

# Data Visualization - 1.

# Looking at Data (part 1)

Kieran Healy  
Code Horizons

October 2024

# Data Visualization with R and ggplot2

# Housekeeping

10:00am to 12:30pm US EST

Break from 12:30:pm to 1:30pm

1:30pm to 3:30pm

Use the Zoom chat to ask questions, or raise a hand with 

In between class sessions



# My Setup and Yours

Talking, Slides, and Live-Coding in RStudio

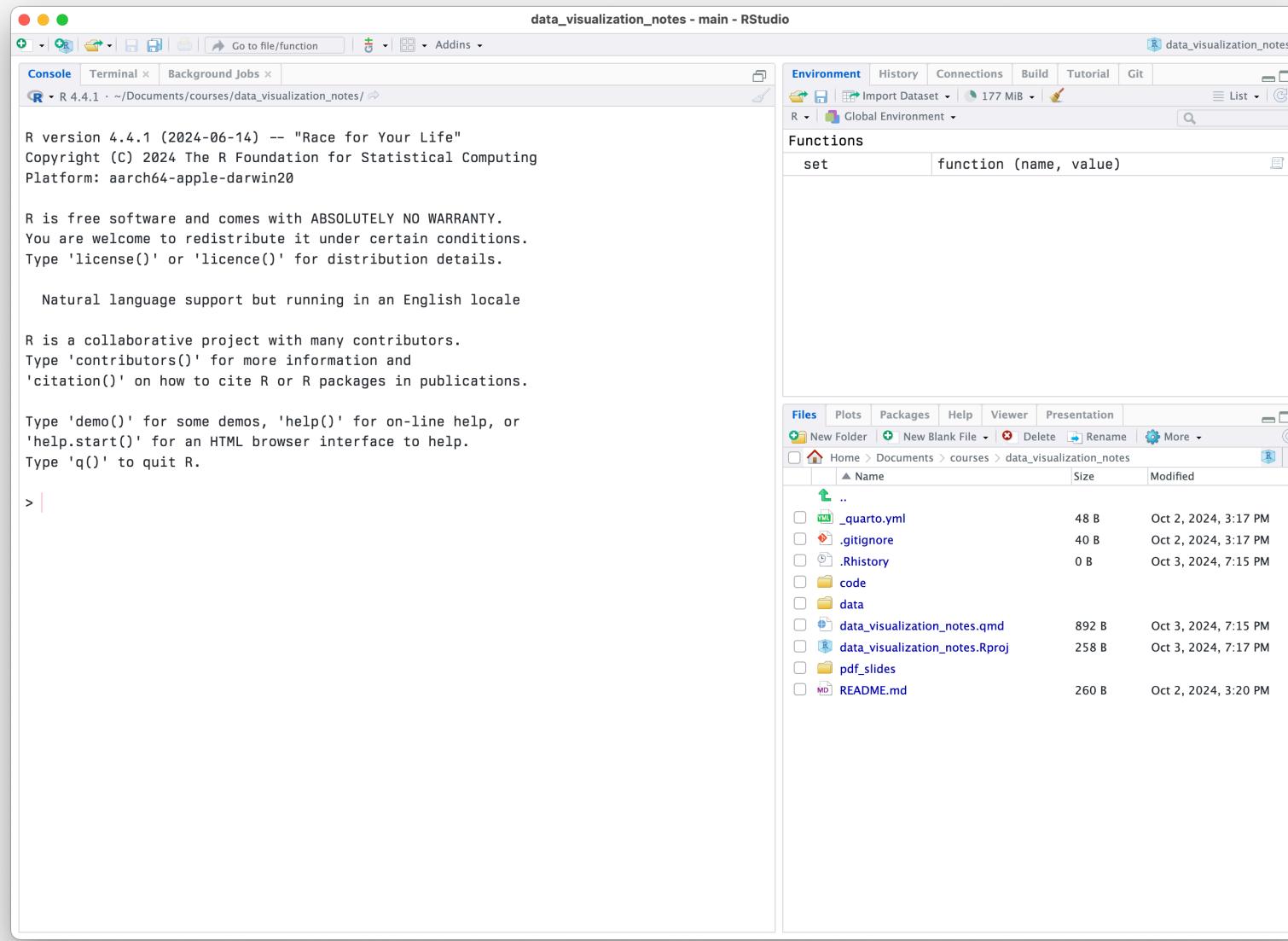
Follow along and take notes in RStudio yourself

The course packet is also an RStudio project

# Get up and Running



Studio<sup>®</sup>



data\_visualization\_notes - main - RStudio

data\_visualization\_notes.qmd

Source Visual

```
1 ---  
2 title: "Data Visualization Notes"  
3 author: "Your Name Here"  
4 format: html  
5 ---  
6  
7 ## Quarto  
8  
9 This is a quarto file. Quarto enables you to weave together content and executable  
code into a finished document. To learn more about Quarto see <https://quarto.org>.  
10  
11 ## Setup  
12  
13 Here we load some packages that we'll be using.  
14  
15 ``{r}  
16 library(here)  
17 library(socviz)  
18 library(gapminder)  
19 library(tidyverse)  
20 ```  
6:1 (Top Level) Quarto
```

Console Terminal x Background Jobs x

R 4.4.1 · ~/Documents/courses/data\_visualization\_notes/ ↵

R is free software and comes with ABSOLUTELY NO WARRANTY.  
You are welcome to redistribute it under certain conditions.  
Type 'license()' or 'licence()' for distribution details.

Natural language support but running in an English locale

R is a collaborative project with many contributors.  
Type 'contributors()' for more information and  
'citation()' on how to cite R or R packages in publications.

Type 'demo()' for some demos, 'help()' for on-line help, or  
'help.start()' for an HTML browser interface to help.  
Type 'q()' to quit R.

> |

Environment History Connections Build Tutorial Git

Import Dataset 177 MB List C

Global Environment

Functions

set function (name, value)

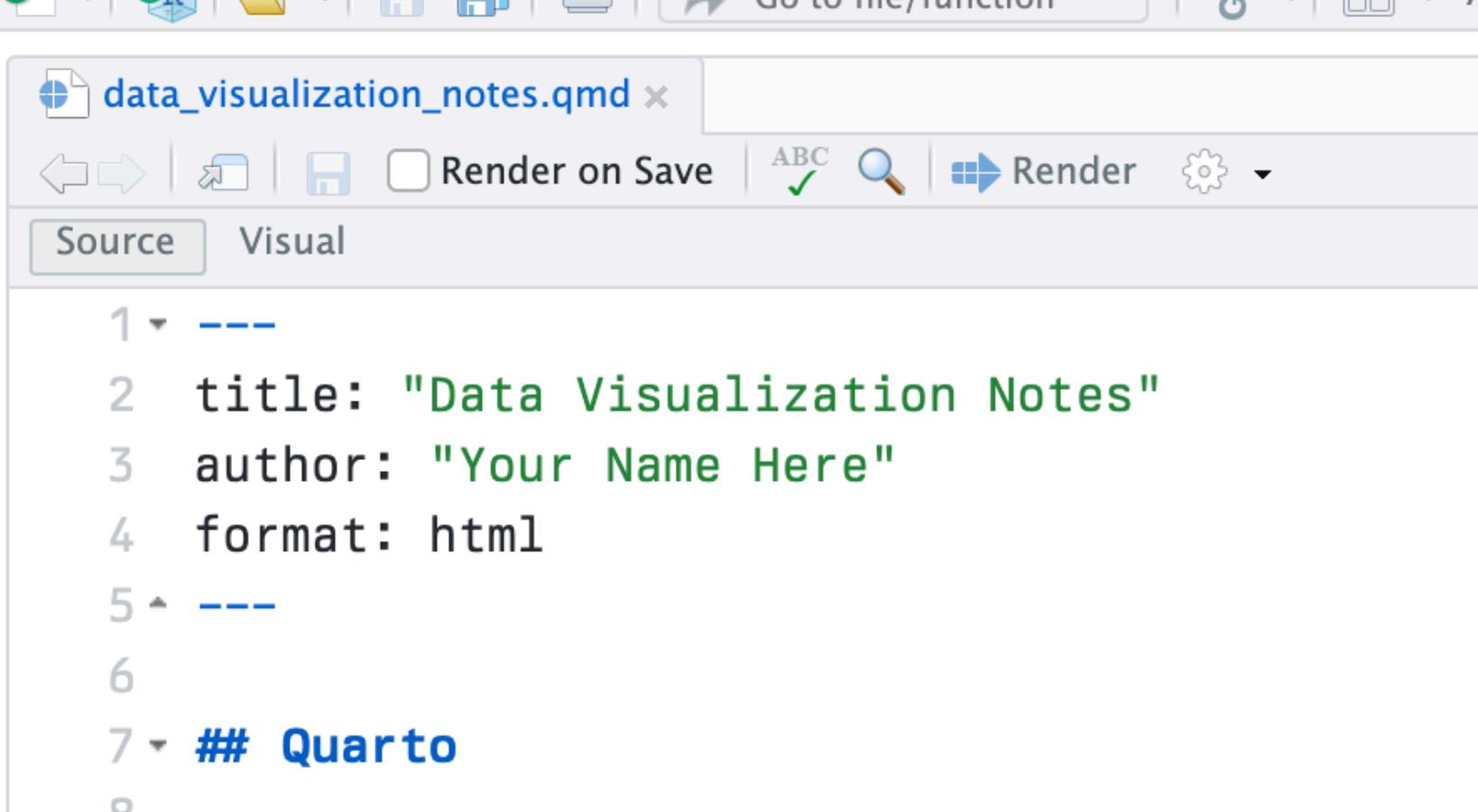
Files Plots Packages Help Viewer Presentation

New Folder New Blank File Delete Rename More

Home Documents courses data\_visualization\_notes

Name	Size	Modified
_quarto.yml	48 B	Oct 2, 2024, 3:17 PM
.gitignore	40 B	Oct 2, 2024, 3:17 PM
.Rhistory	0 B	Oct 3, 2024, 7:15 PM
code		
data		
data_visualization_notes.qmd	892 B	Oct 3, 2024, 7:15 PM
data_visualization_notes.Rproj	258 B	Oct 3, 2024, 7:17 PM
pdf_slides		
README.md	260 B	Oct 2, 2024, 3:20 PM

# Try rendering your notes



The screenshot shows a Quarto editor window with the following details:

- Title Bar:** Shows the file name "data\_visualization\_notes.qmd".
- Toolbar:** Includes icons for back, forward, search, and render, along with a "Render on Save" checkbox which is checked.
- Mode Bar:** Shows tabs for "Source" (which is selected) and "Visual".
- Code Area:** Displays the following QMD code:

```
1 ---  
2 title: "Data Visualization Notes"  
3 author: "Your Name Here"  
4 format: html  
5 ---  
6  
7 ## Quarto
```

Don't worry if it's not clear what's happening at this point.

# Now write the following code

Write this out inside the “code chunk” in your notes.

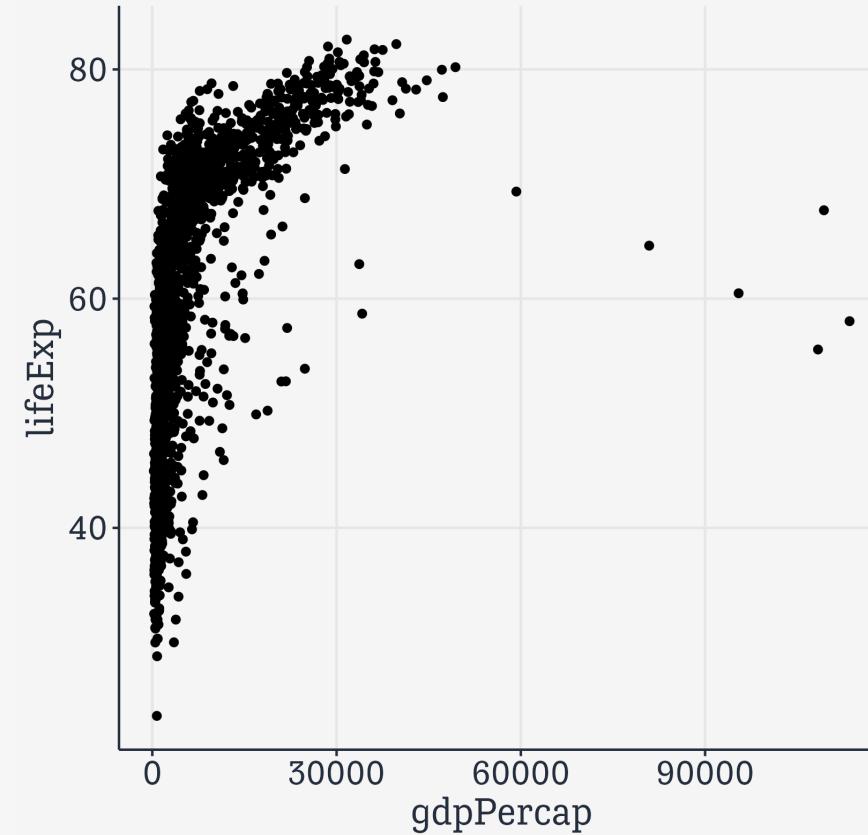
```
p ← ggplot(data = gapminder,  
            mapping = aes(x = gdpPercap,  
                           y = lifeExp))  
  
p + geom_point()
```

... And Render your document again.

# Now write the following code

Write this out inside the “code chunk” in your notes.

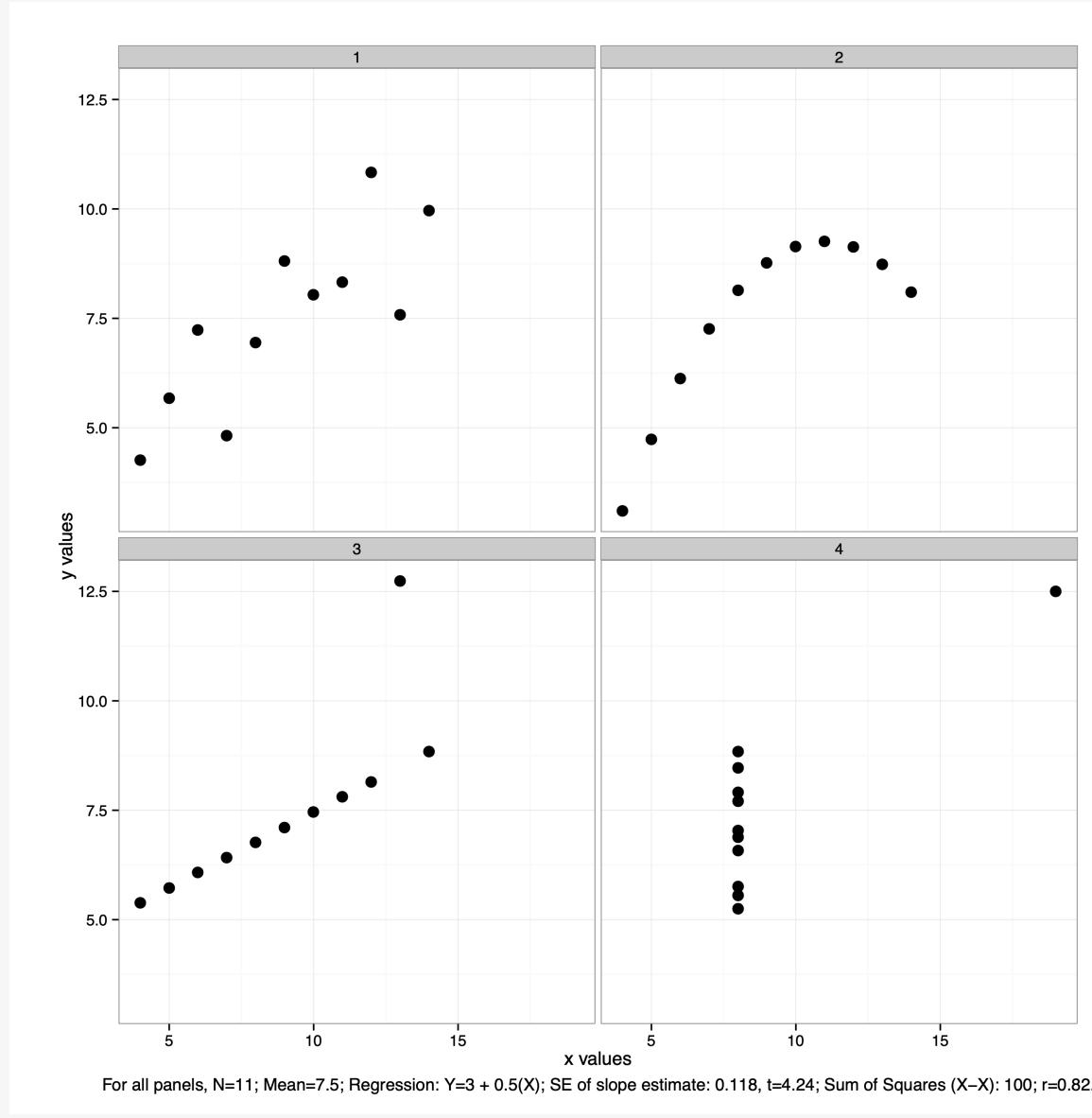
```
p ← ggplot(data = gapminder,  
            mapping = aes(x = gdpPercap,  
                           y = lifeExp))  
  
p + geom_point()
```



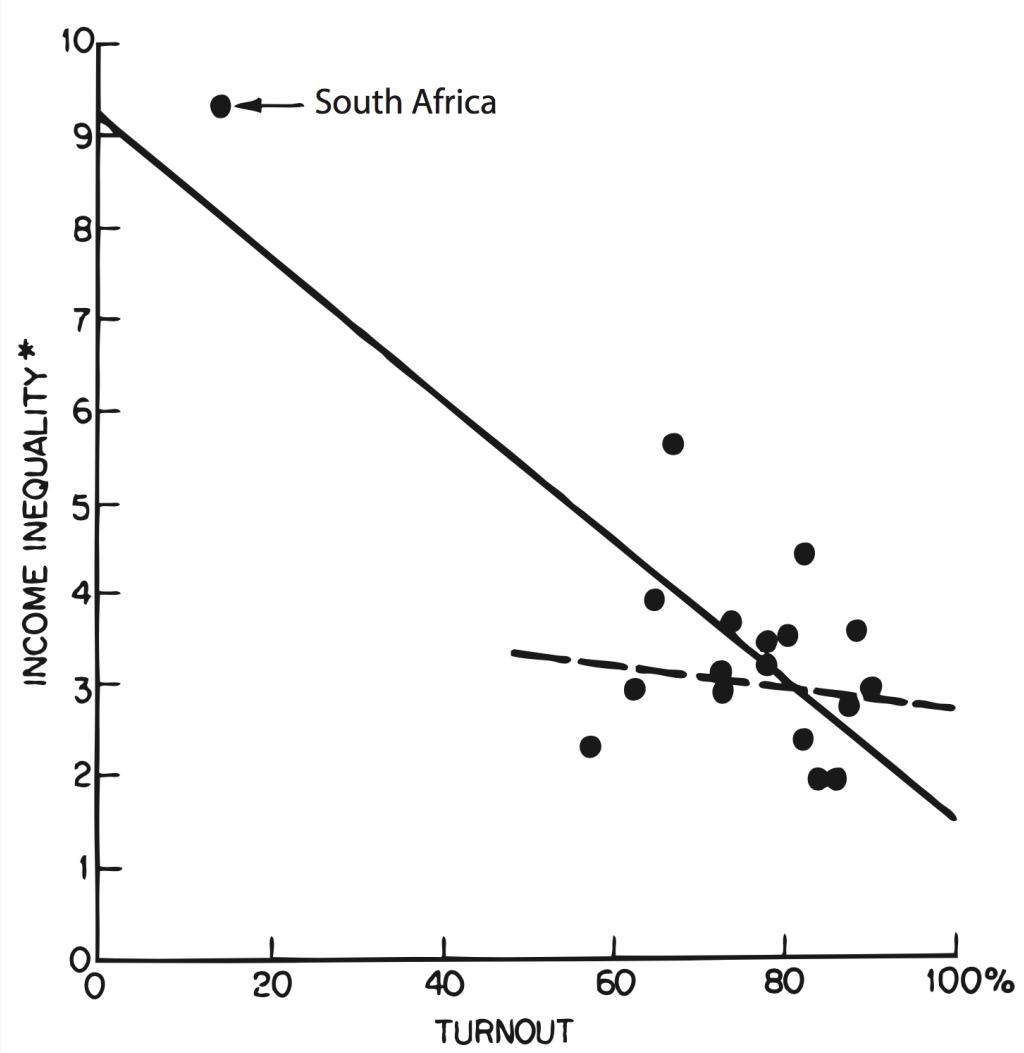
... And Render your document again.

