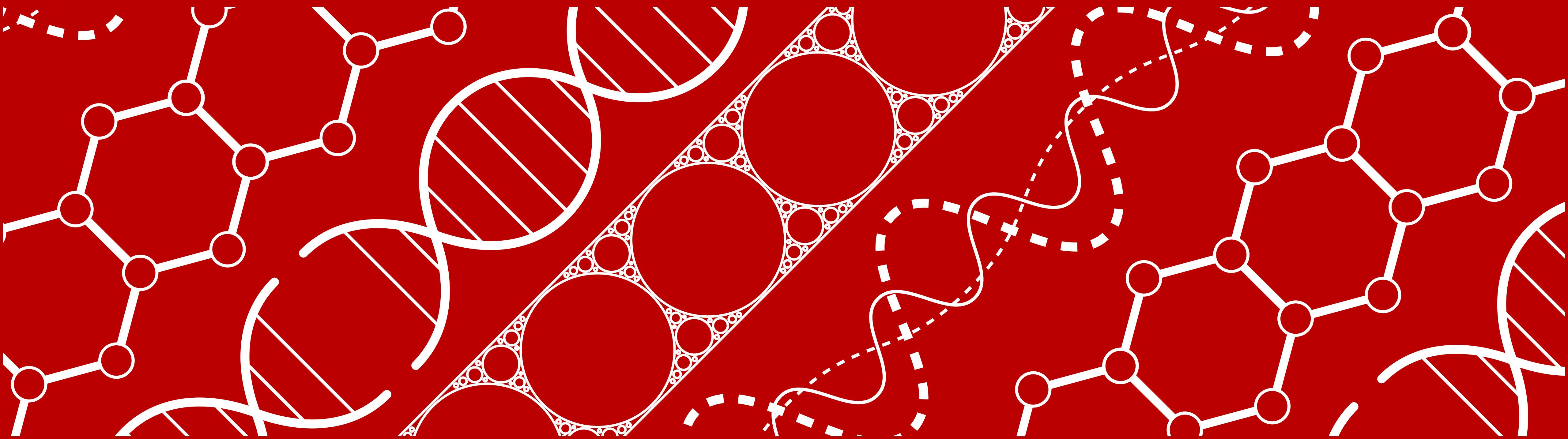


Clear thinking made visible



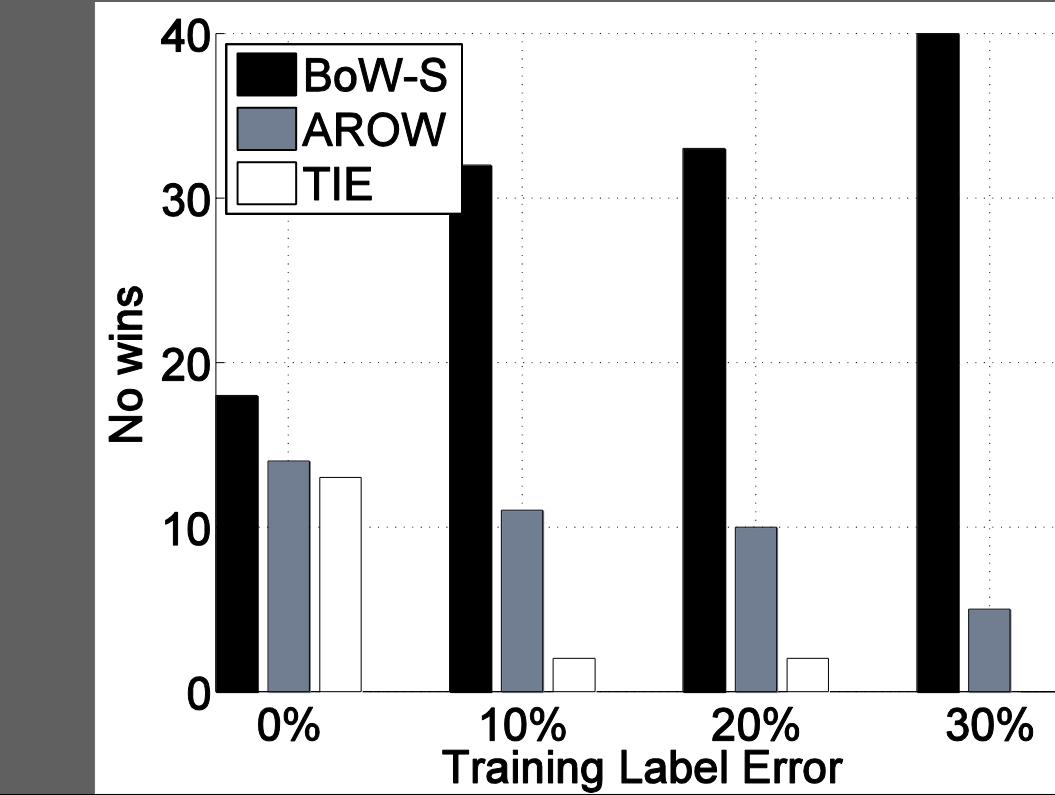
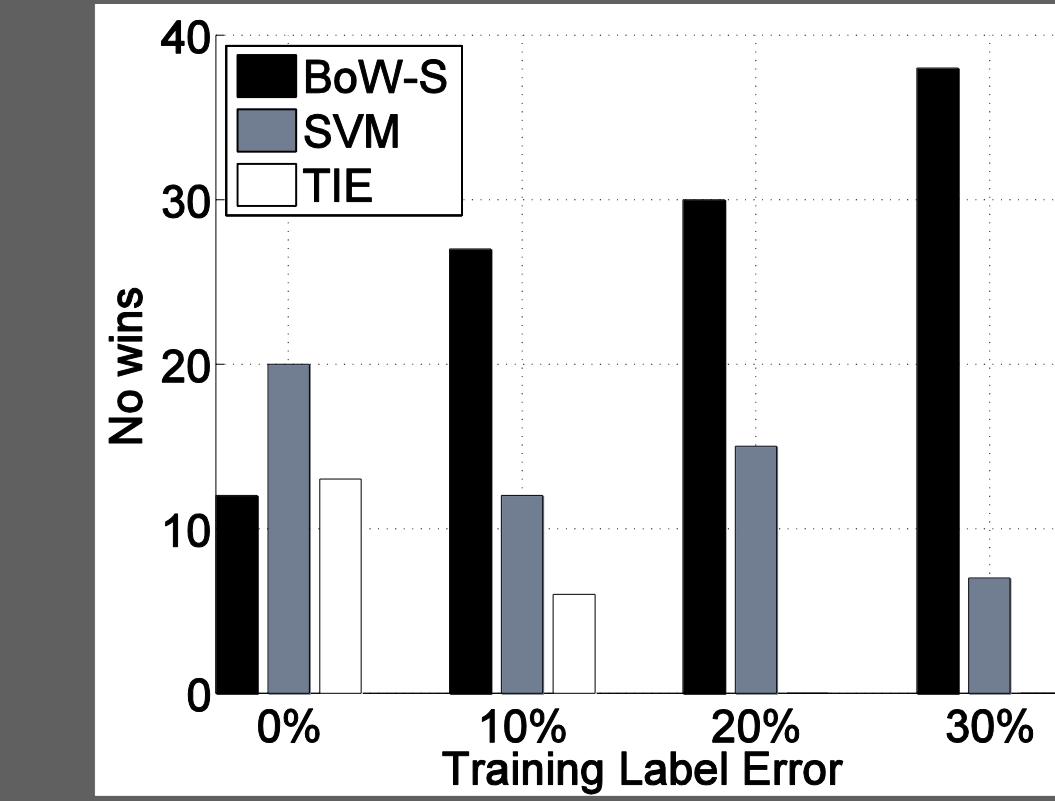
