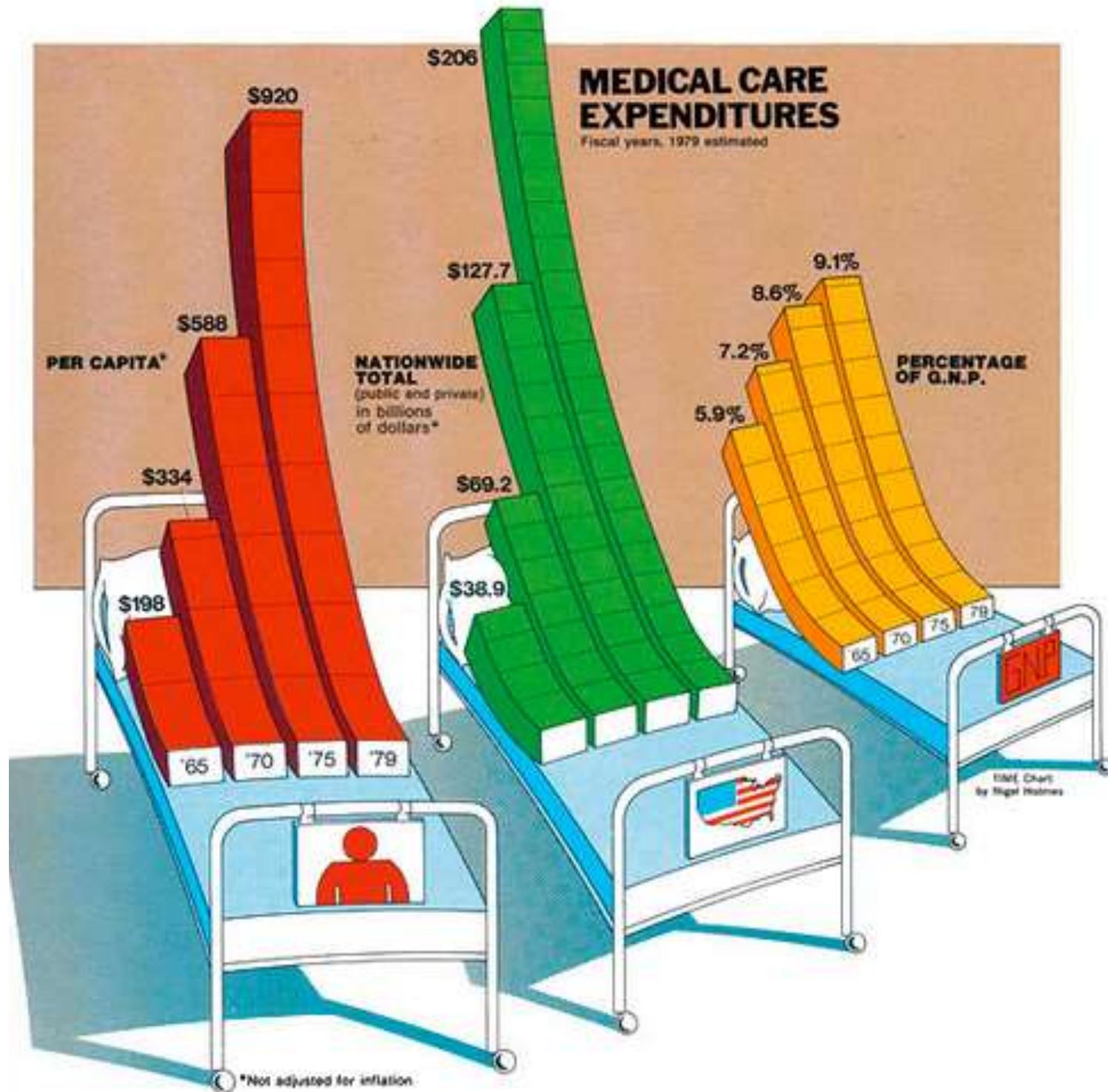
Number of murders committed using firearms



Source: Florida Department of Law Enforcement

C. Chan 16/02/2014

REUTERS



Implicit argumentation

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

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 lynching
by county

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

Normal



$$6m + 6m = 12m$$

Snow
and ice



$$6m + 60m = 66m$$

50 mph

Metres

0

50

100

150

200

250

300

350

400

Normal



$$15m + 38m = 53m$$

Snow
and ice



$$15m + 380m = 395m$$

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**