You should  
look at  
your data

# Seeing things

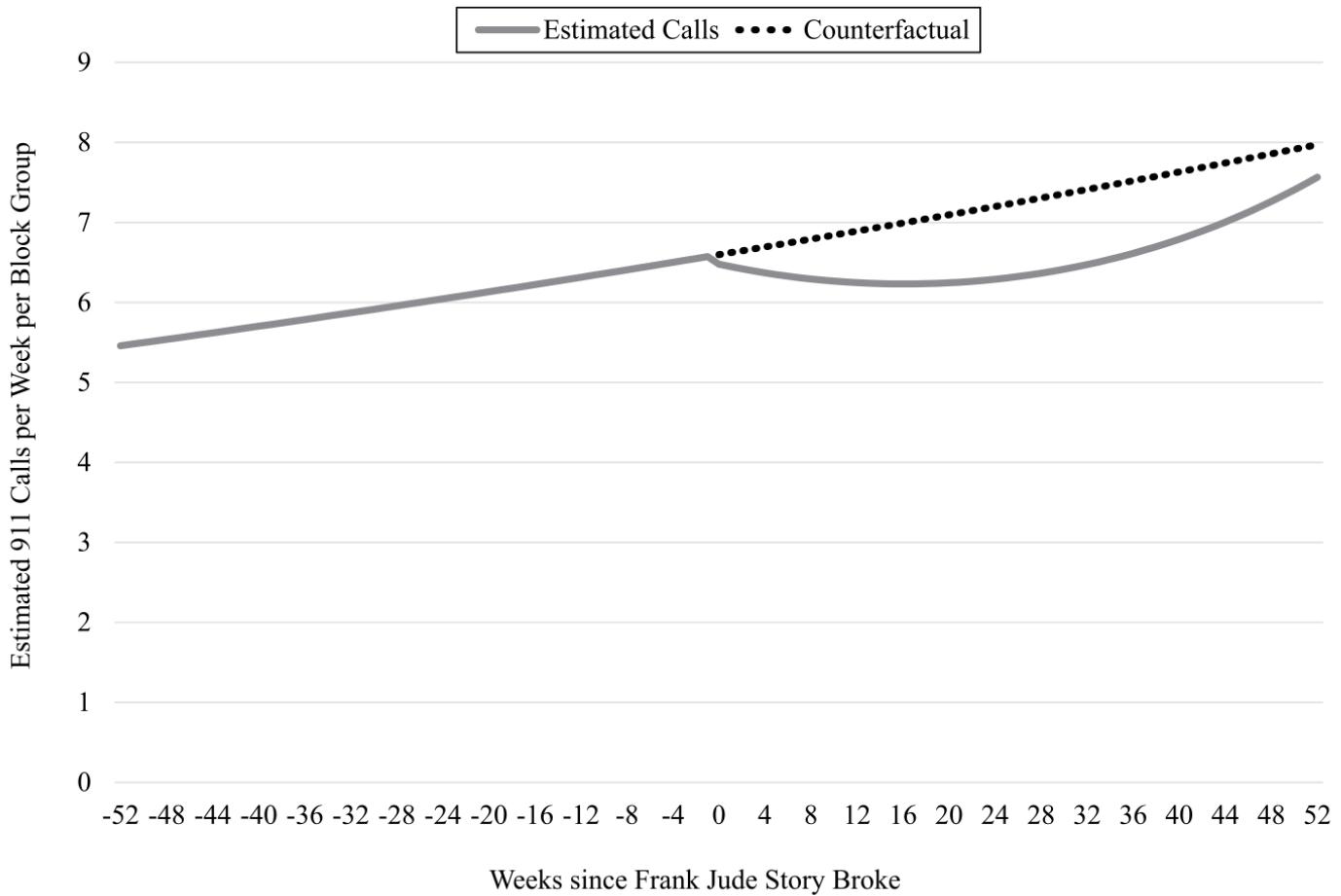


Anscombe's Quartet

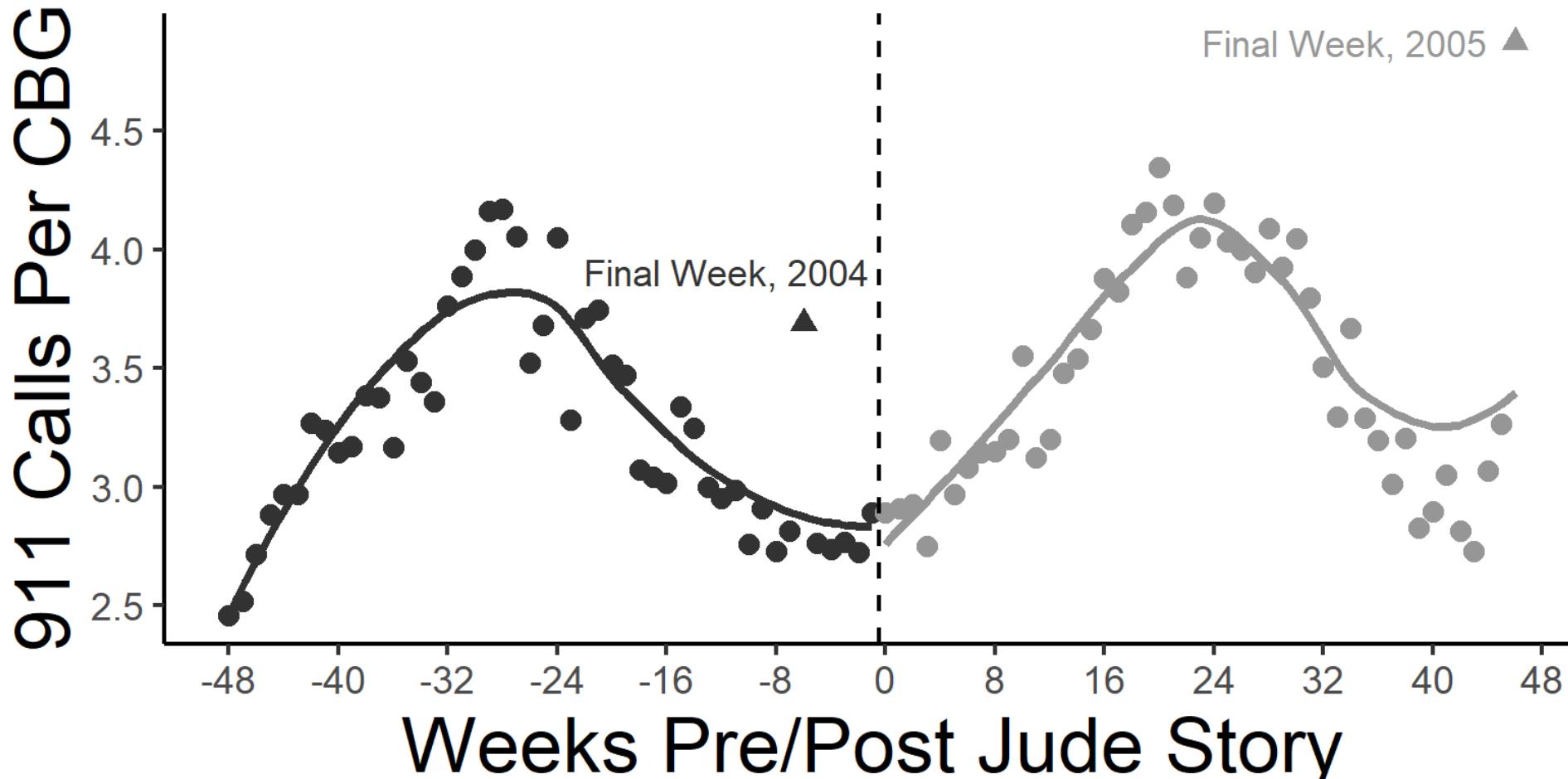


Key. — Bivariate slope including South Africa ( $N = 18$ )

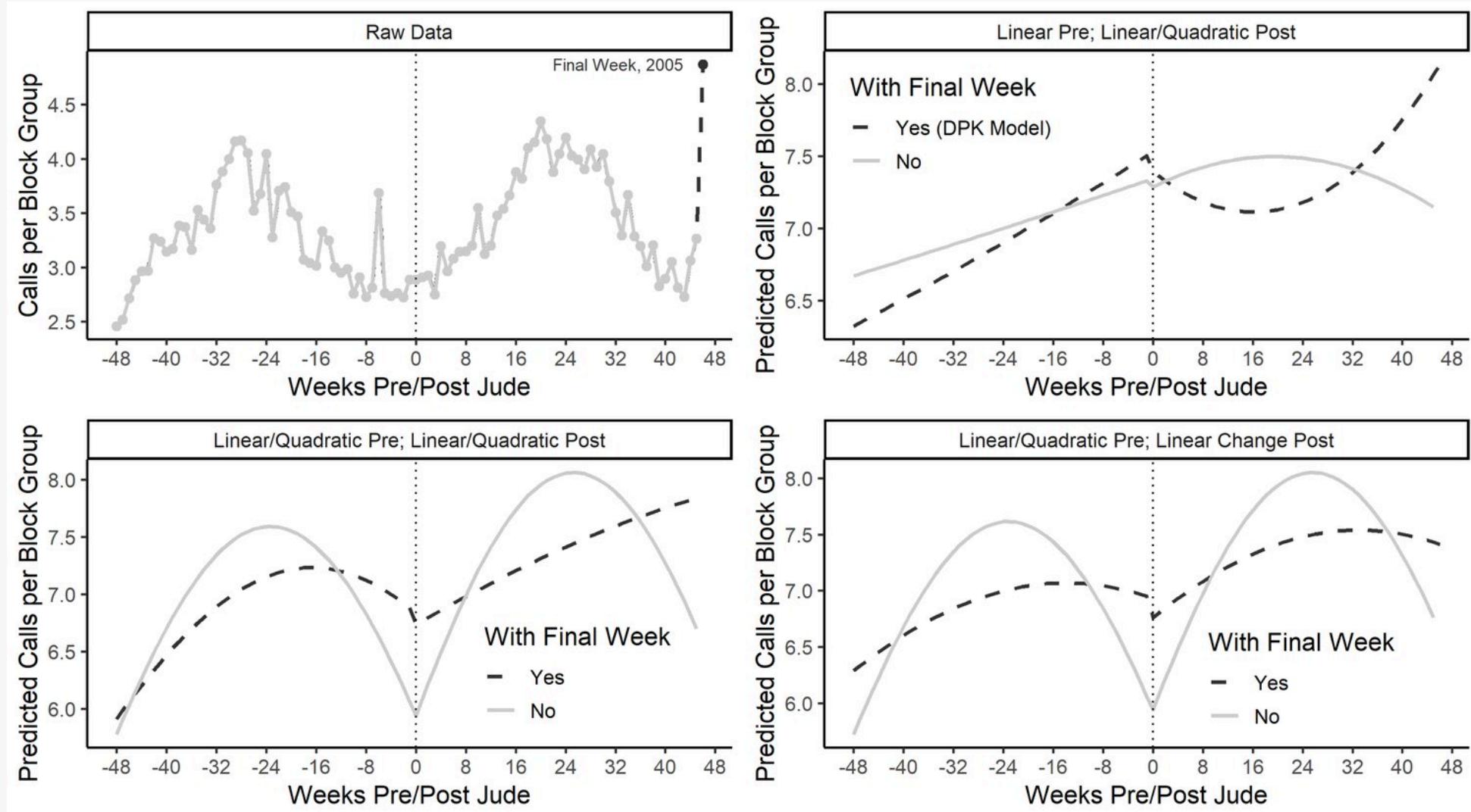
- - - Bivariate slope excluding South Africa ( $N = 17$ )



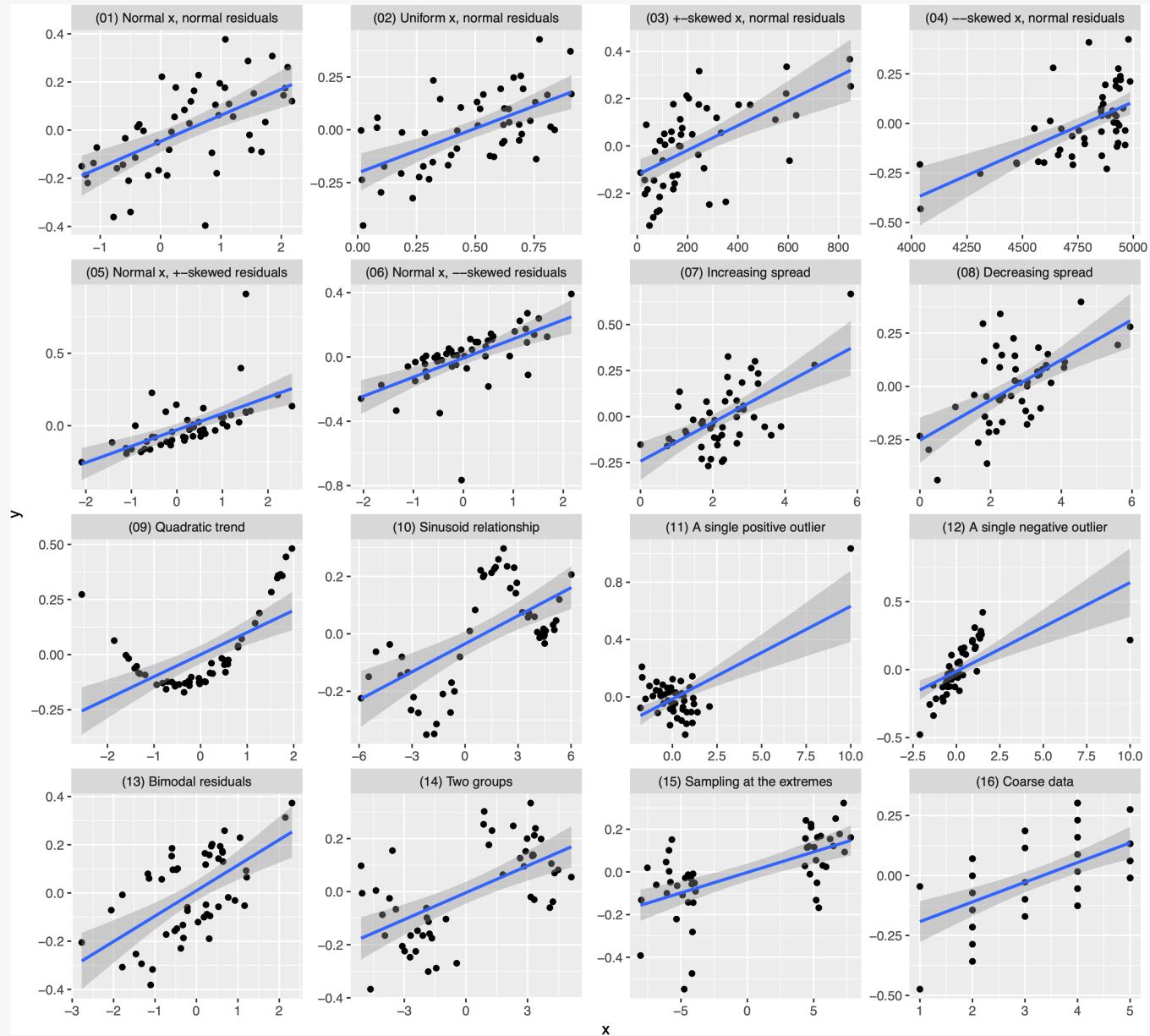
# All Neighborhoods

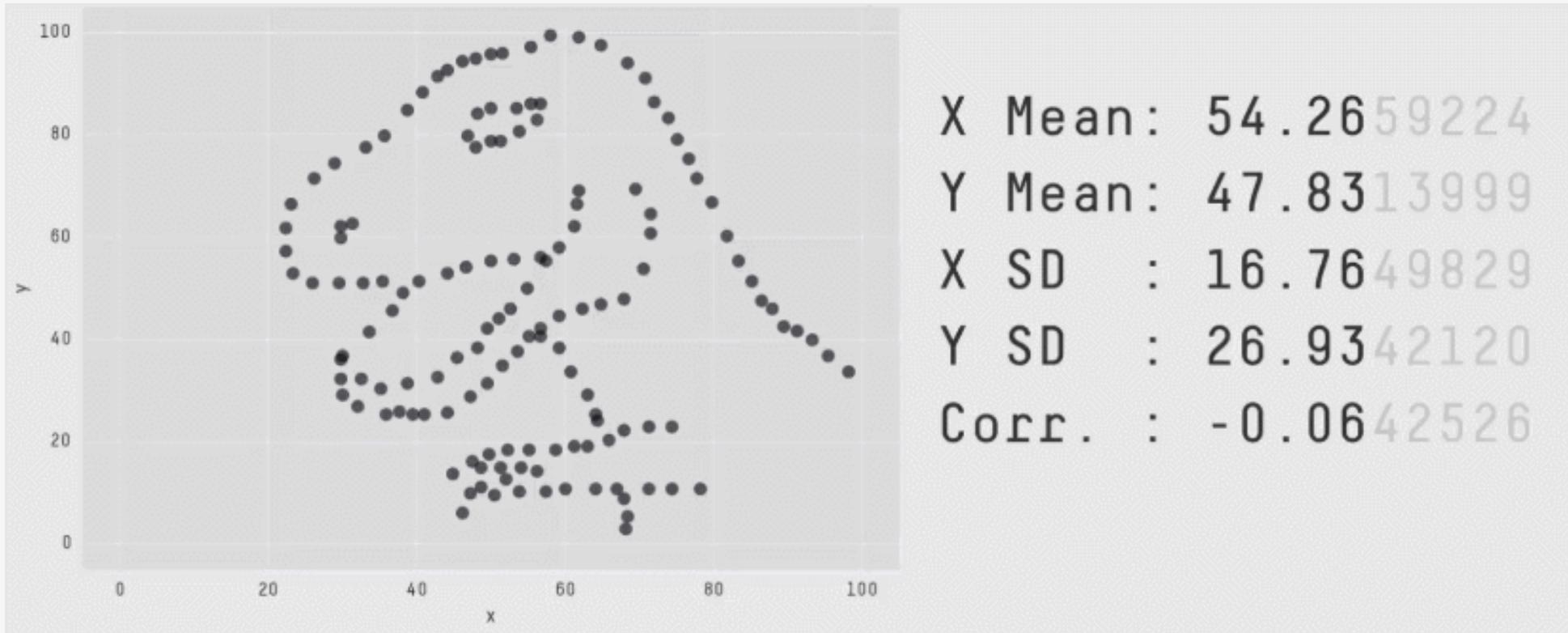


Zoorob (2020)