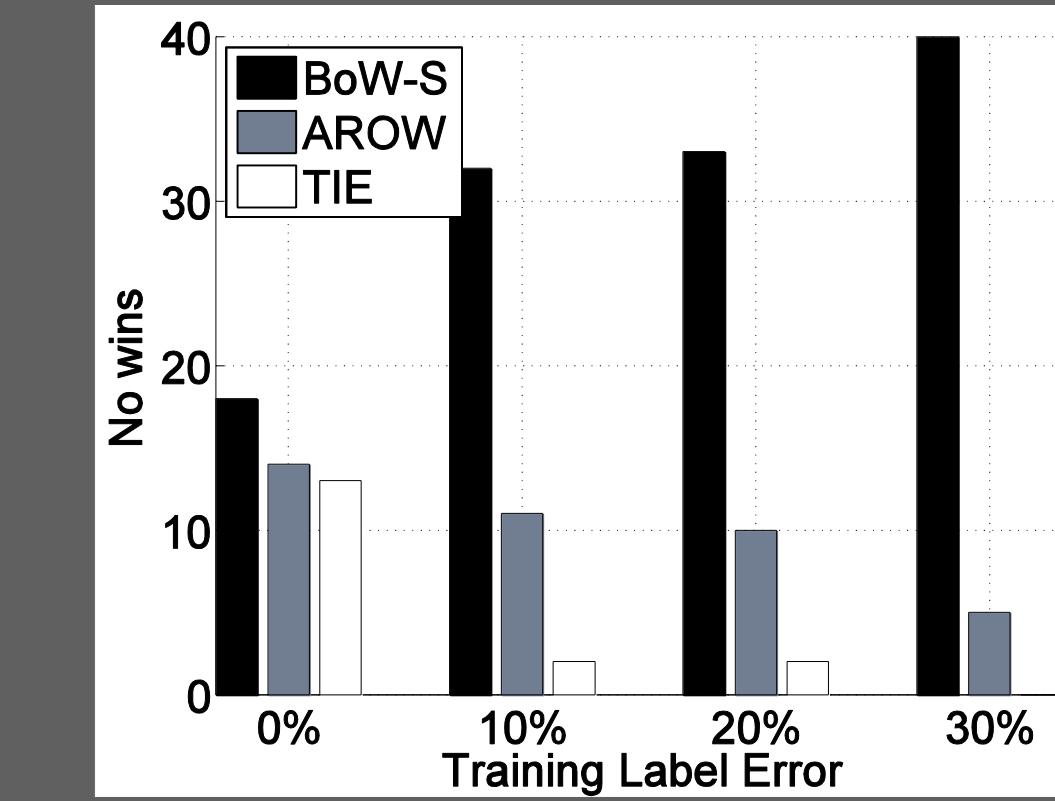
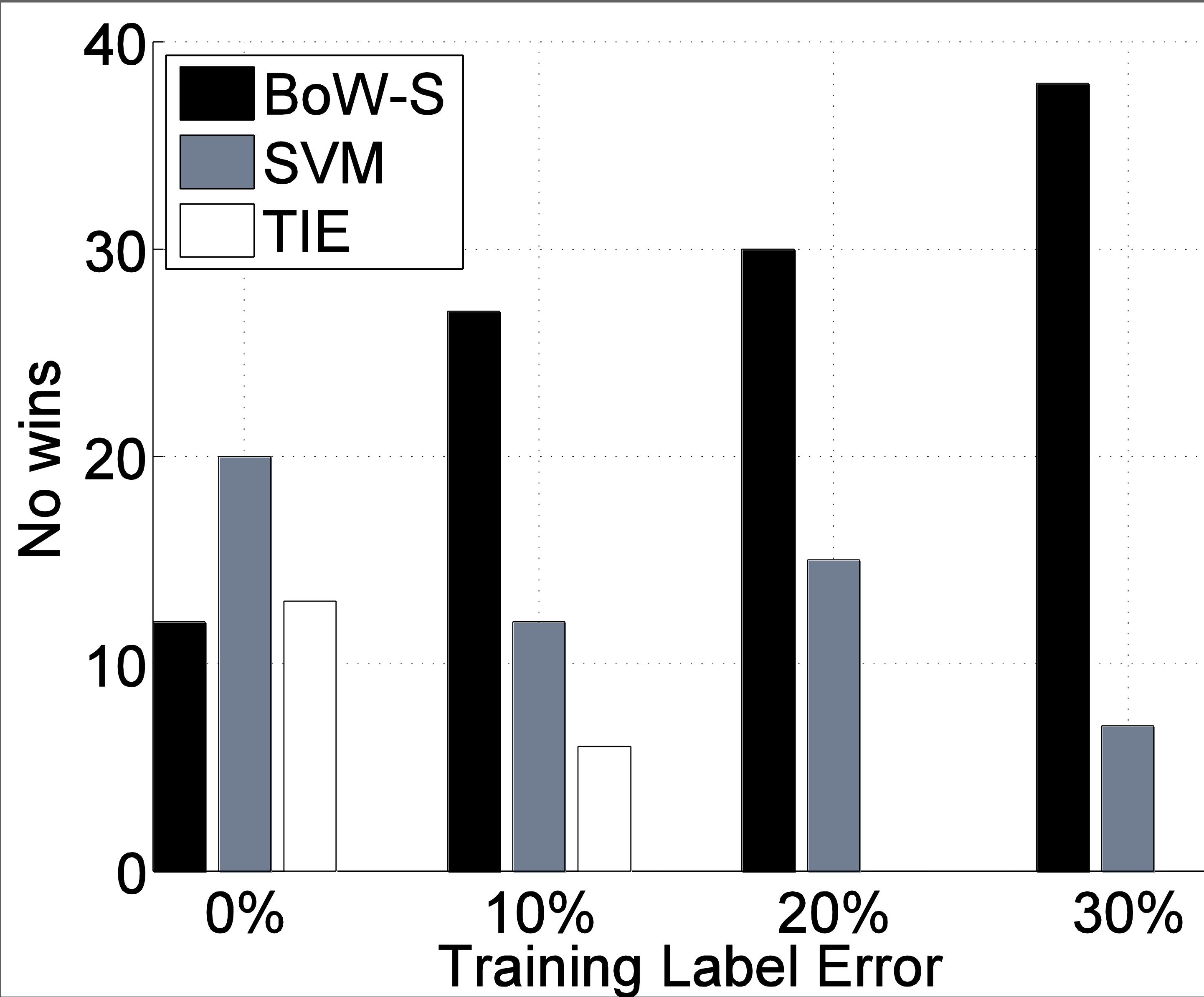
**SCIENCE
COMMUNICATION**
Carnegie Mellon University

Ardon Shorr, Ph.D.