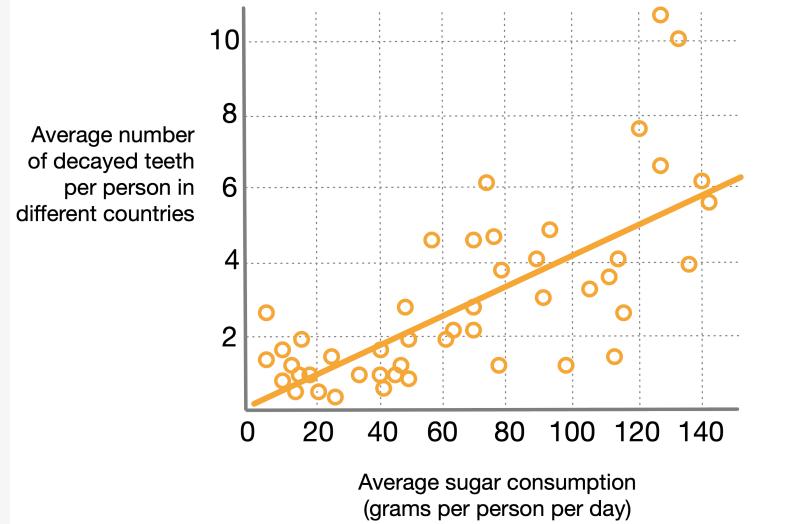
Zoorob (2020)





Cairo; Matejka & Fitzmaurice

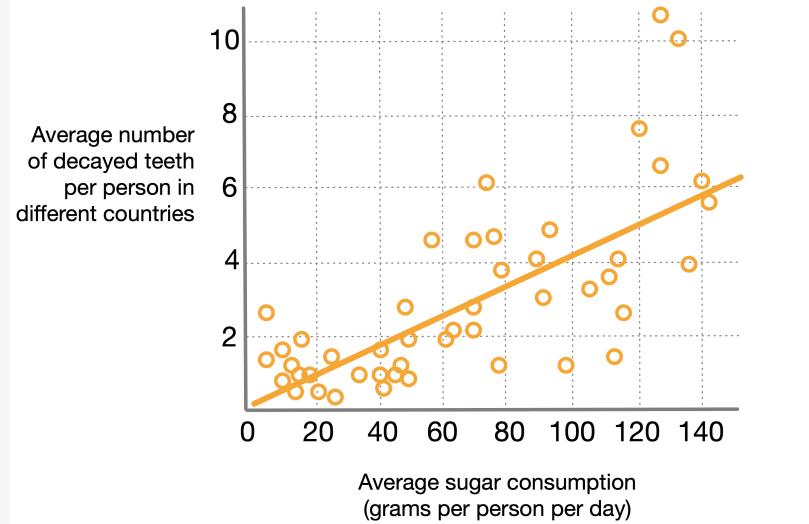
*Which of the following statements best describes the data in the graph below?*



Pew Research

- A. In recent years, the rate of cavities has increased in many countries
- B. In some countries, people brush their teeth more frequently than in other countries
- C. The more sugar people eat, the more likely they are to get cavities
- D. In recent years, the consumption of sugar has increased in many countries

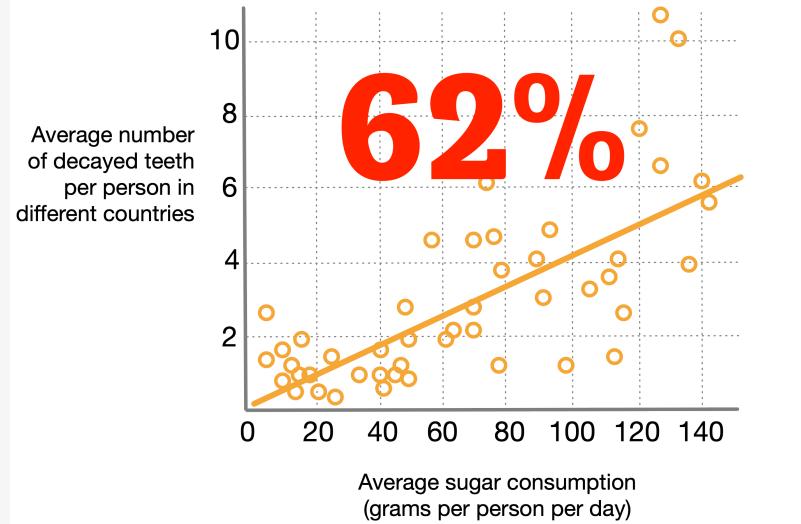
Which of the following statements best describes the data in the graph below?



Pew Research

- A. In recent years, the rate of cavities has increased in many countries
- B. In some countries, people brush their teeth more frequently than in other countries
- C. The more sugar people eat, the more likely they are to get cavities
- D. In recent years, the consumption of sugar has increased in many countries

Which of the following statements best describes the data in the graph below?

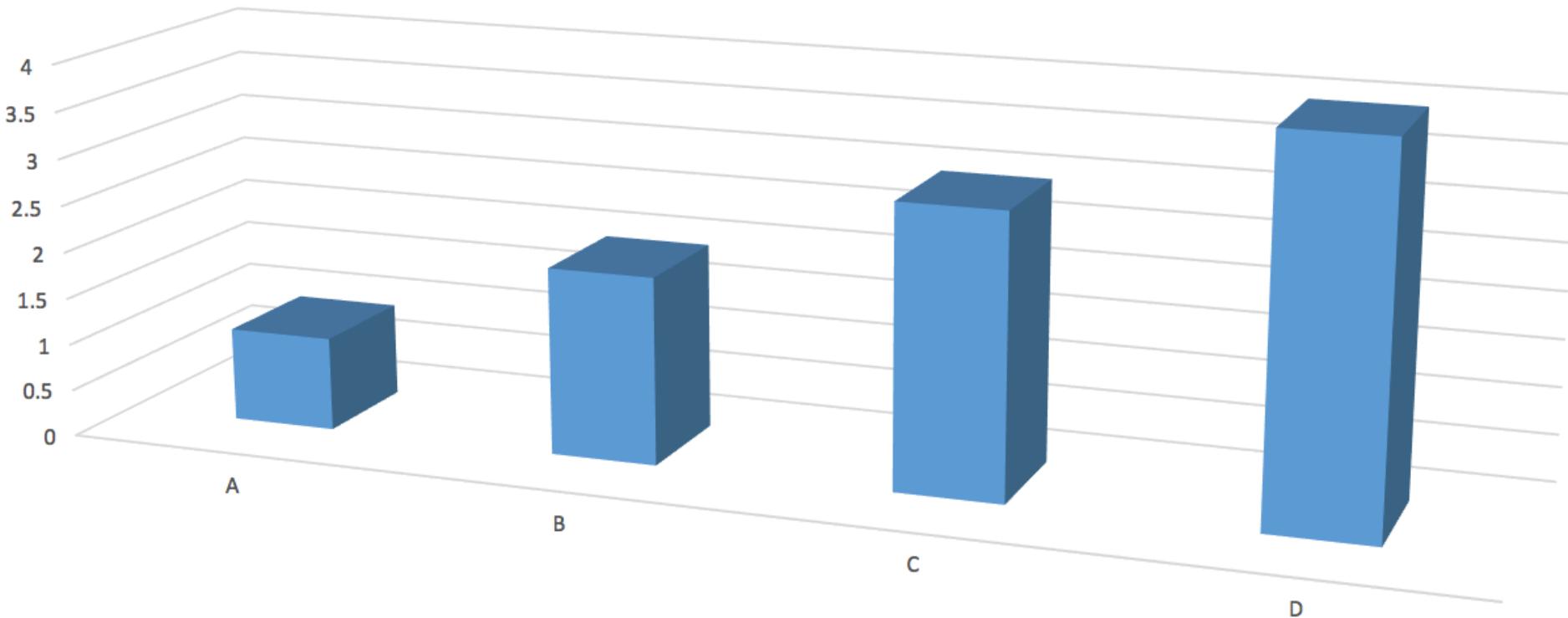


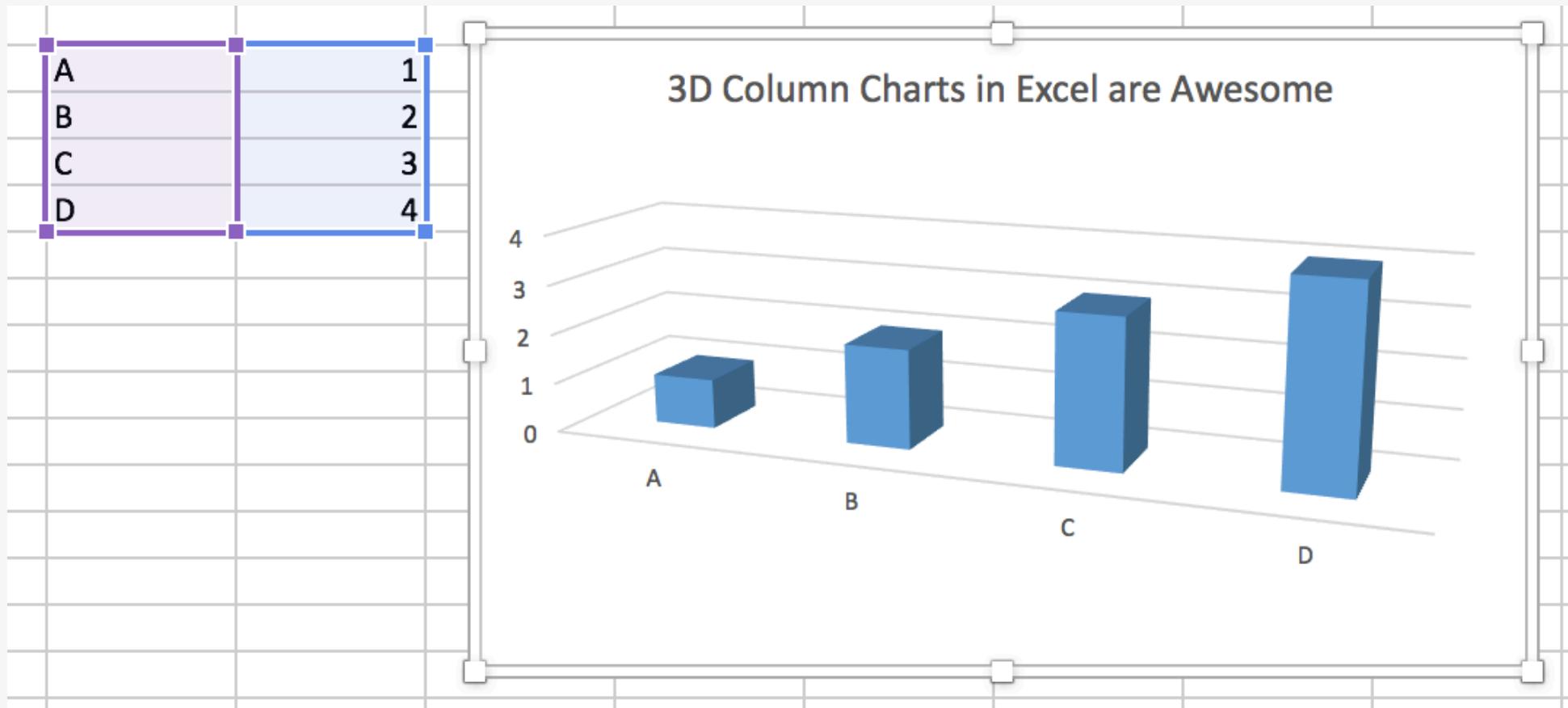
Pew Research

- A. In recent years, the rate of cavities has increased in many countries
- B. In some countries, people brush their teeth more frequently than in other countries
- C. **The more sugar people eat, the more likely they are to get cavities**
- D. In recent years, the consumption of sugar has increased in many countries

**Not Seeing Things**

## 3D Column Charts in Excel are Awesome





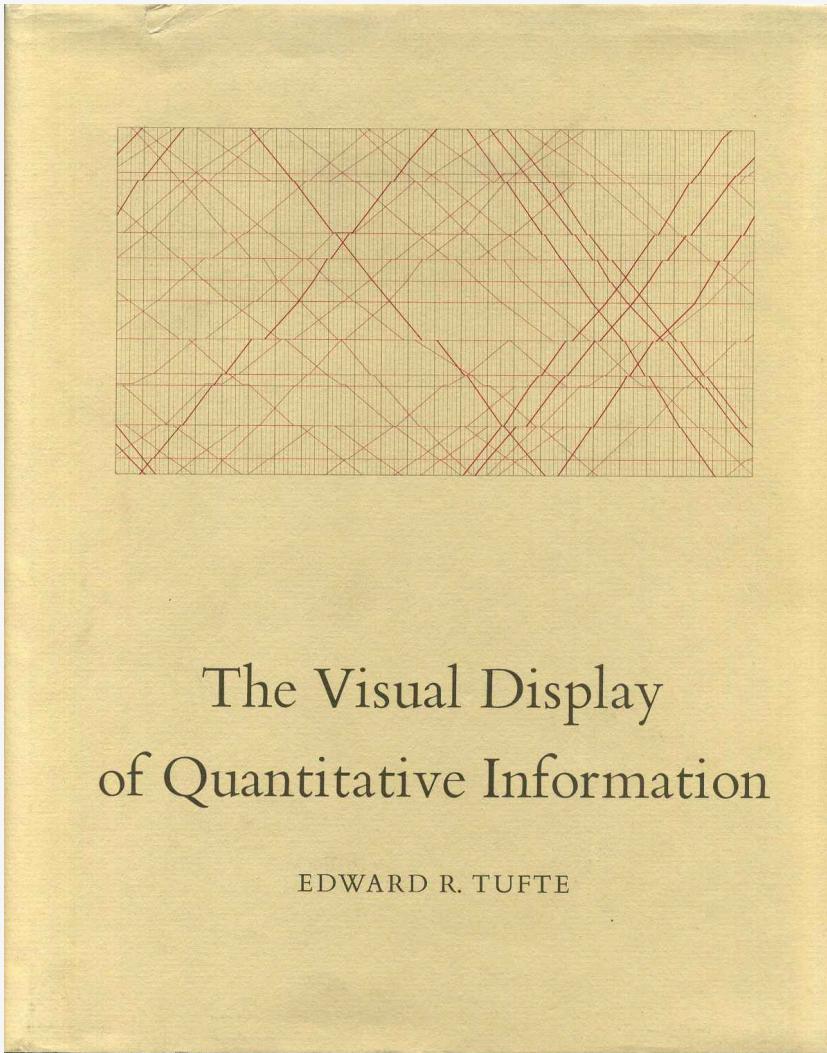
**Bad Taste**

**Bad Data**

**Bad Perception**

# Bad Taste: Simplify, Simplify?

# Tufte's “Data to Ink Ratio”





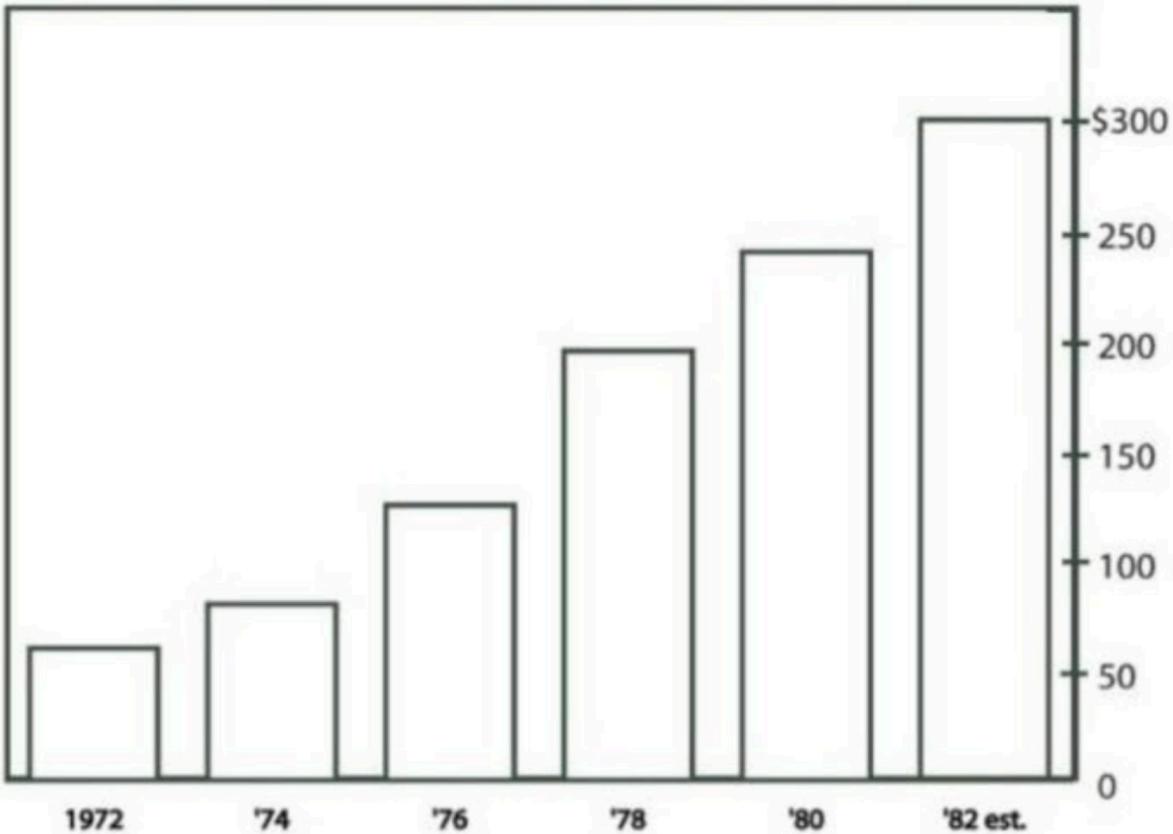
## MONSTROUS COSTS

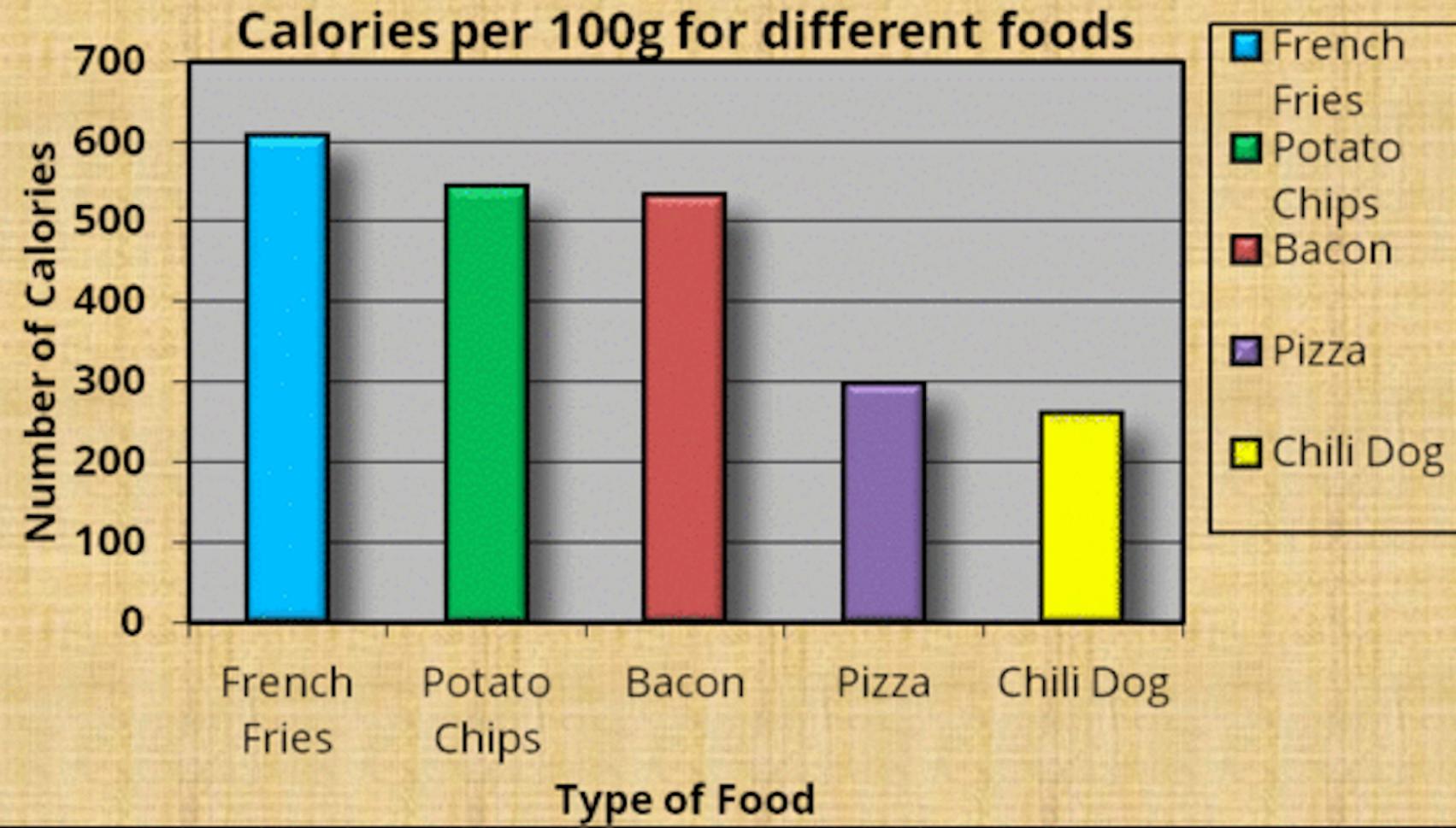
Total House and Senate campaign expenditures,  
in millions



Nigel Holmes

**MONSTROUS COSTS**  
Total House and Senate campaign expenditures, in millions

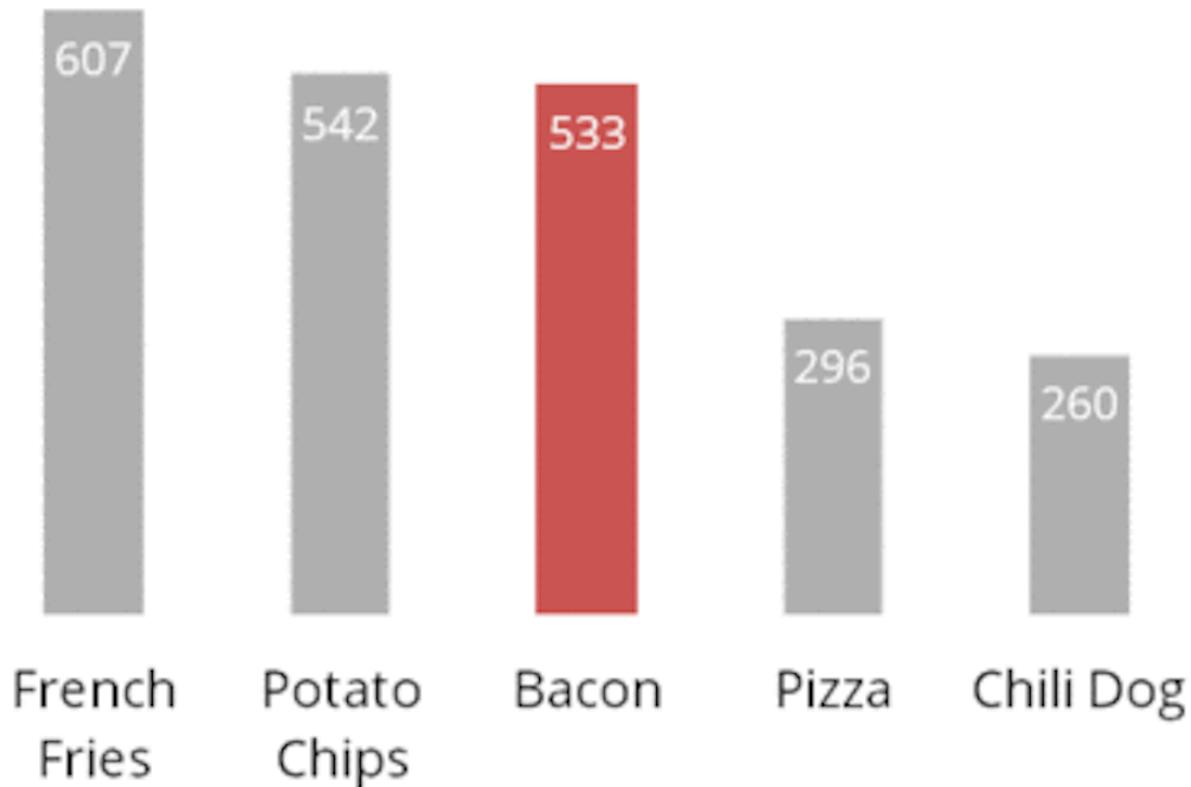




Created by Darkhorse Analytics

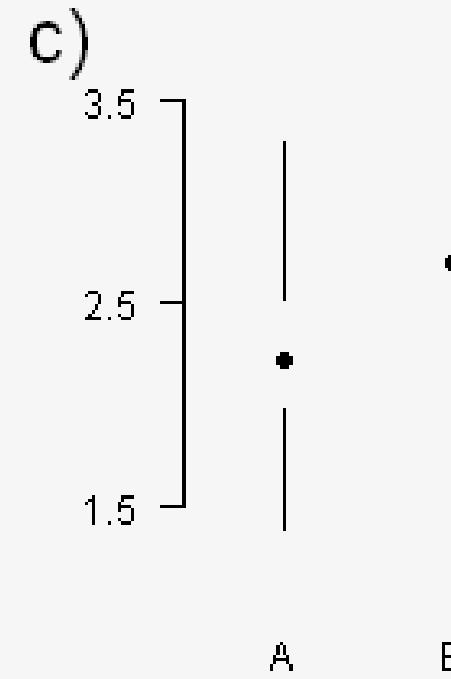
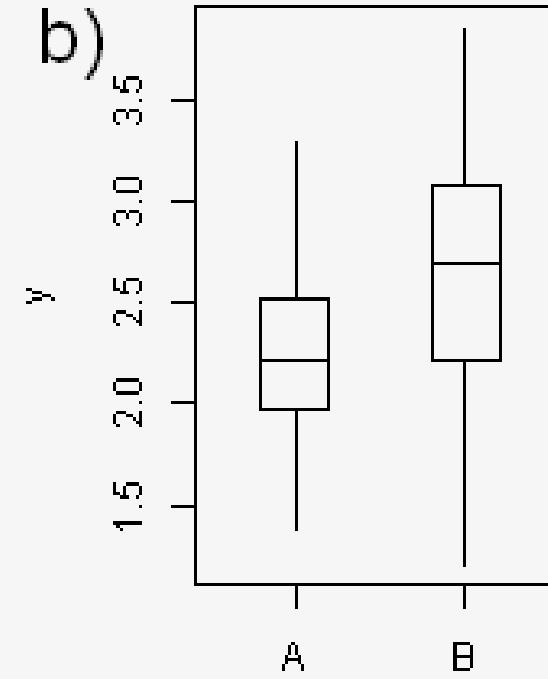
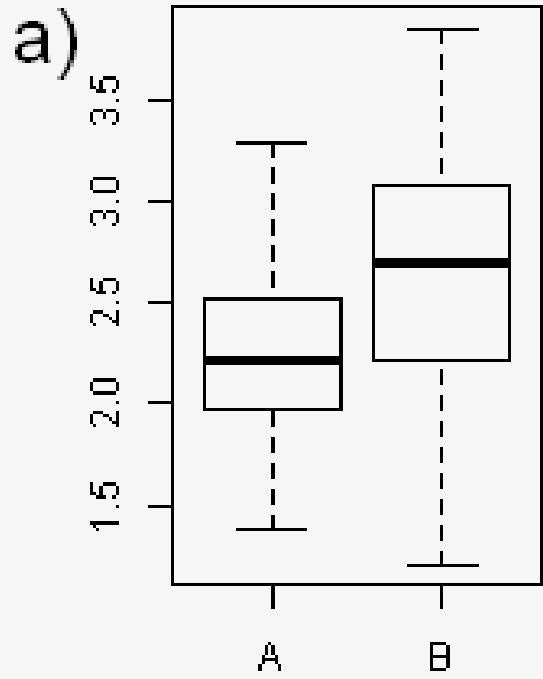
[www.darkhorseanalytics.com](http://www.darkhorseanalytics.com)

## Calories per 100g



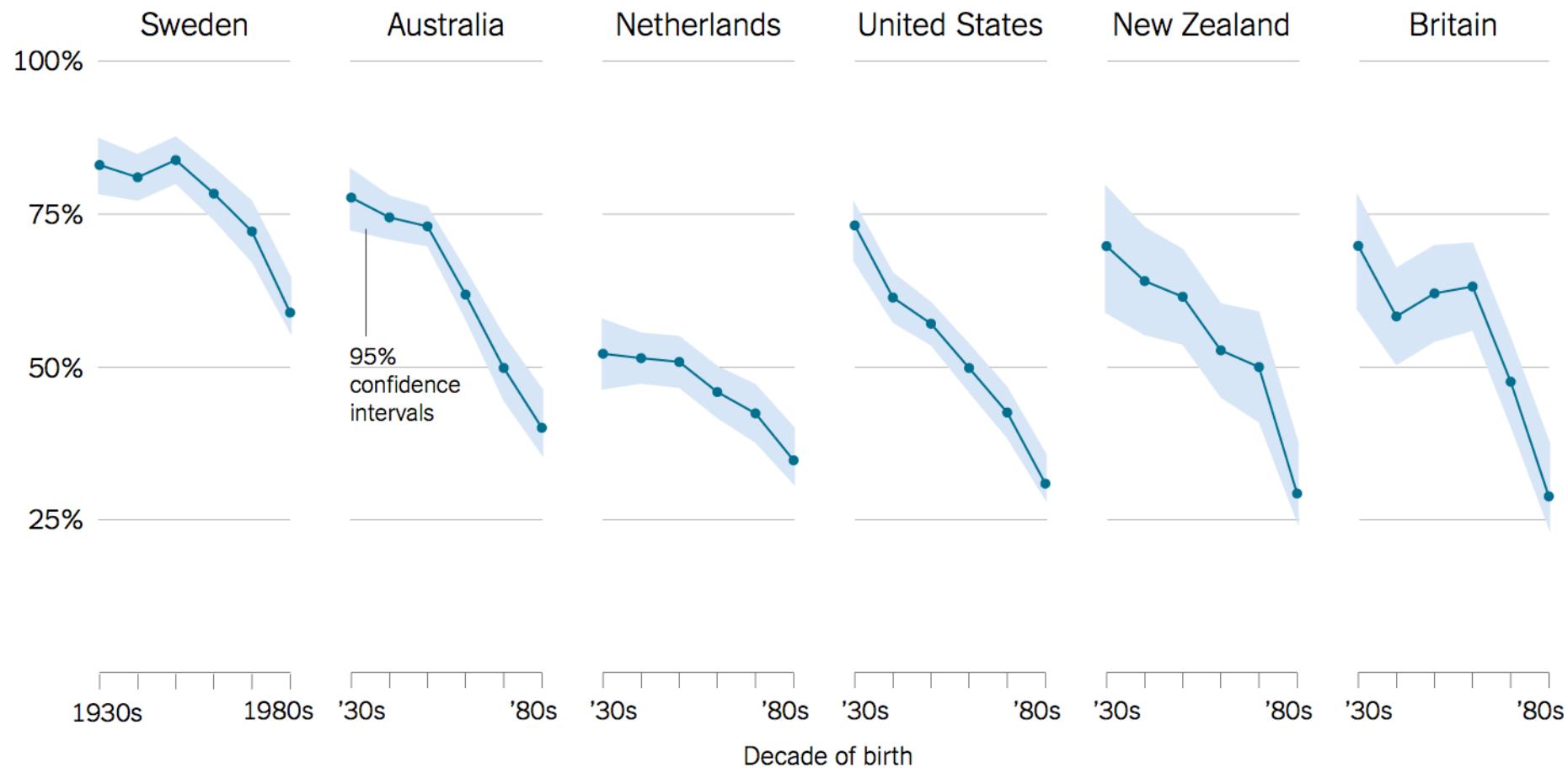
Created by Darkhorse Analytics

[www.darkhorseanalytics.com](http://www.darkhorseanalytics.com)

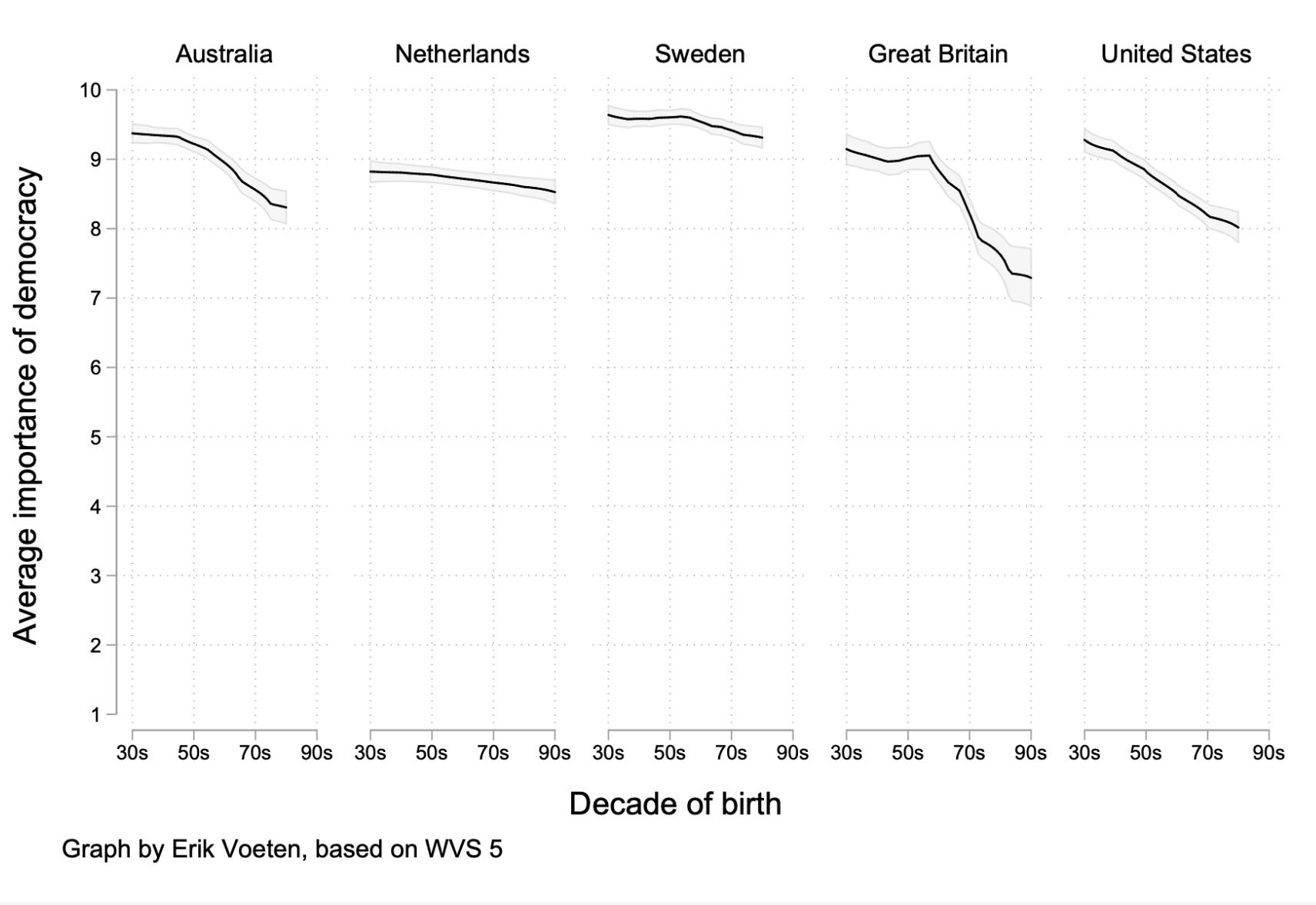


# Bad Data: Junk-Free Junk Charts

## Percentage of people who say it is “essential” to live in a democracy



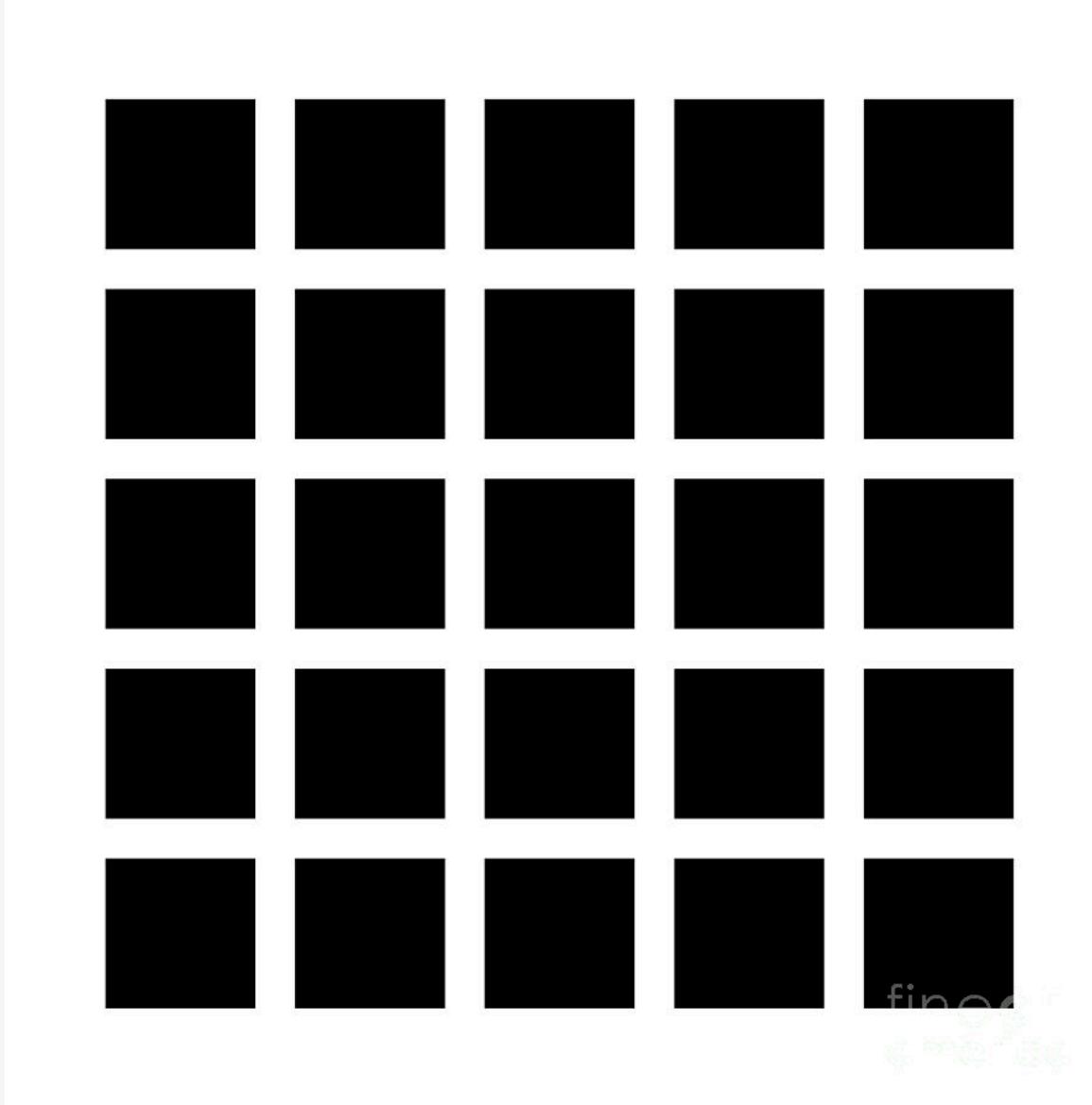
Source: Yascha Mounk and Roberto Stefan Foa, “The Signs of Democratic Deconsolidation,” Journal of Democracy | By The New York Times