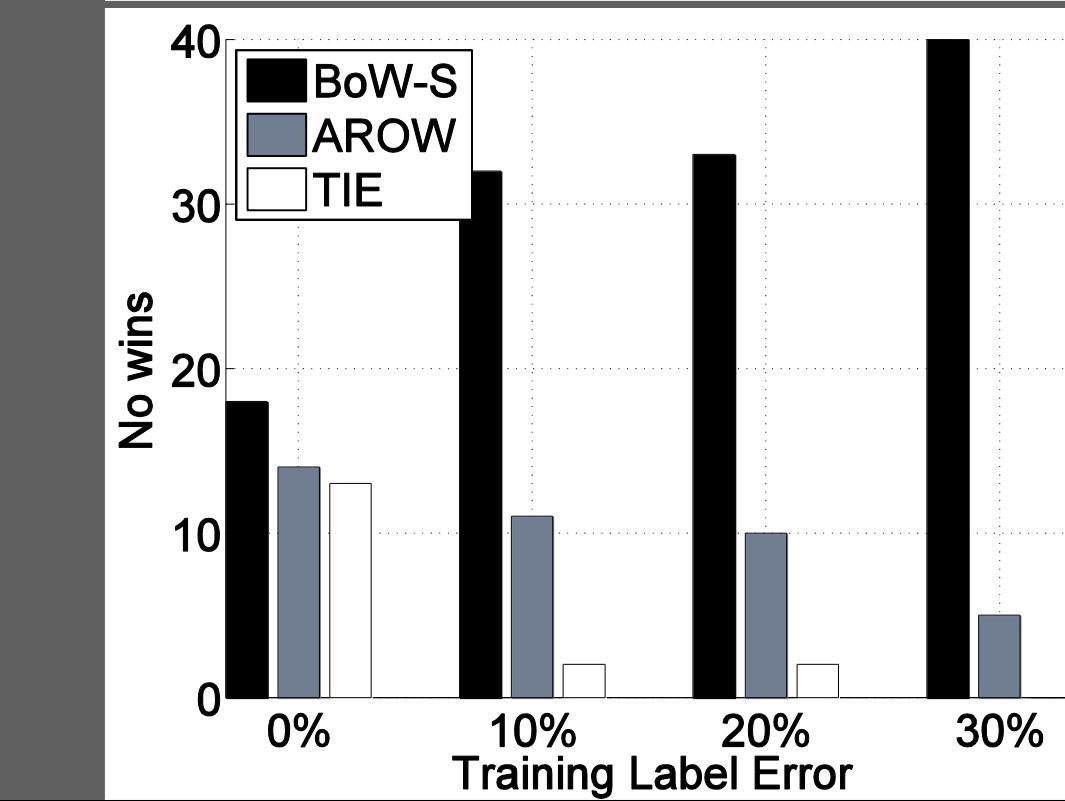
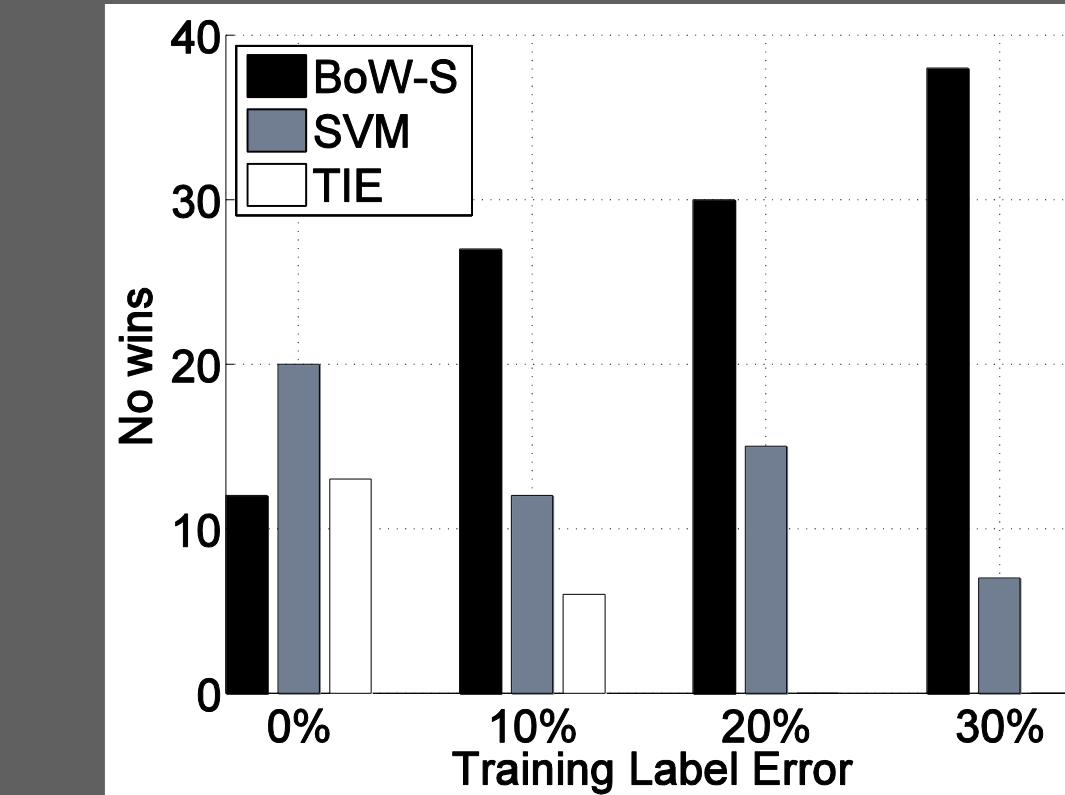