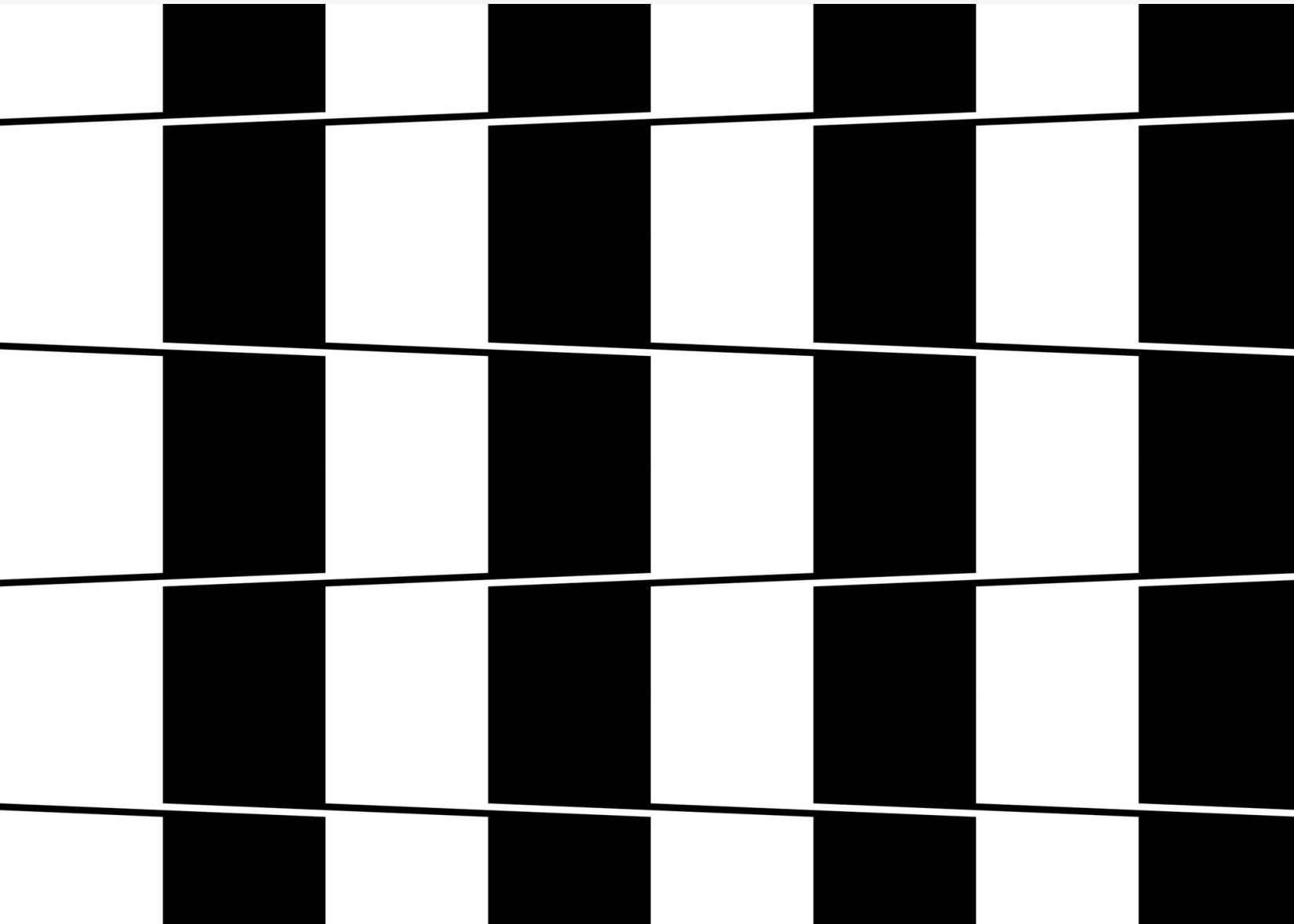
Erik Voeten

# Bad Perception: Seeing and Not Seeing

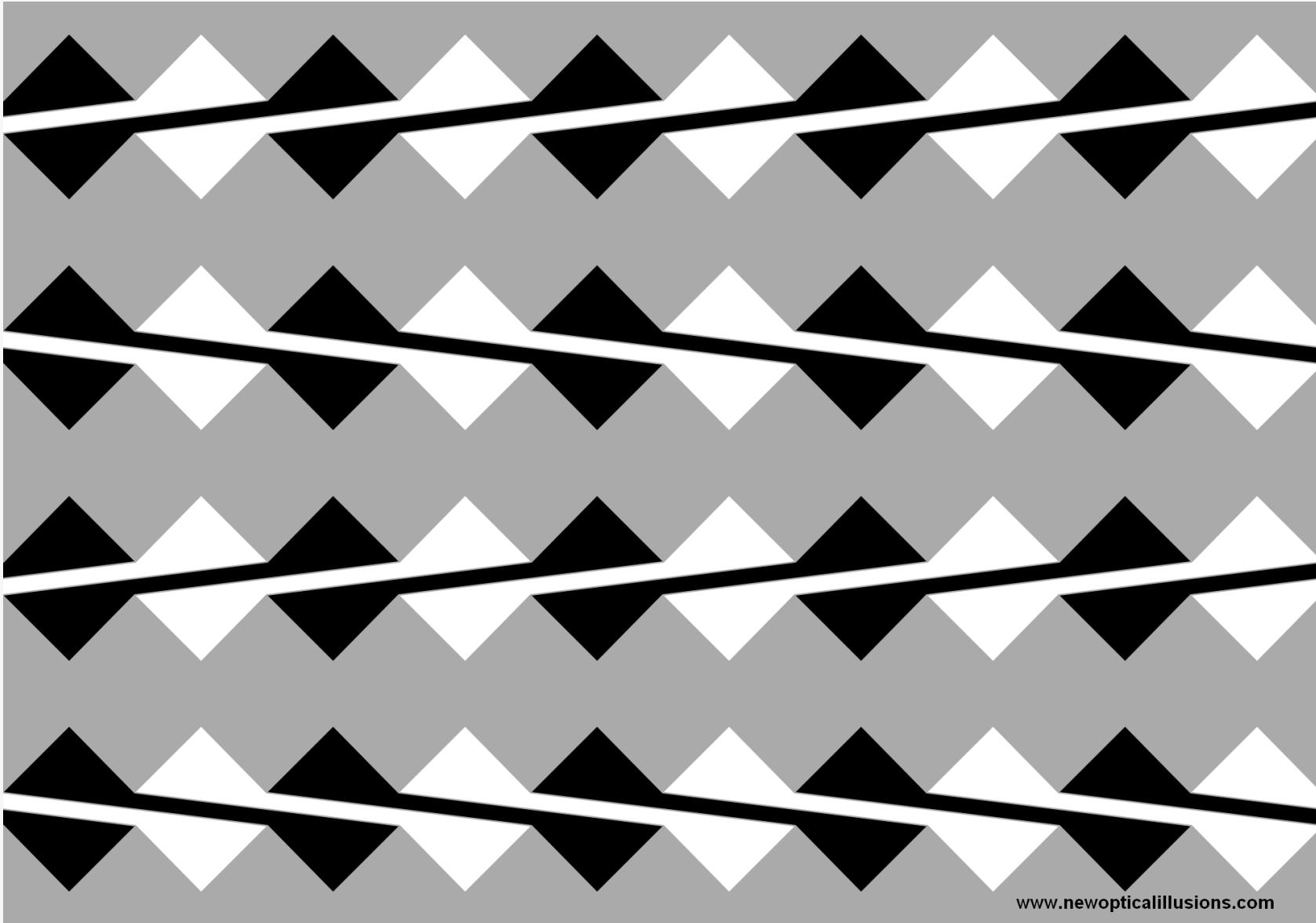
# Edges & Contrasts



Hermann Grid Effect



Fraser Columns



[www.newopticalillusions.com](http://www.newopticalillusions.com)

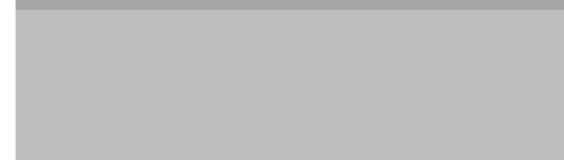
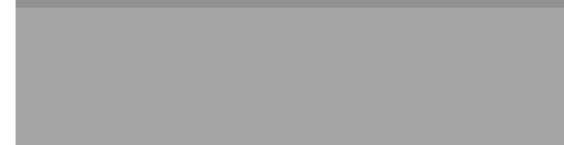
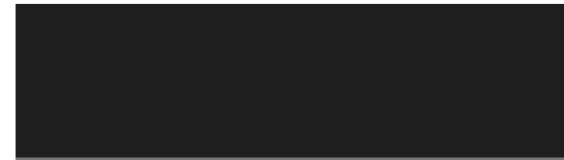
Fraser Diamonds



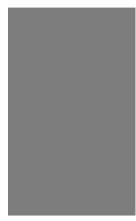
These are two perfectly  
geometrical circles