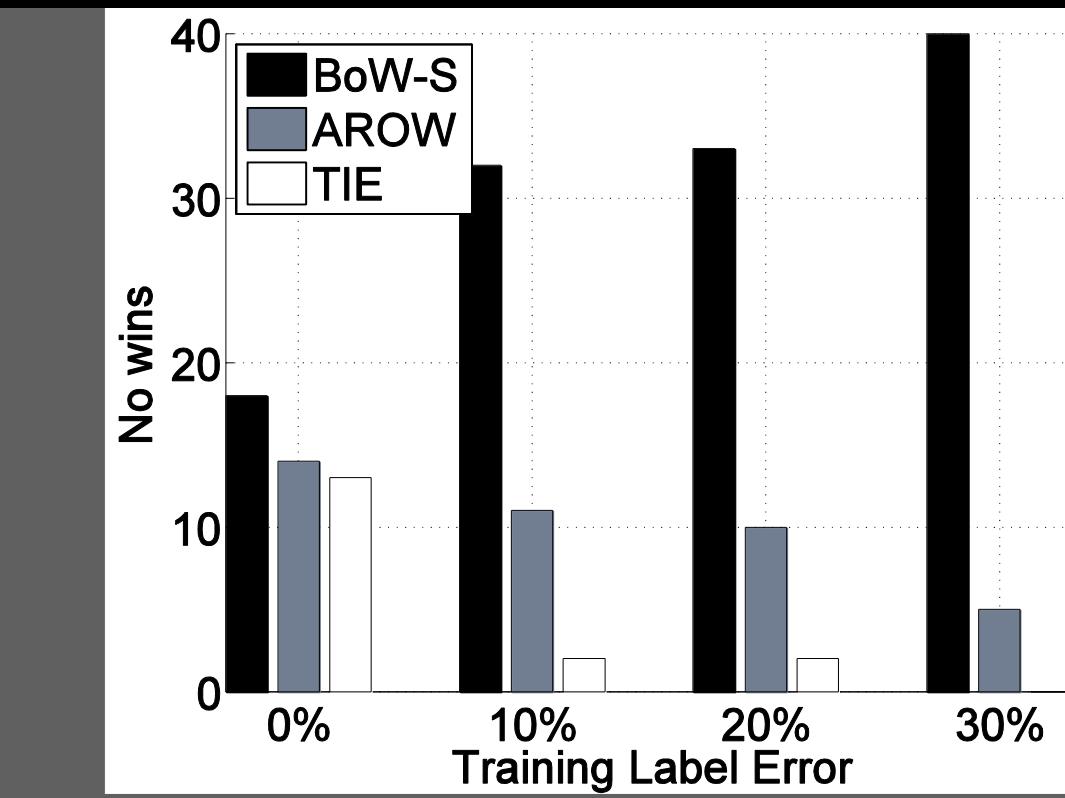
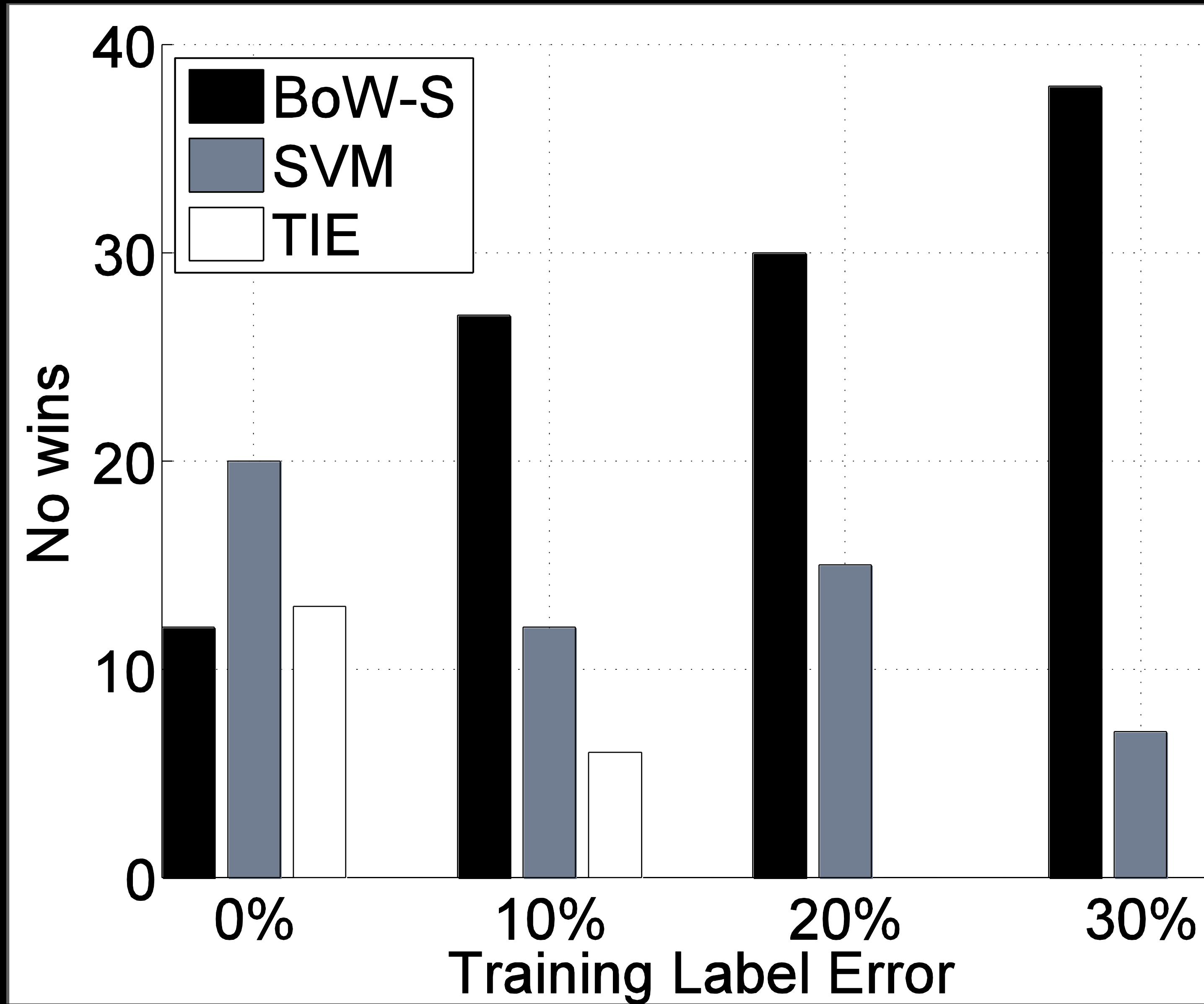
Fig. 1 Overview

What's a rule
you've been taught?

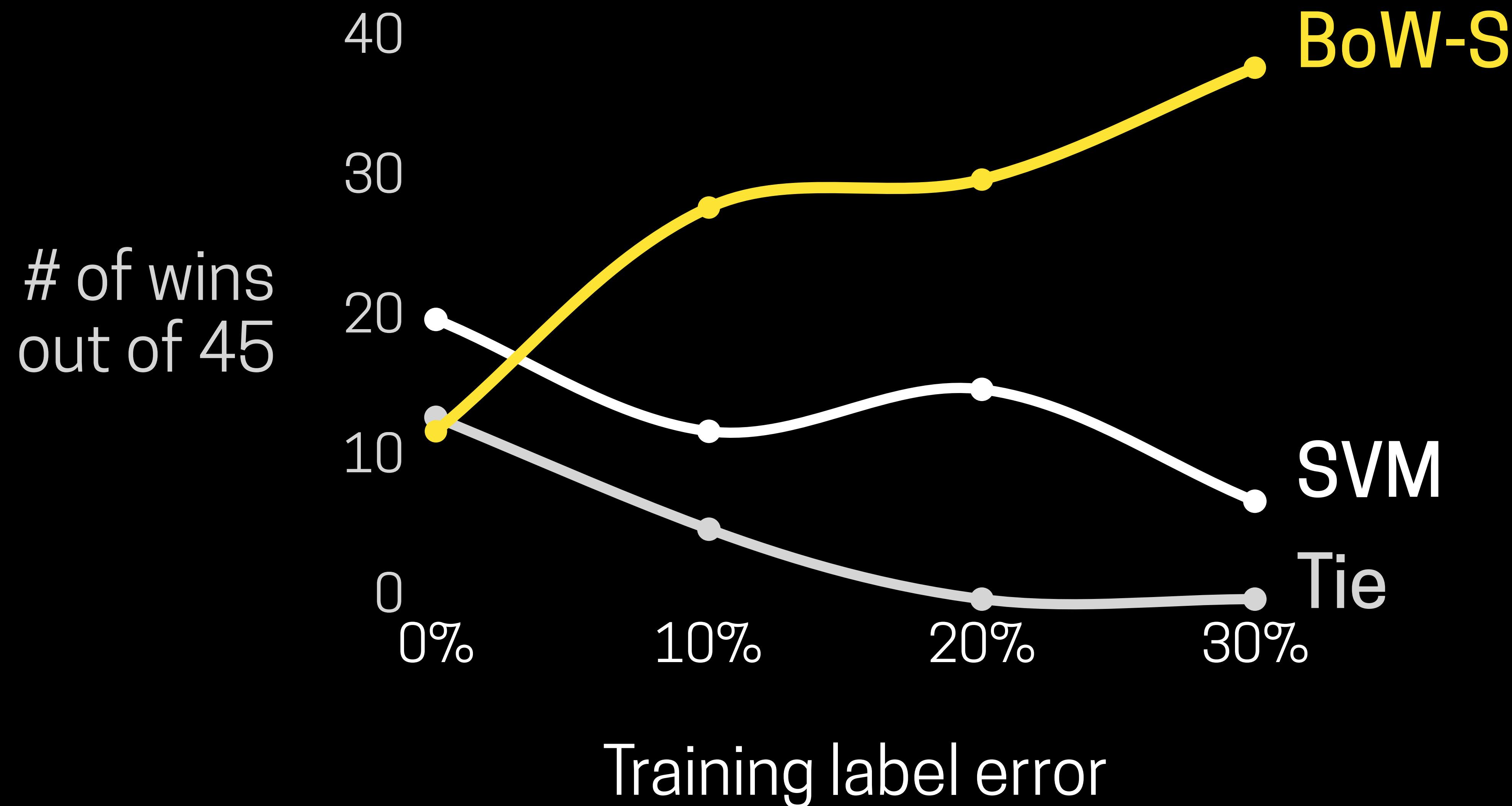
Number of wins of BoW vs SVM on all 45 pairs of USPS data-set



BoW-S outperforms SVM on noisy data



BoW-S outperforms SVM on noisy data



Clear visualization is a 2-step process:

1. Distill your message

Number of wins of BoW vs SVM



BoW-S outperforms SVM on noisy data

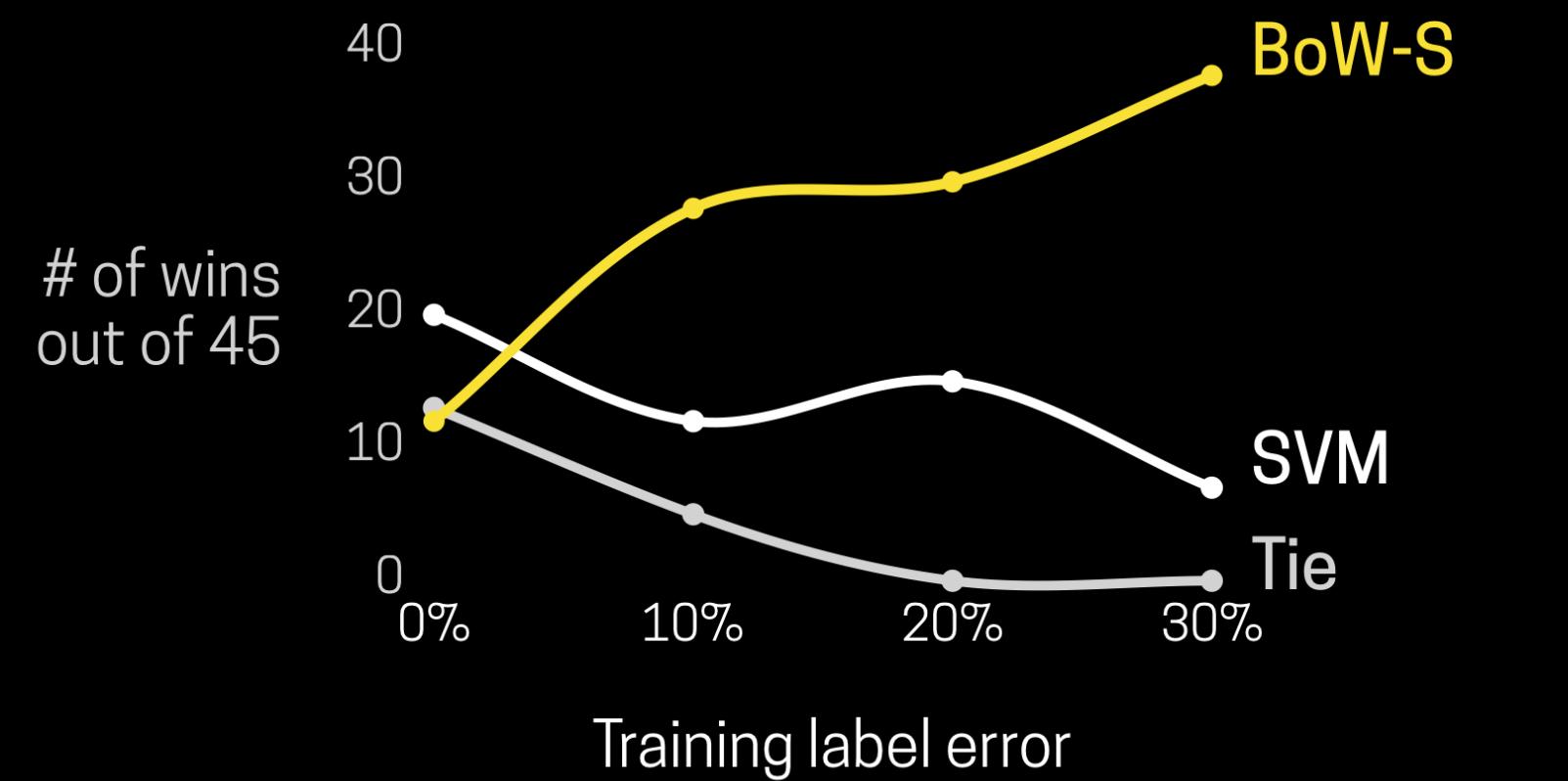
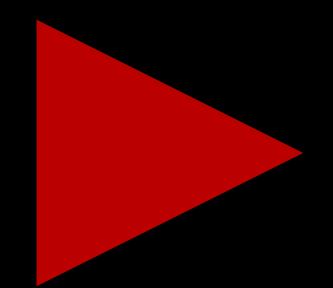
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1. Distill your message
2. Align visual emphasis