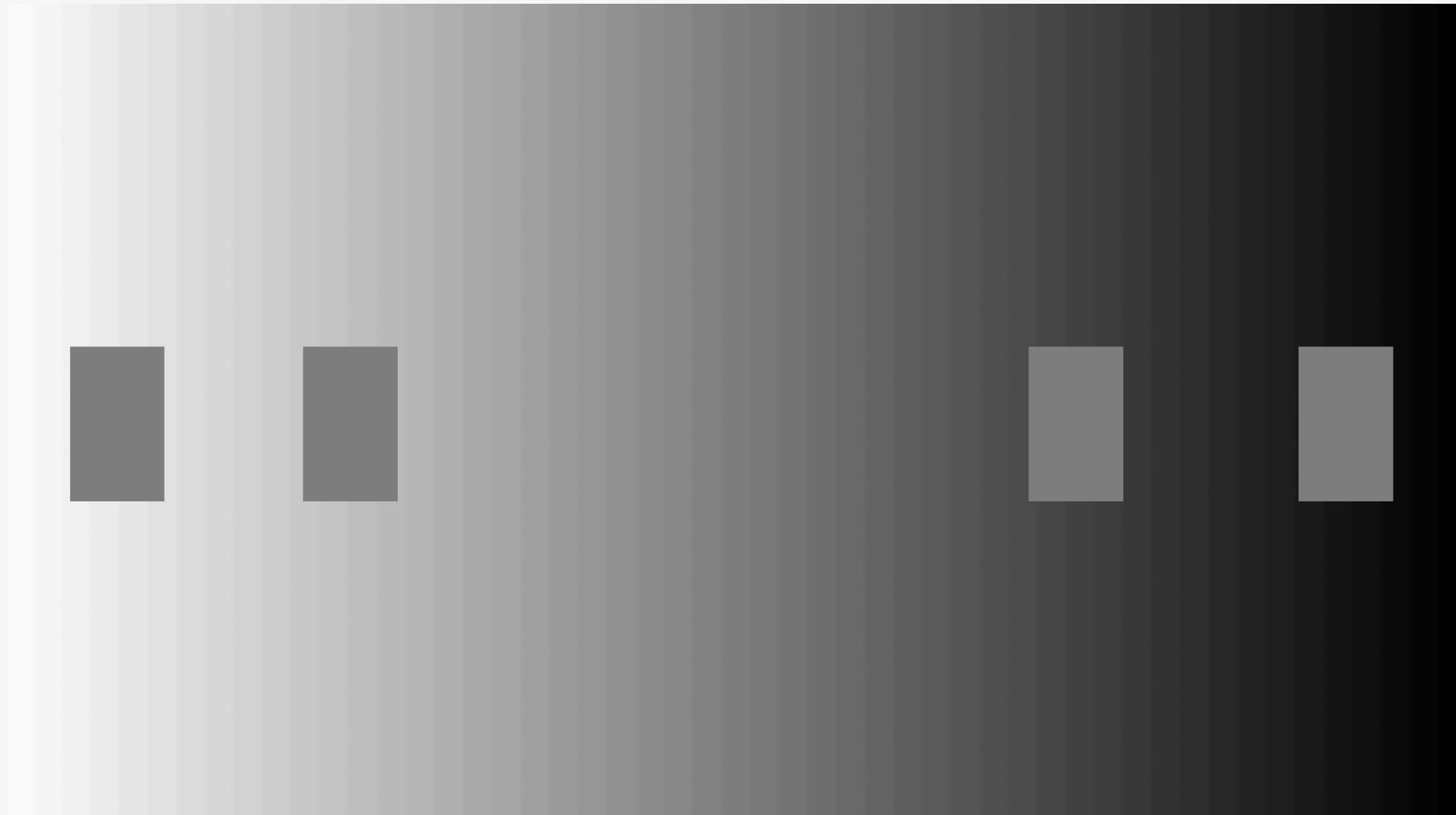


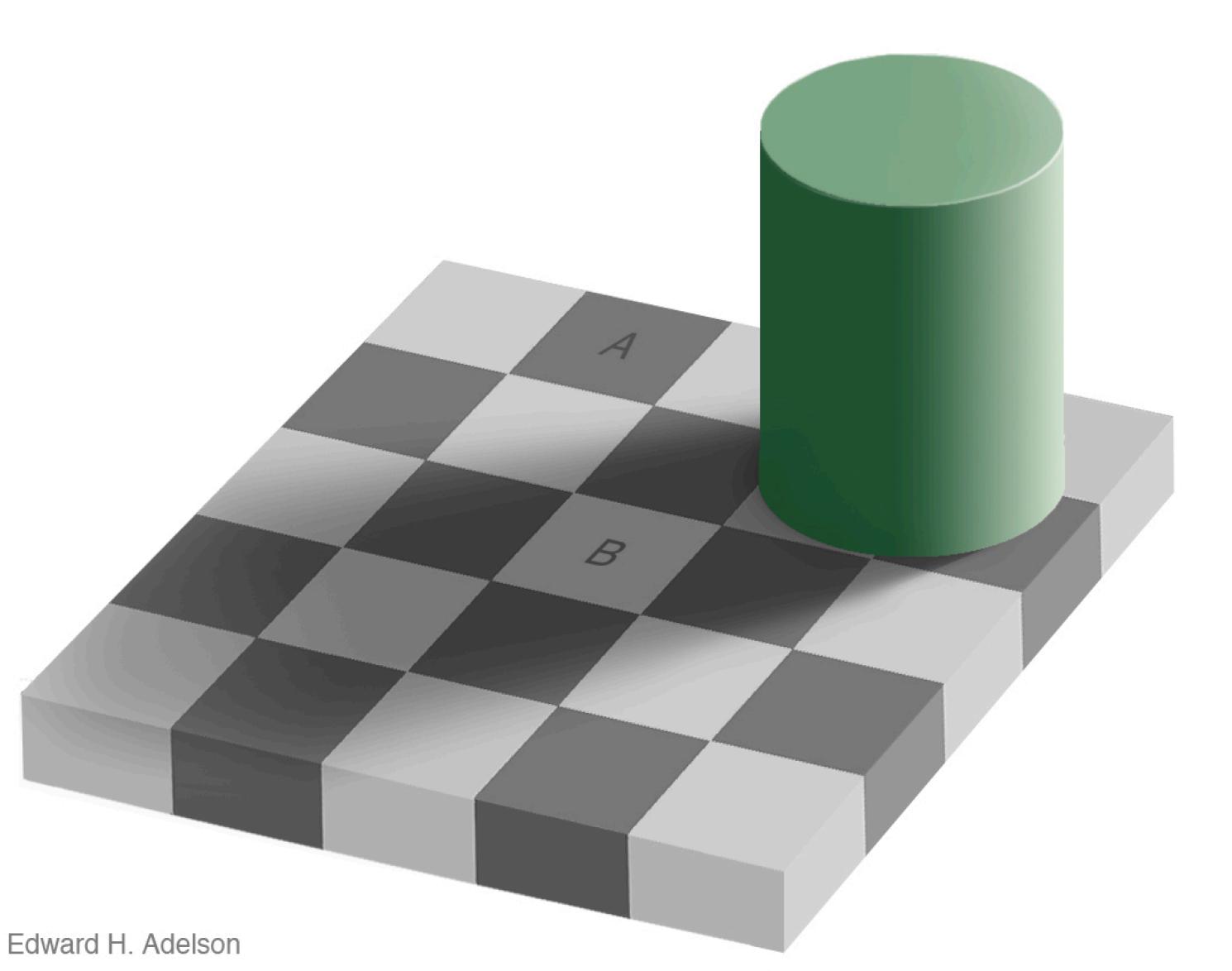
Mach Bands



Mach Bands

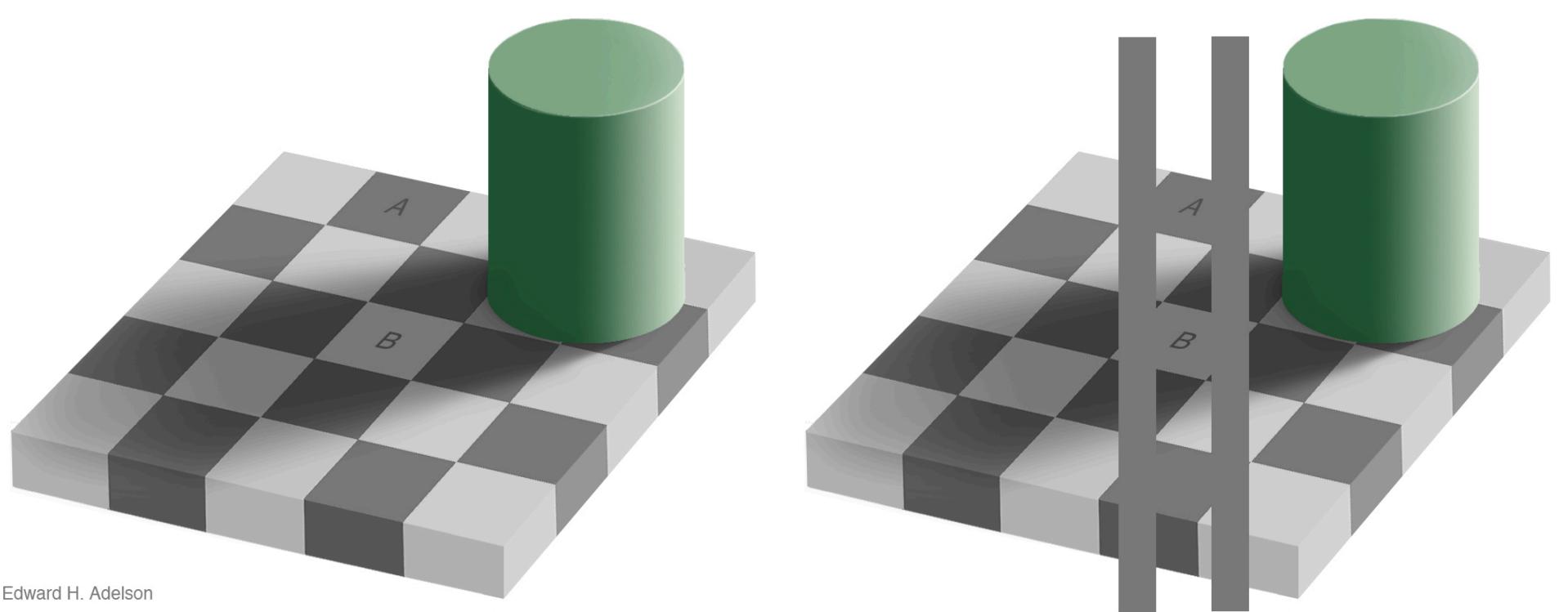






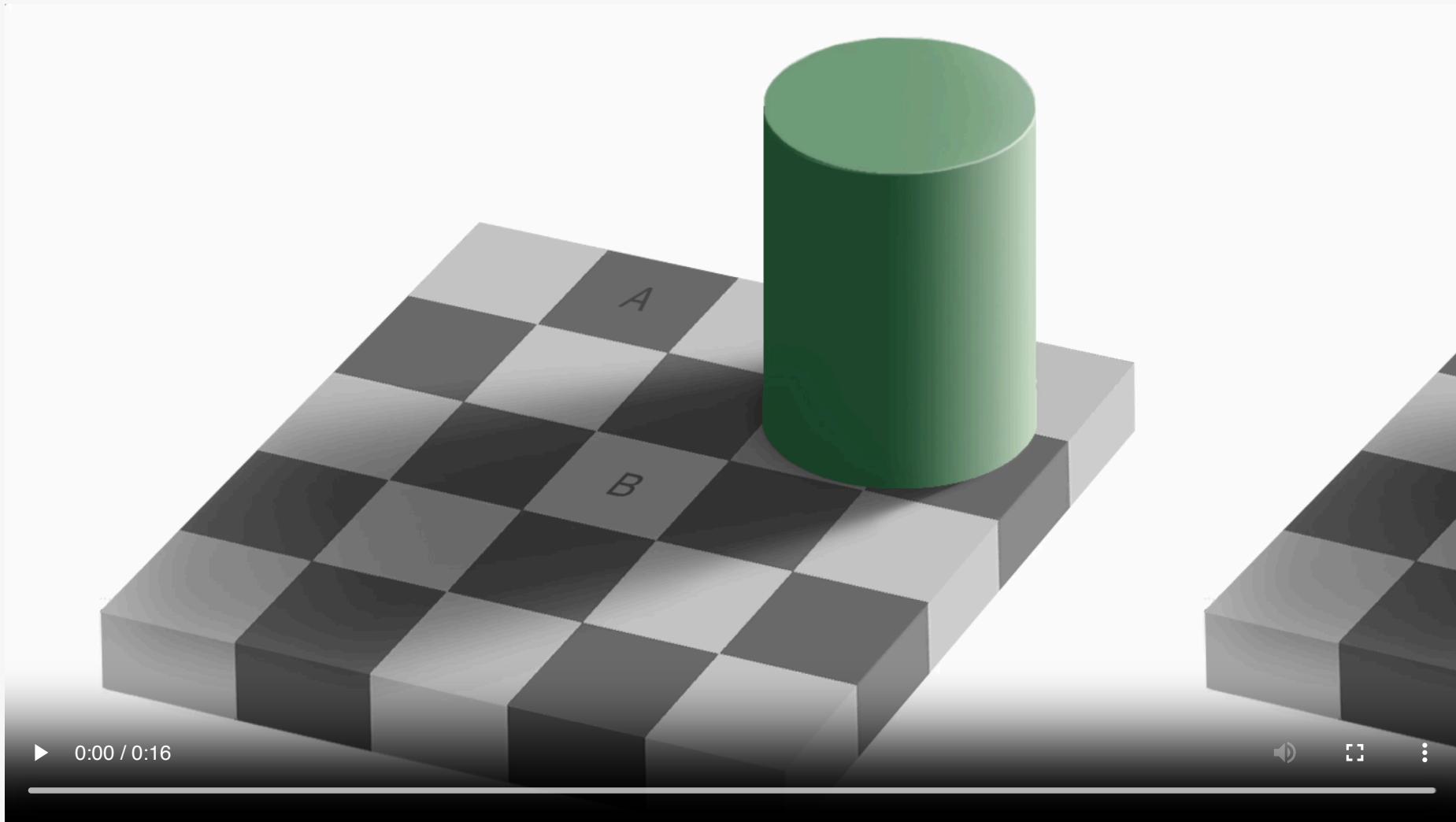
Edward H. Adelson

Edward Adelson



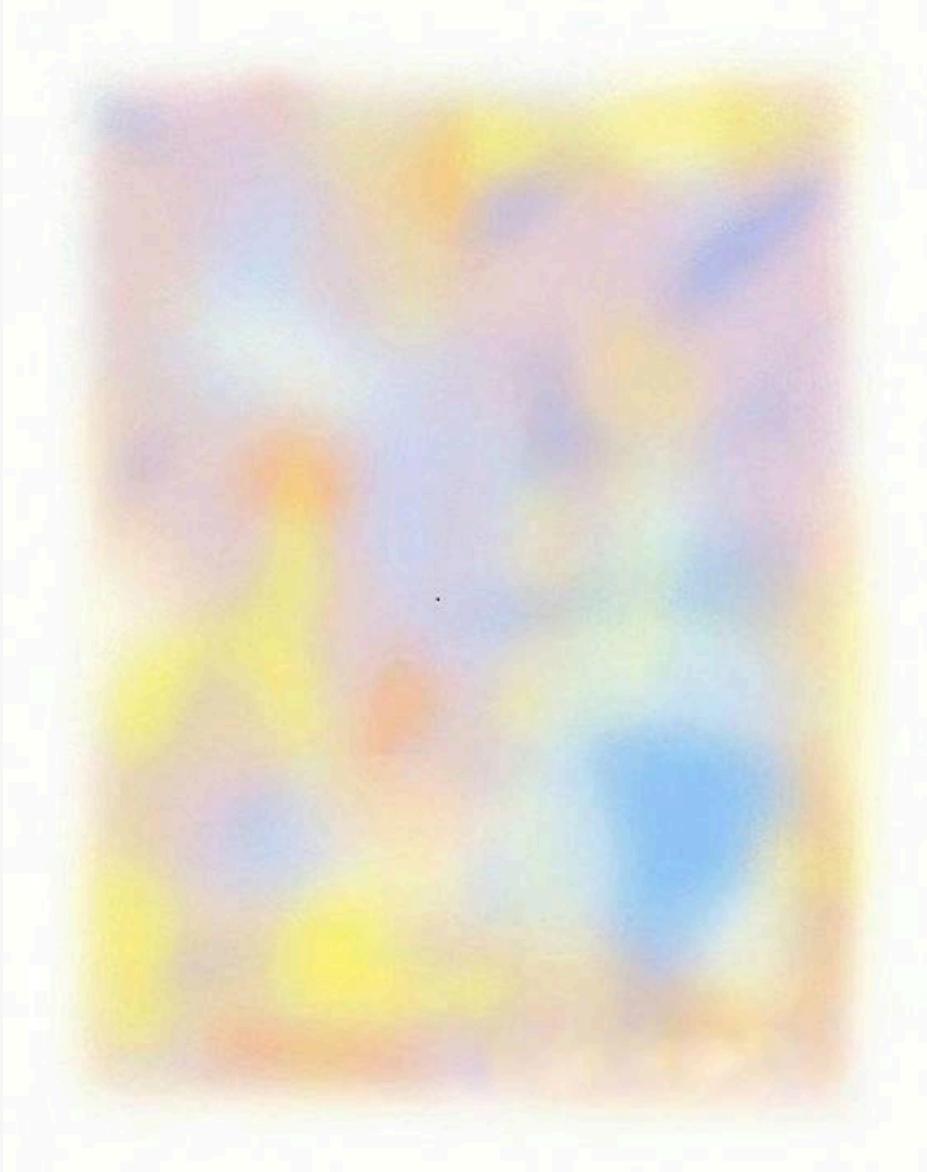
Edward H. Adelson

Edward Adelson

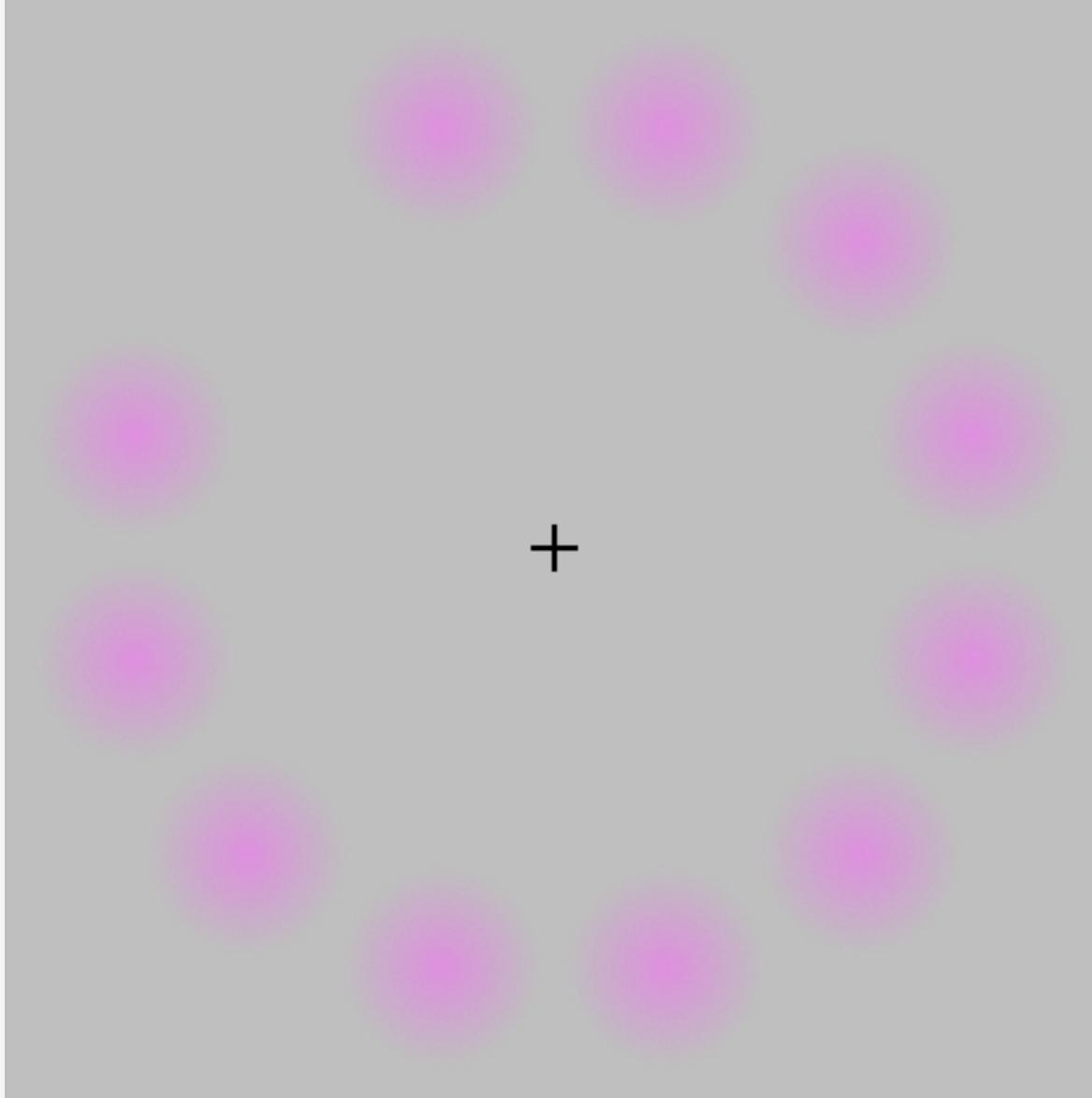


Edward Adelson

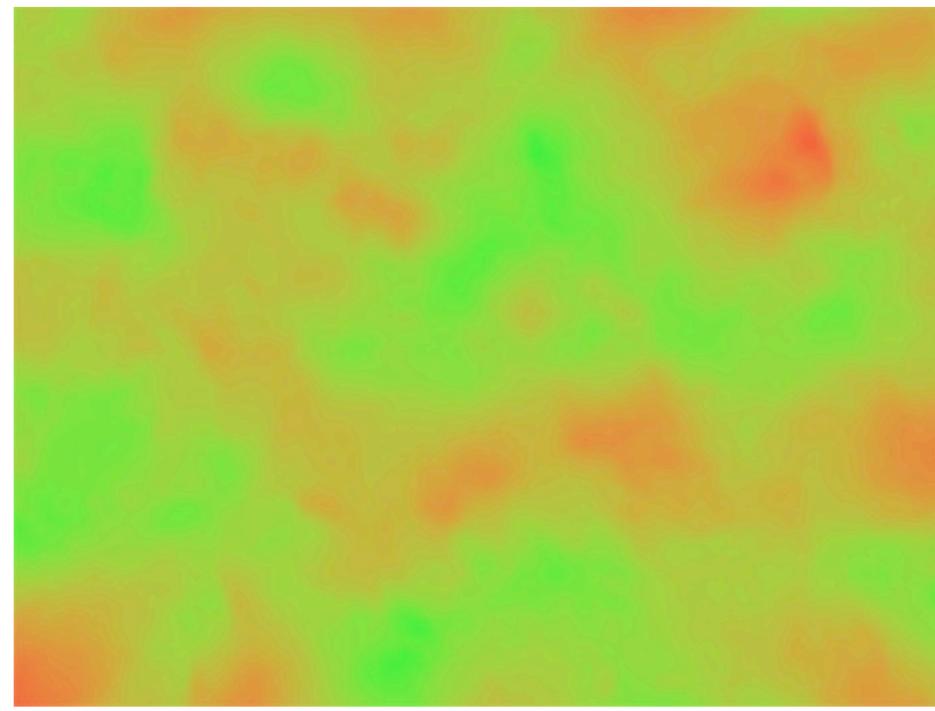
# Luminance and Color



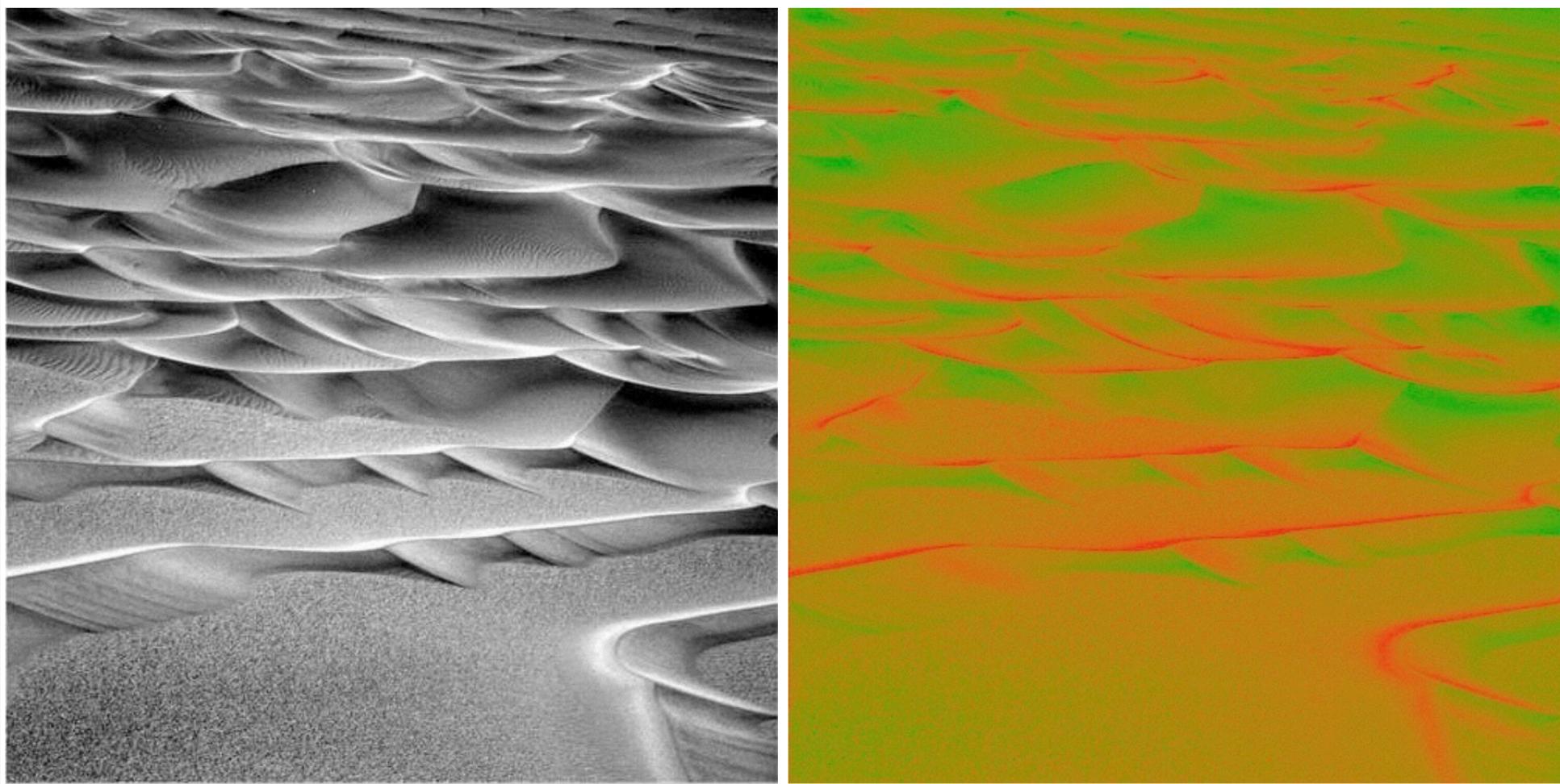