Number of wins of BoW vs SVM

BoW-S outperforms SVM on noisy data

BoW-S outperforms SVM on noisy data



Survey results

What should this course cover?

% respondents



Students are interested in many topics in writing

What should this course cover?

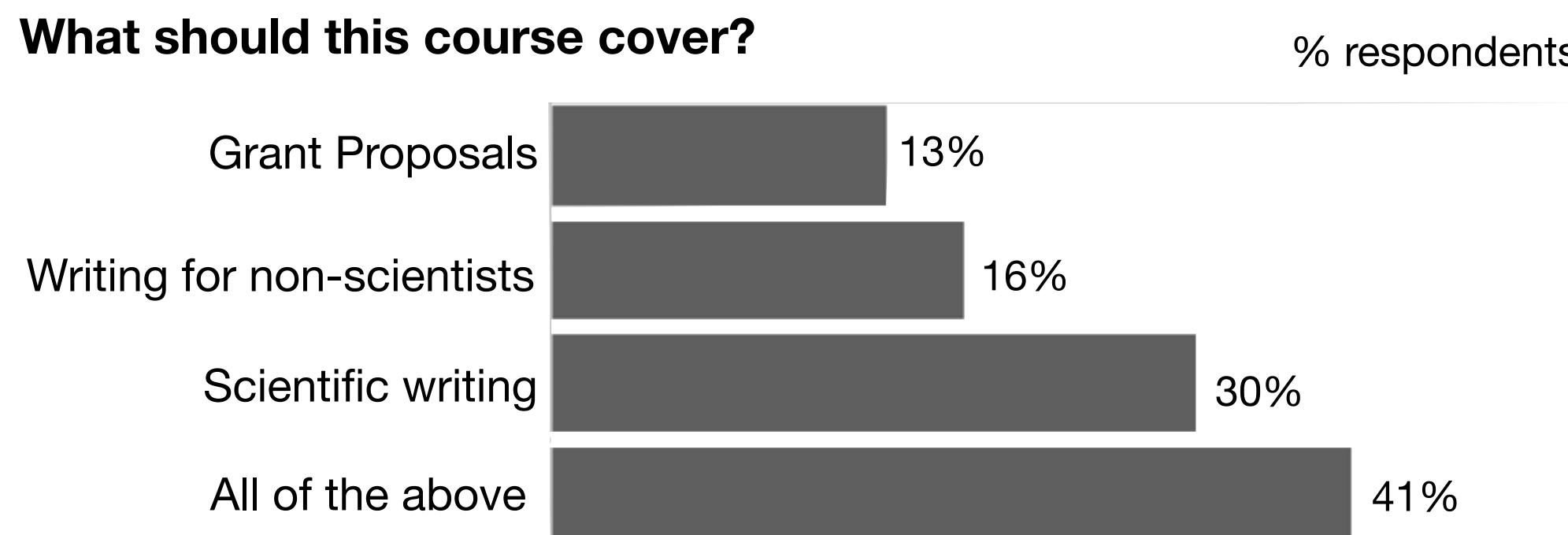
% respondents



Sentence titles state a message, not just the topic

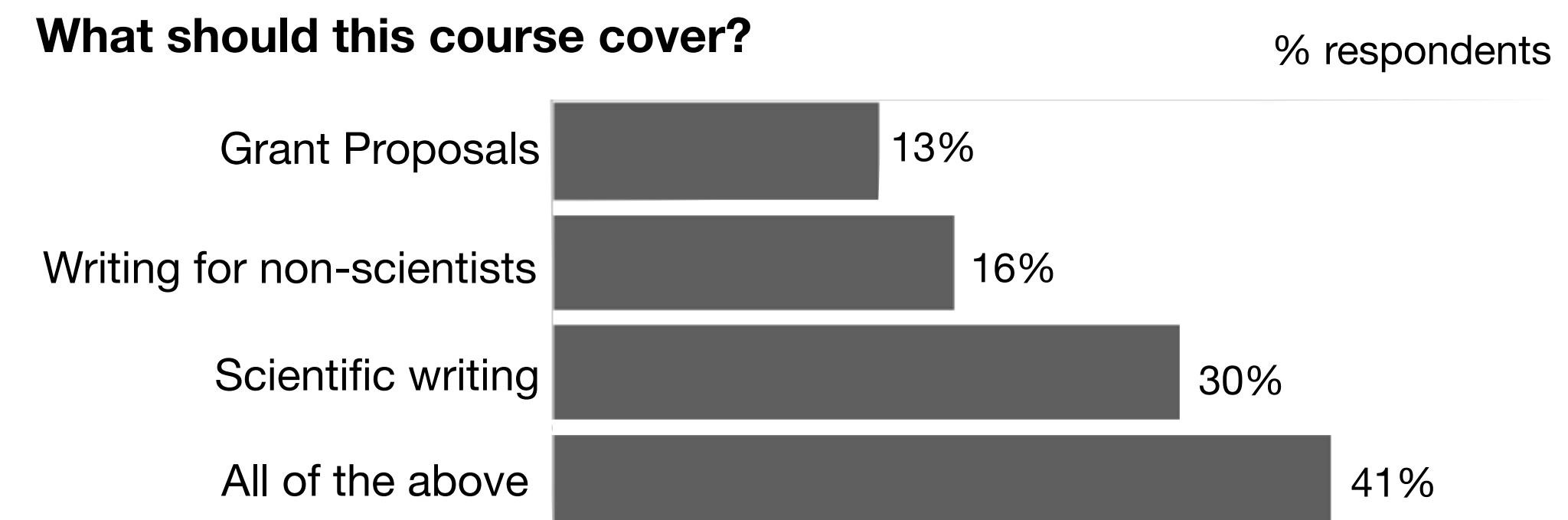
Message

Students are interested in many topics in writing



Topic

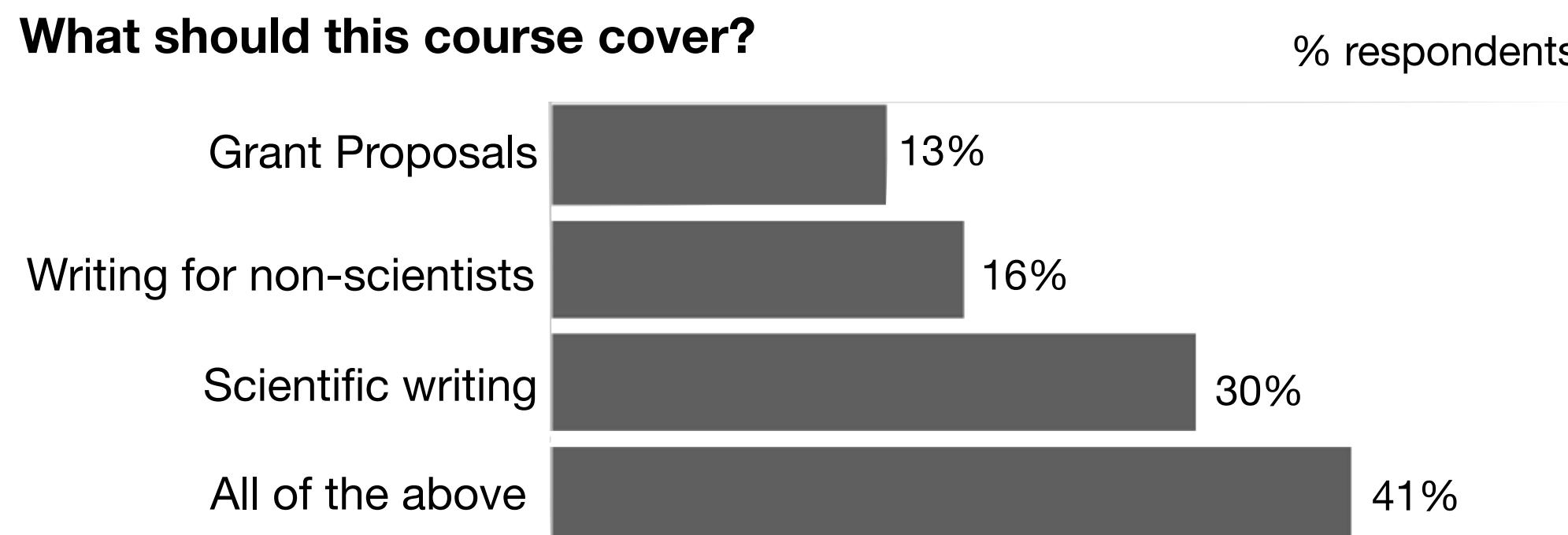
Survey results



Sentence titles are critical because information has many interpretations

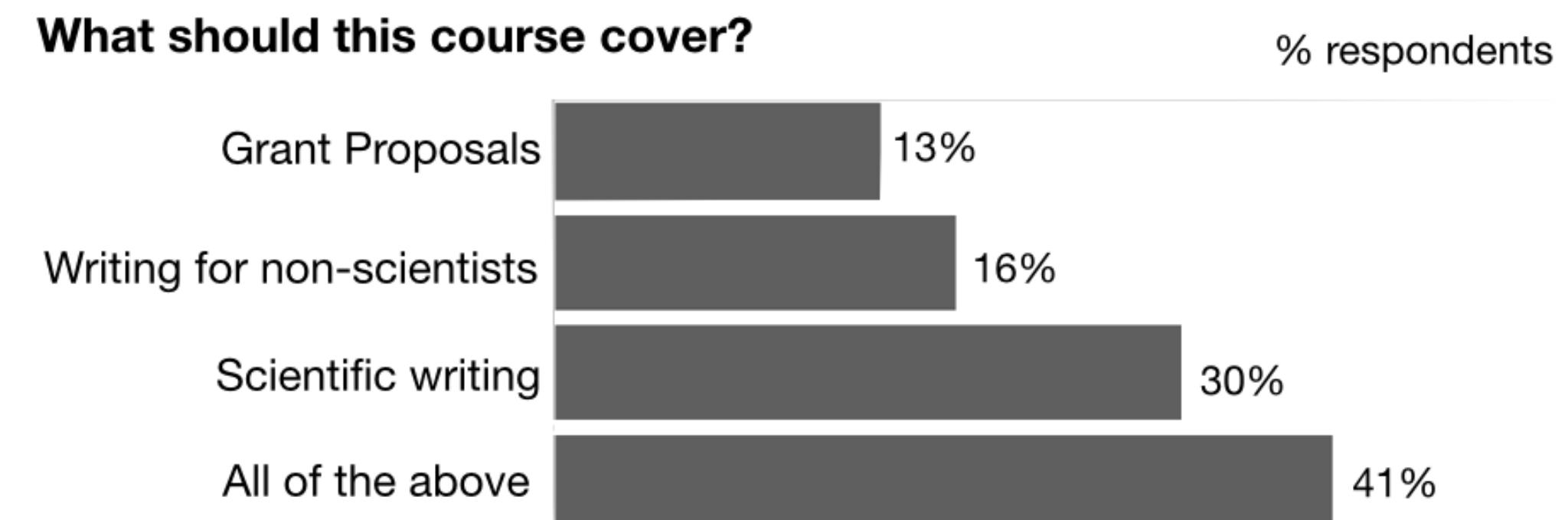
Your message

Students are interested in many topics in writing



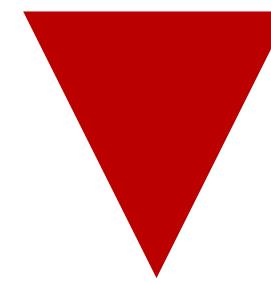
Equally viable message

Most students don't care about grant proposals



Sentence-titles answer [who] [did] [what]