Troxler effect



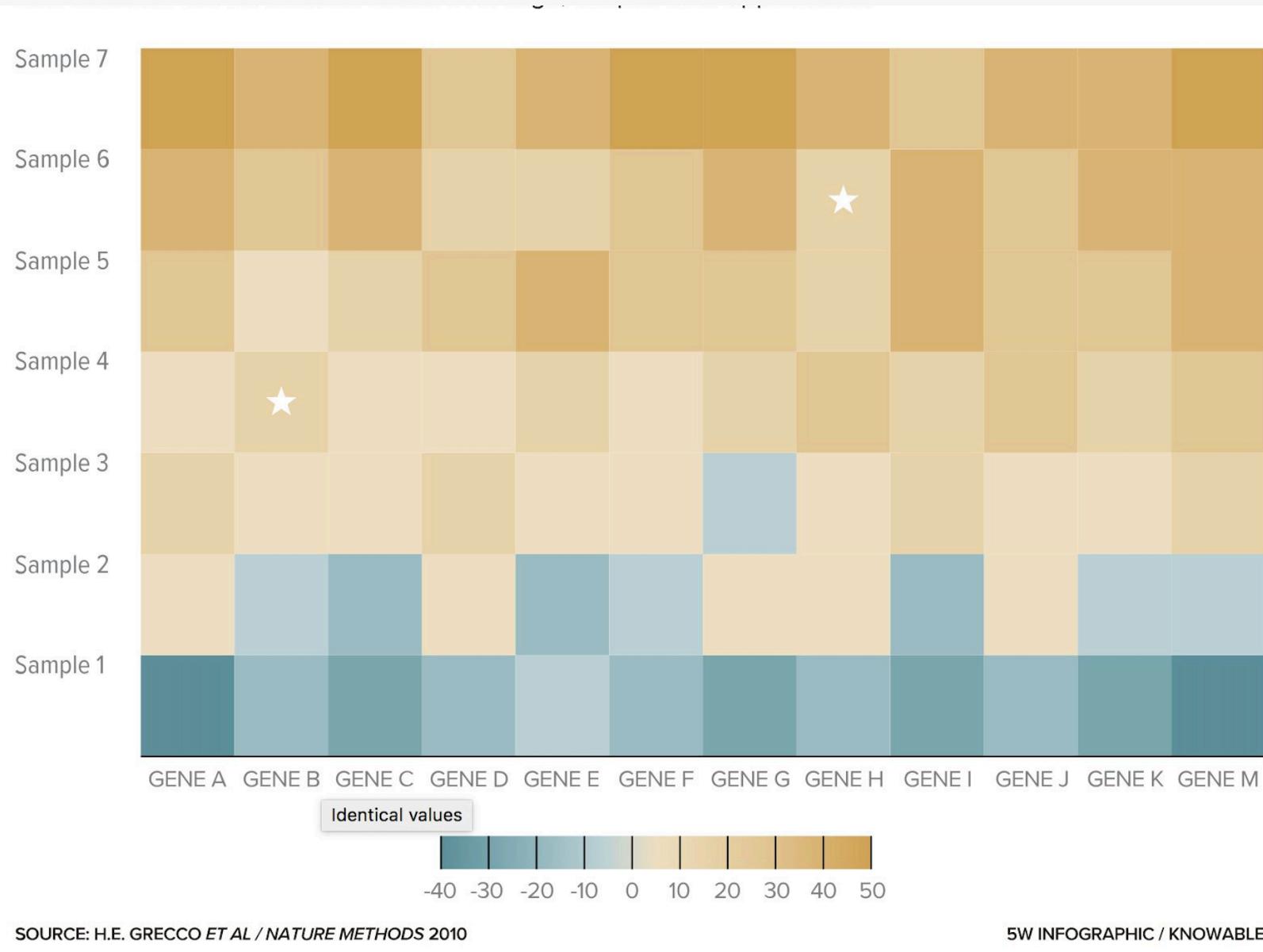
Lilac Chaser



Colin Ware

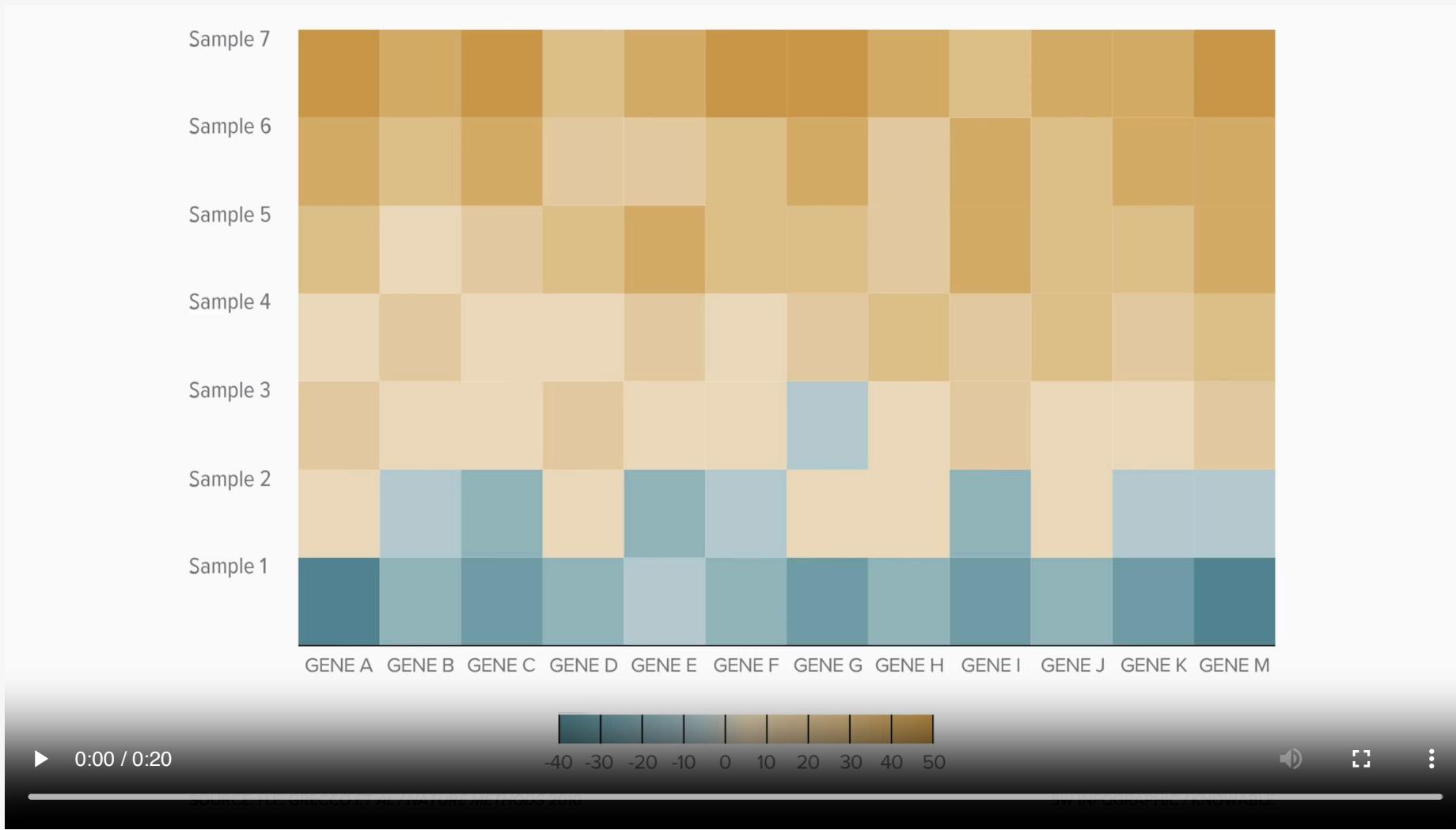


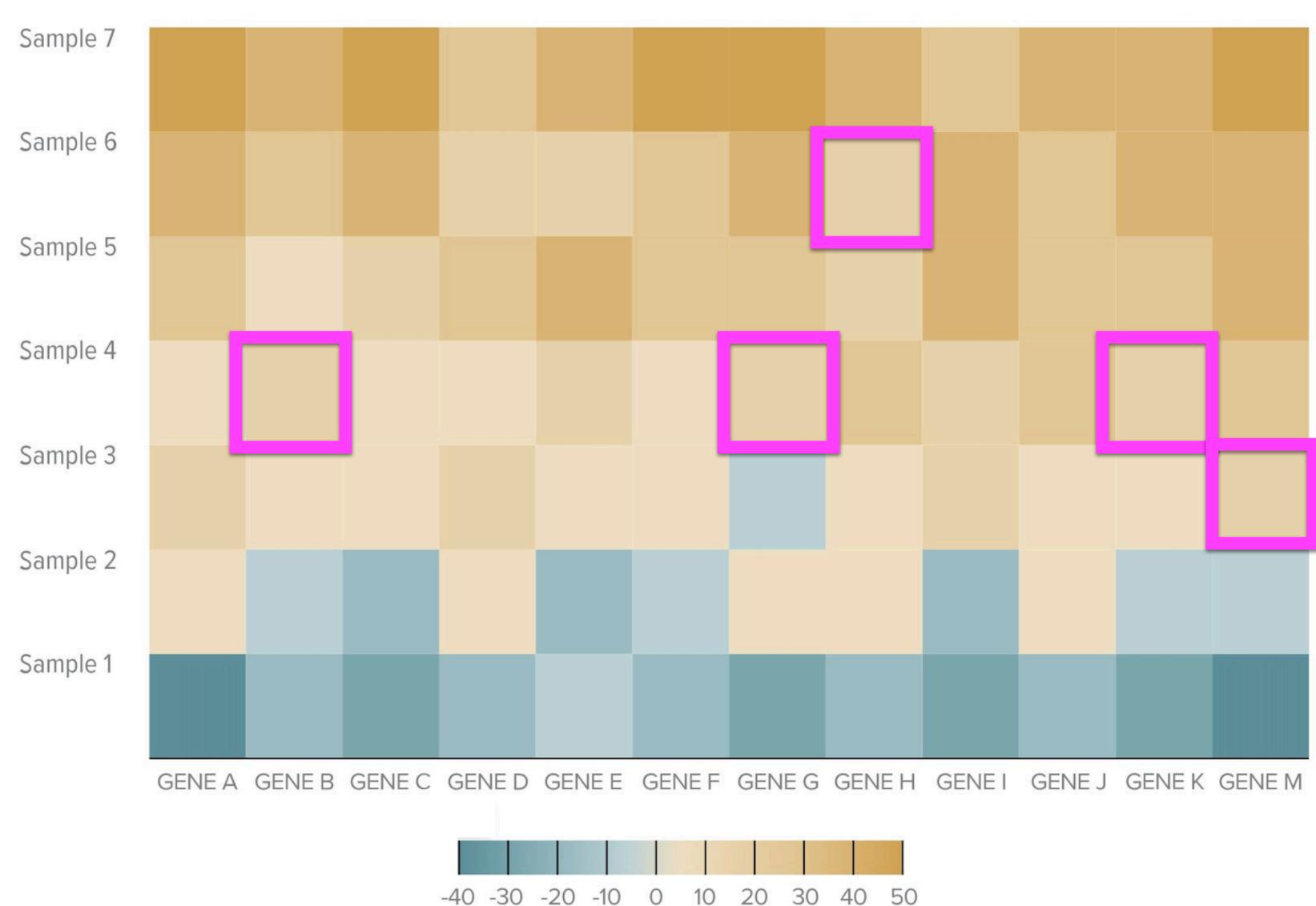
Colin Ware



SOURCE: H.E. GRECCO ET AL / NATURE METHODS 2010

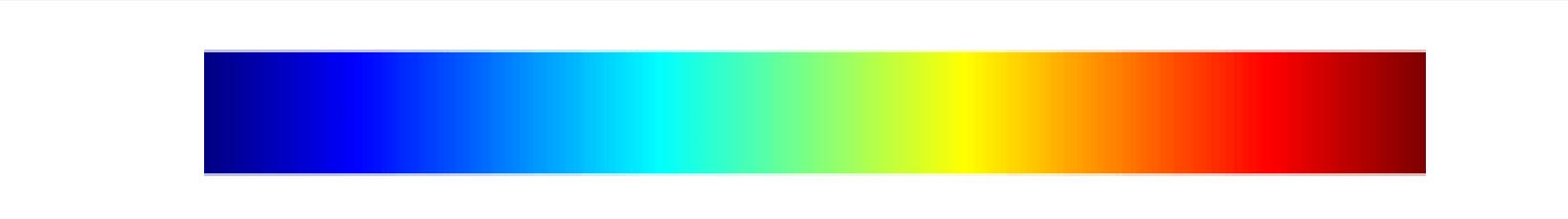
5W INFOGRAPHIC / KNOWABLE

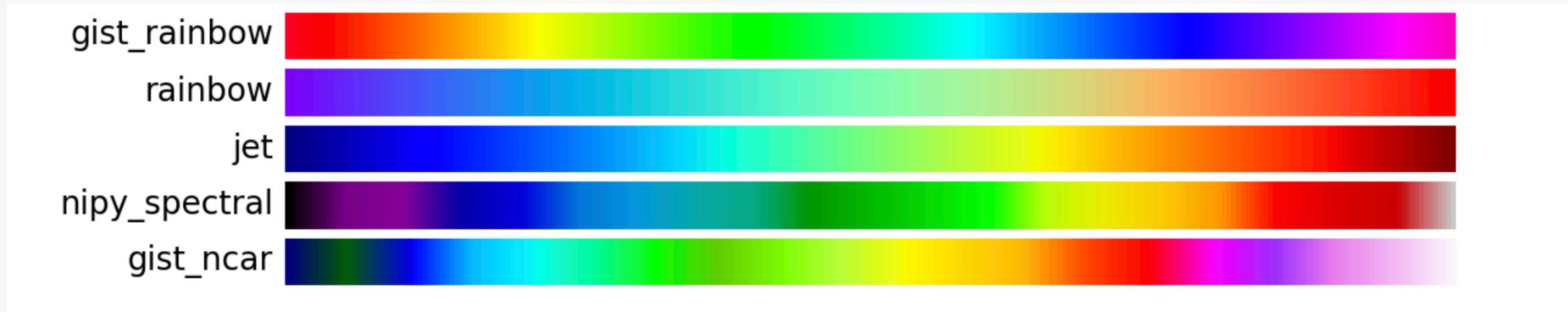


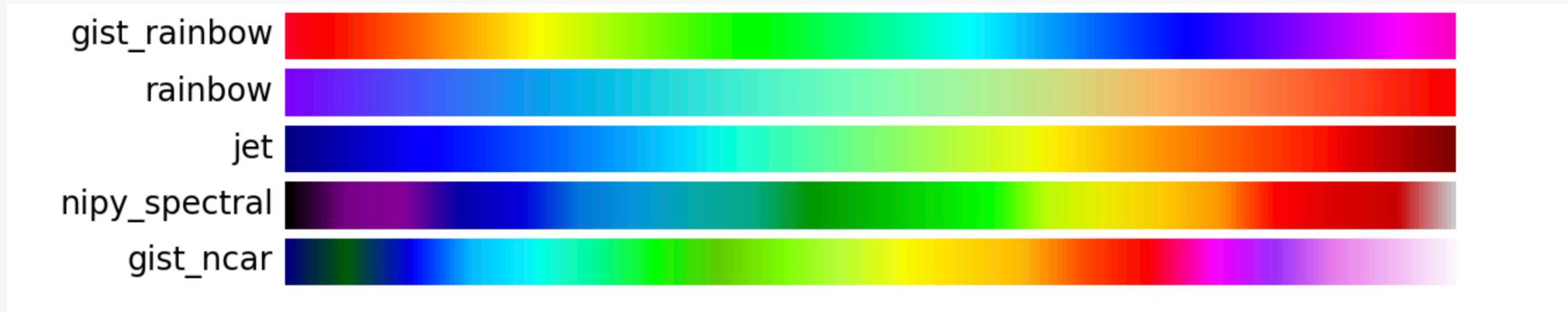


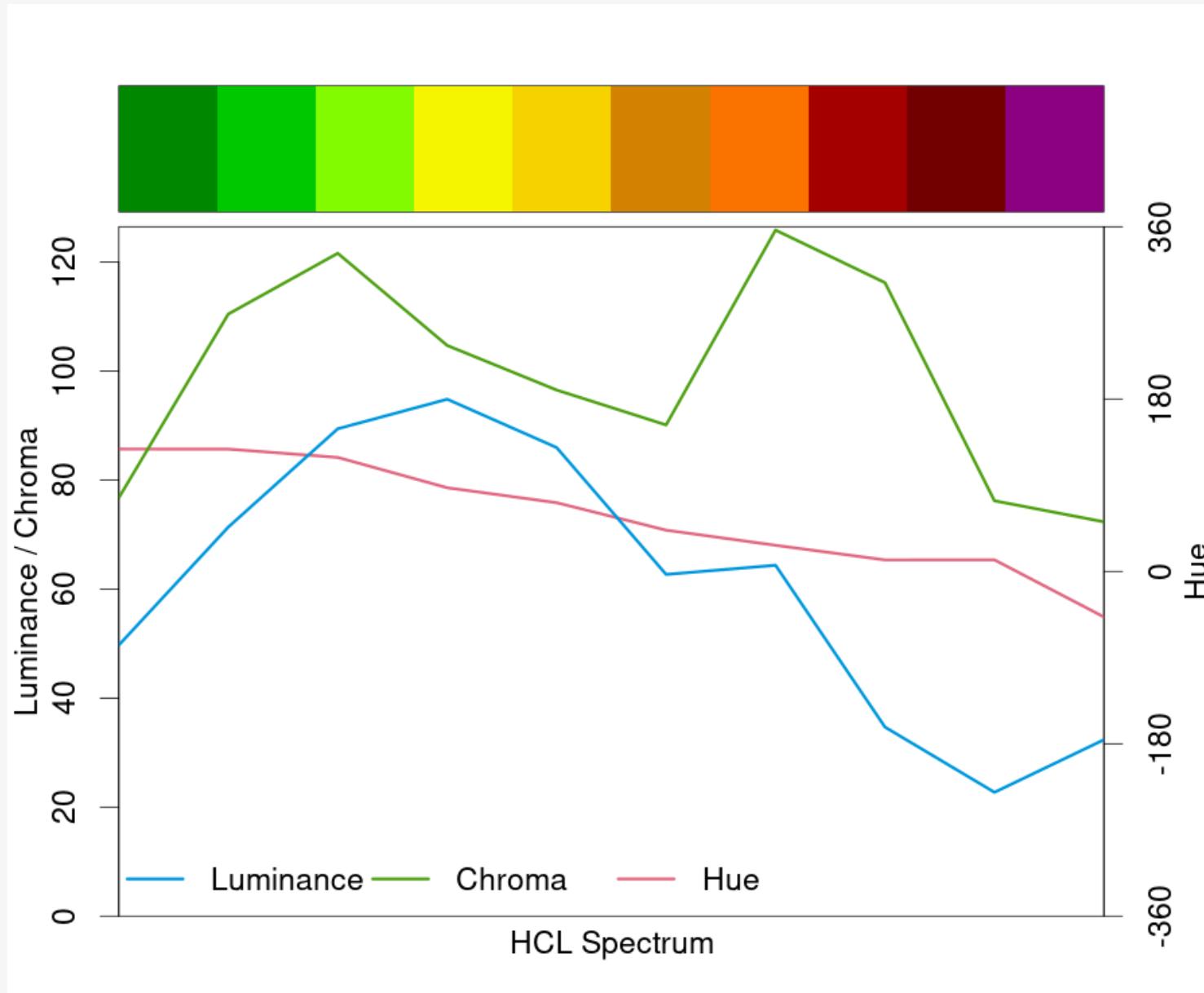
SOURCE: H.E. GRECCO ET AL / NATURE METHODS 2010

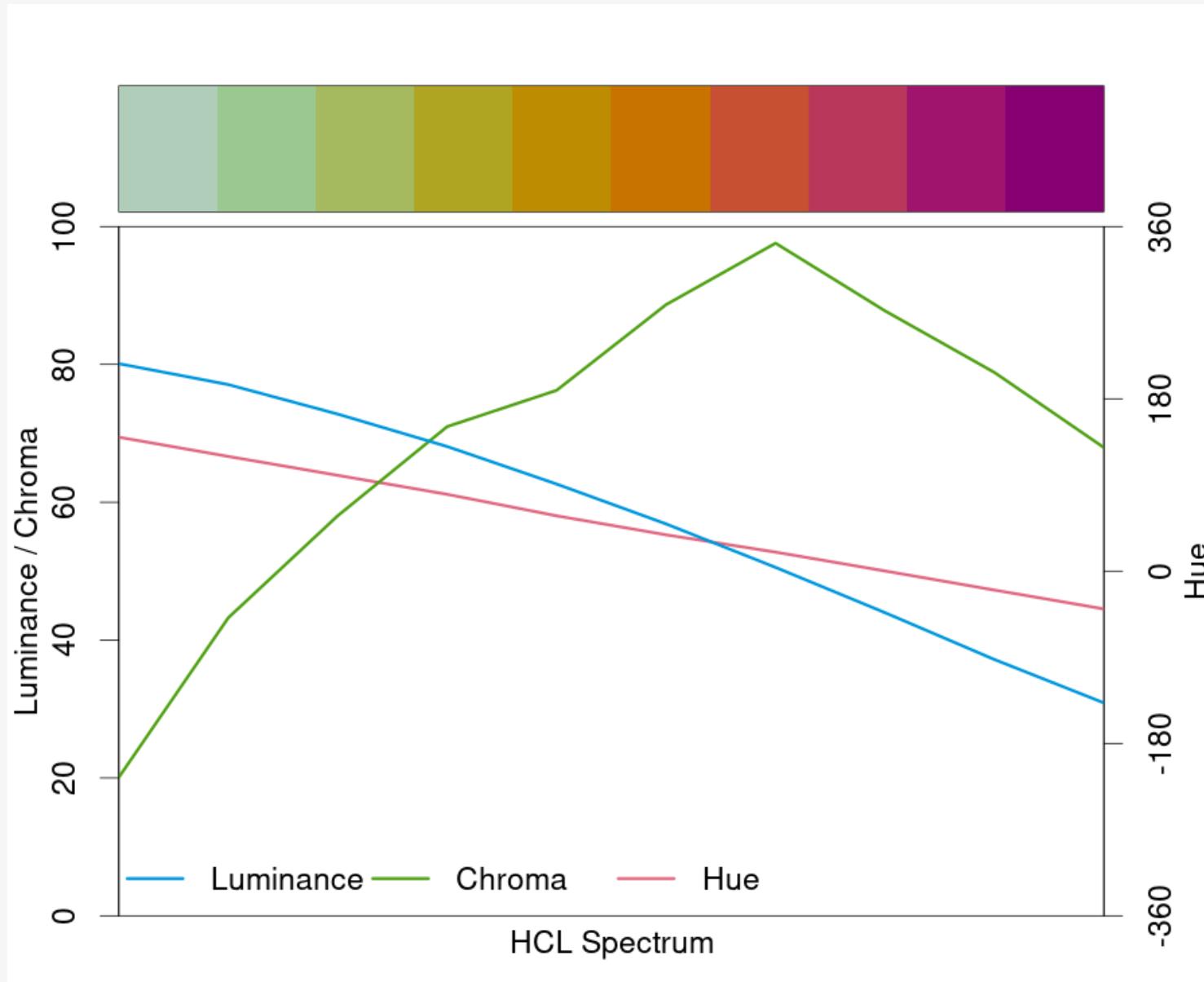
5W INFOGRAPHIC / KNOWABLE





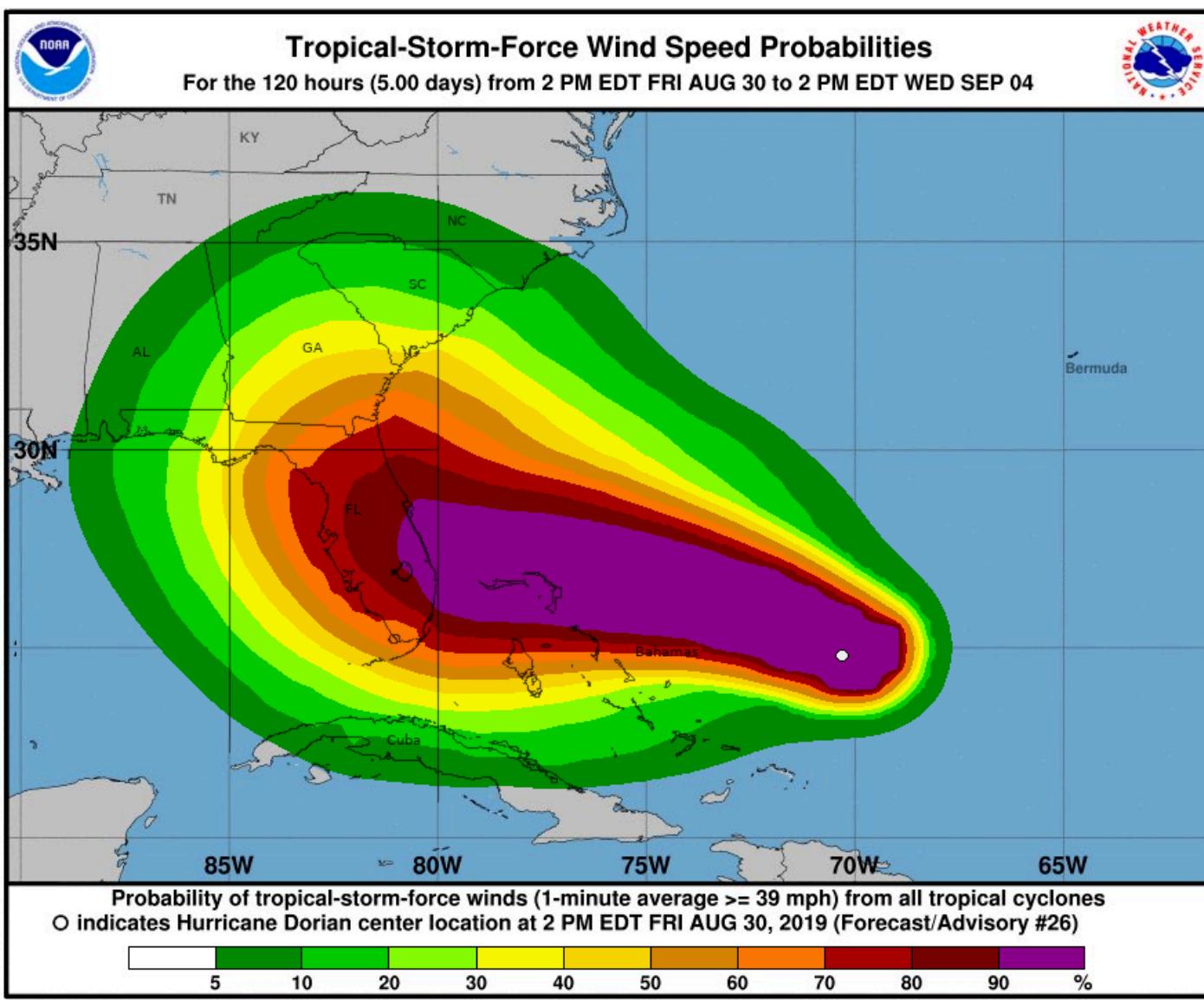




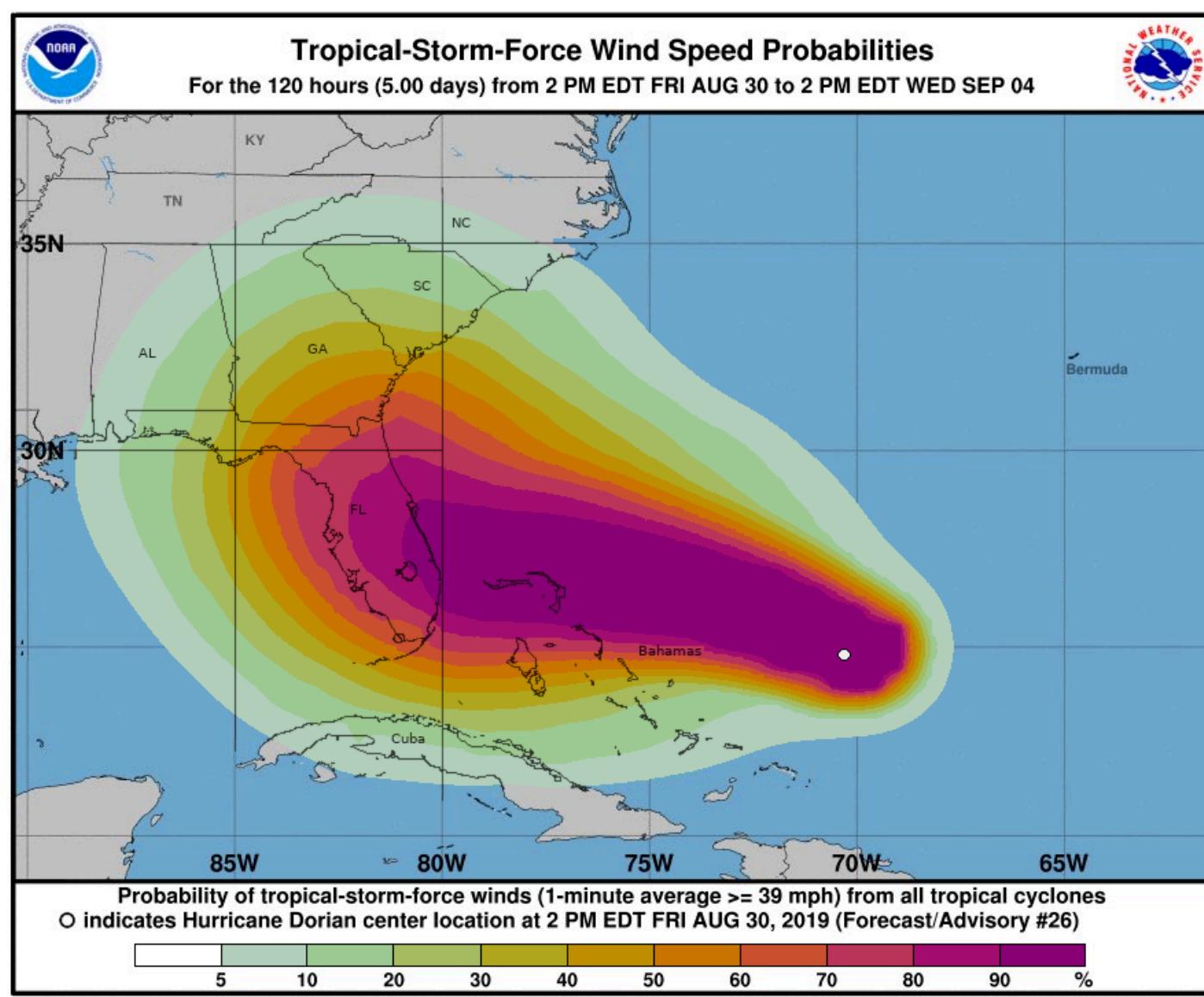




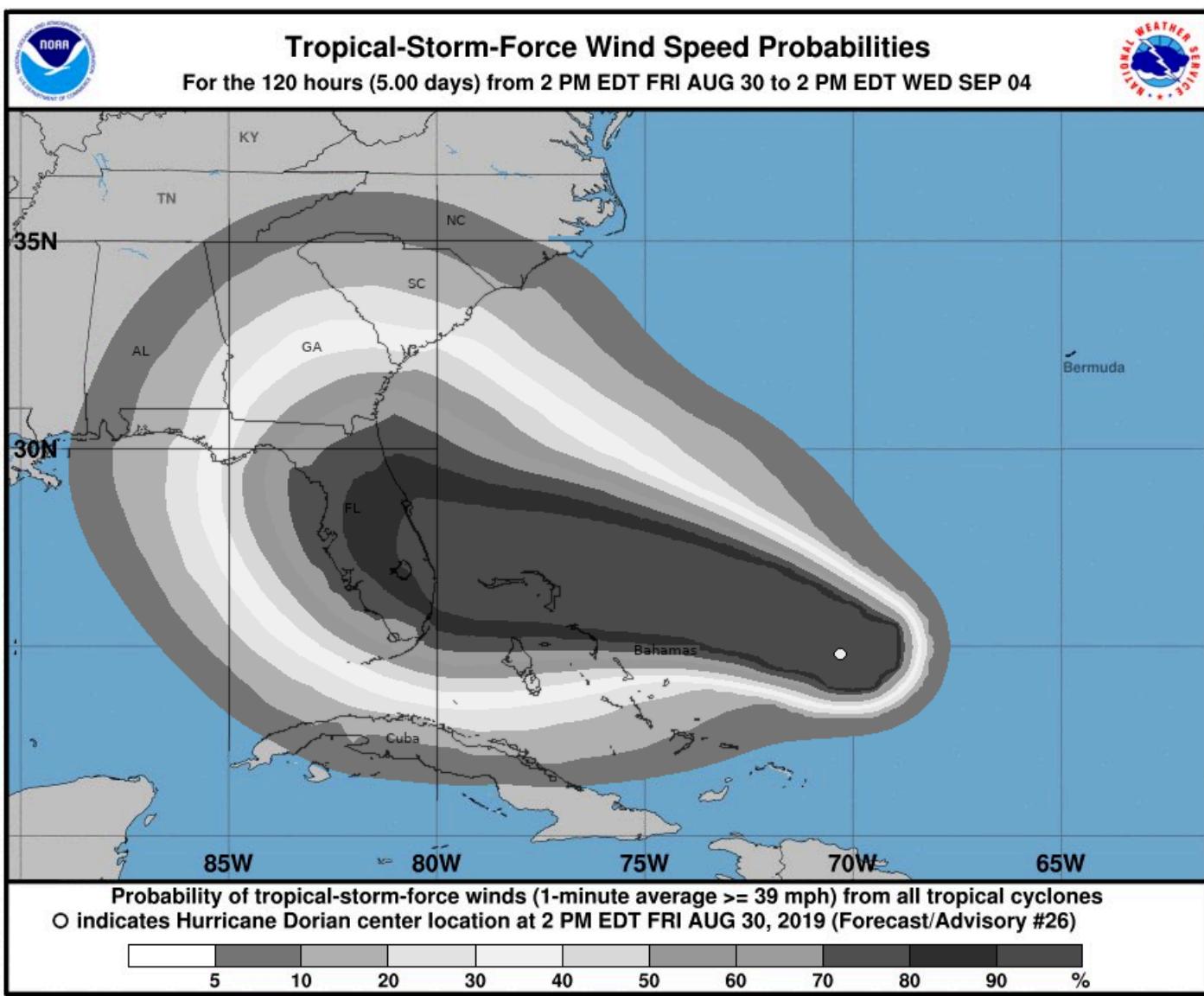




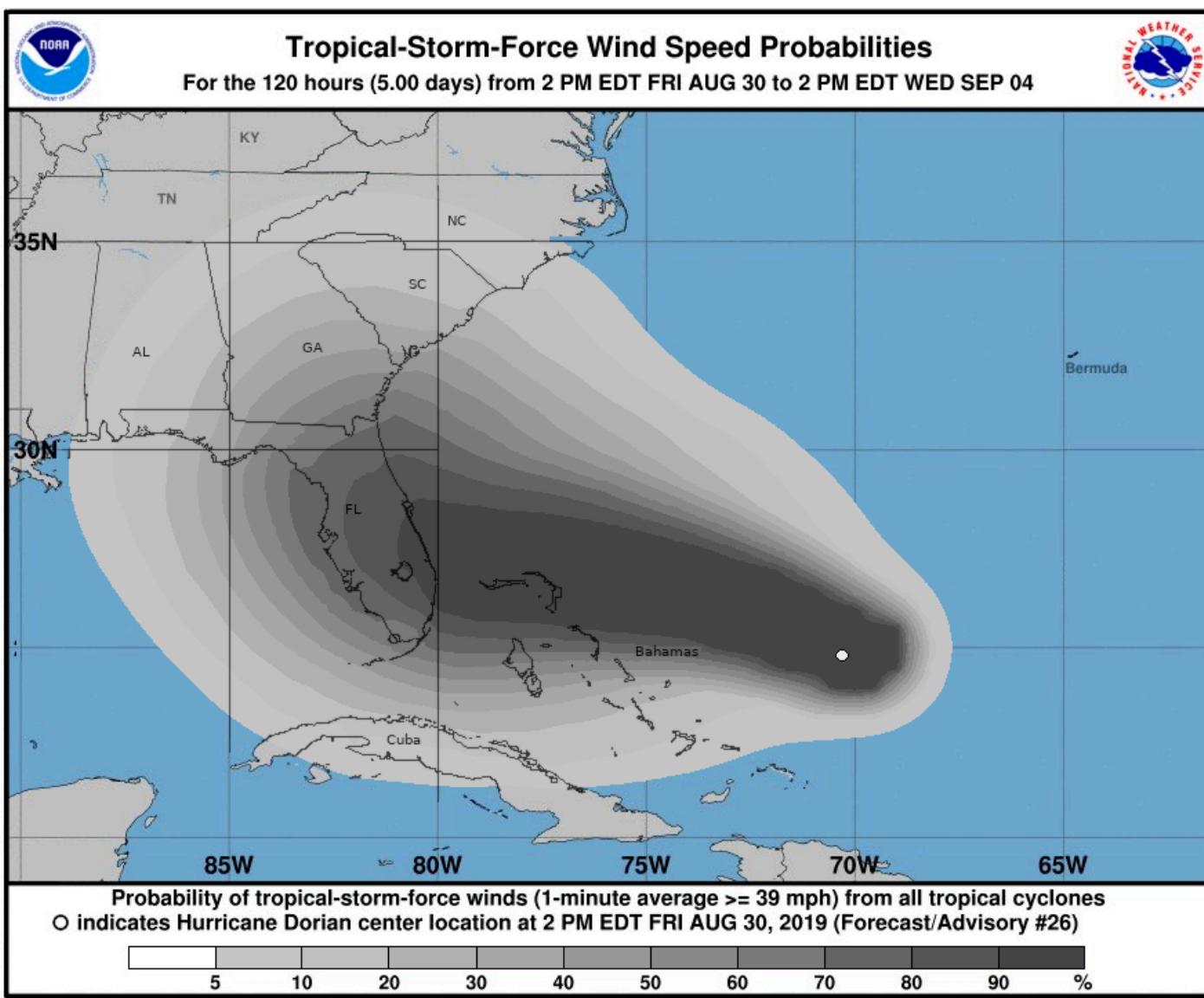
National Weather Service



Achim Zeileis



Achim Zeileis



Achim Zeileis