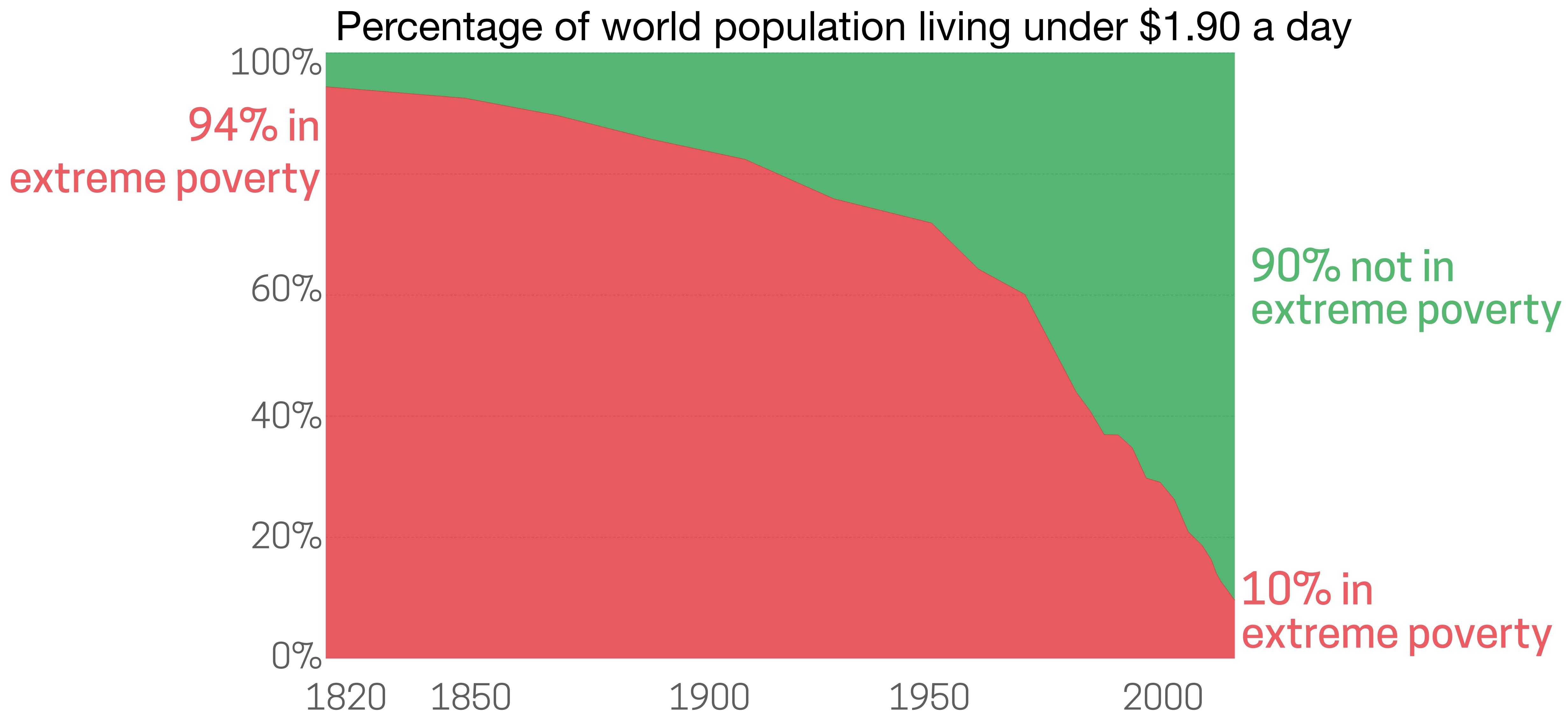
Survey results



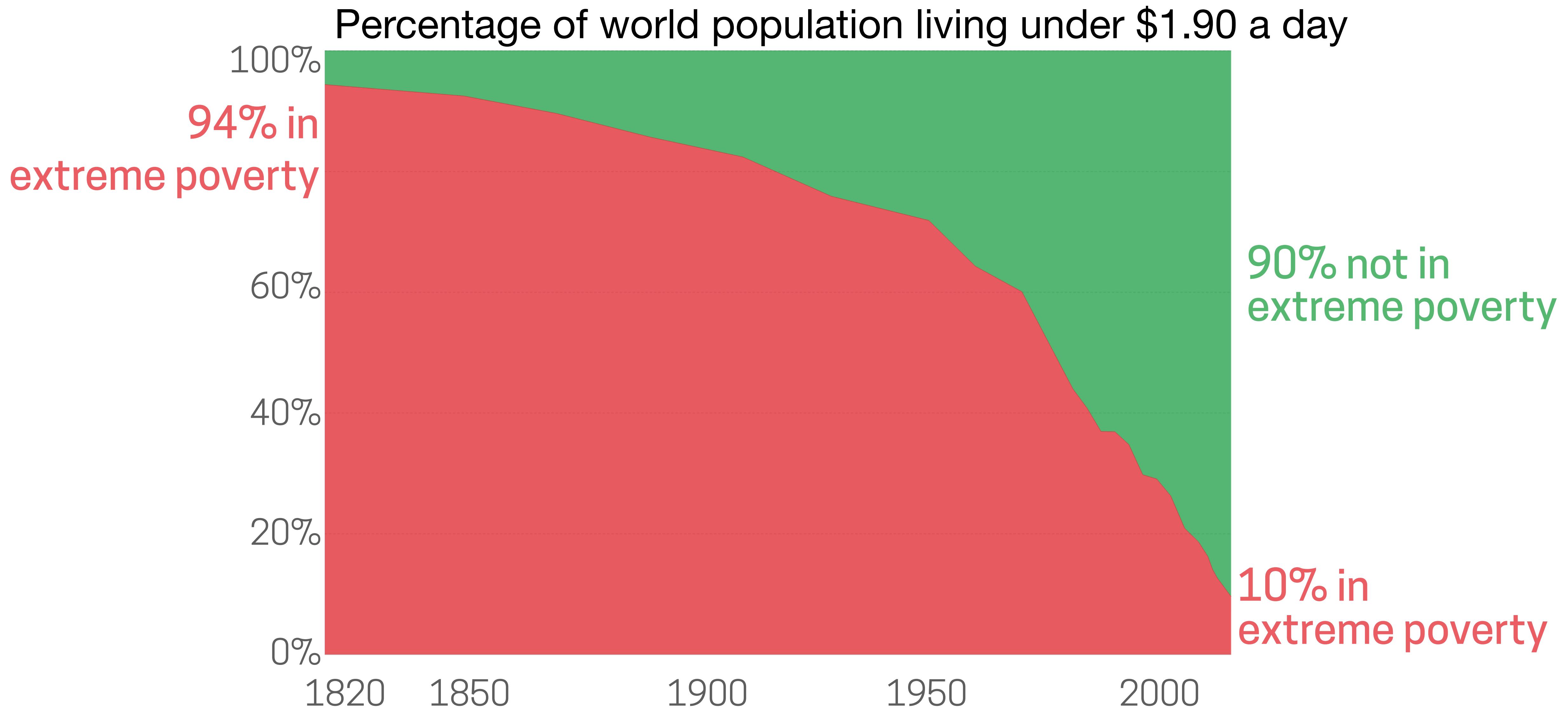
Students are interested in
many topics in writing

- Make a claim that's supported by your evidence
- Subject-Verb-Object order
- Can complete the sentence, "Today I learned that..."
- Tend to be longer

Practice: How might we distill this graph?



Global poverty has dropped dramatically

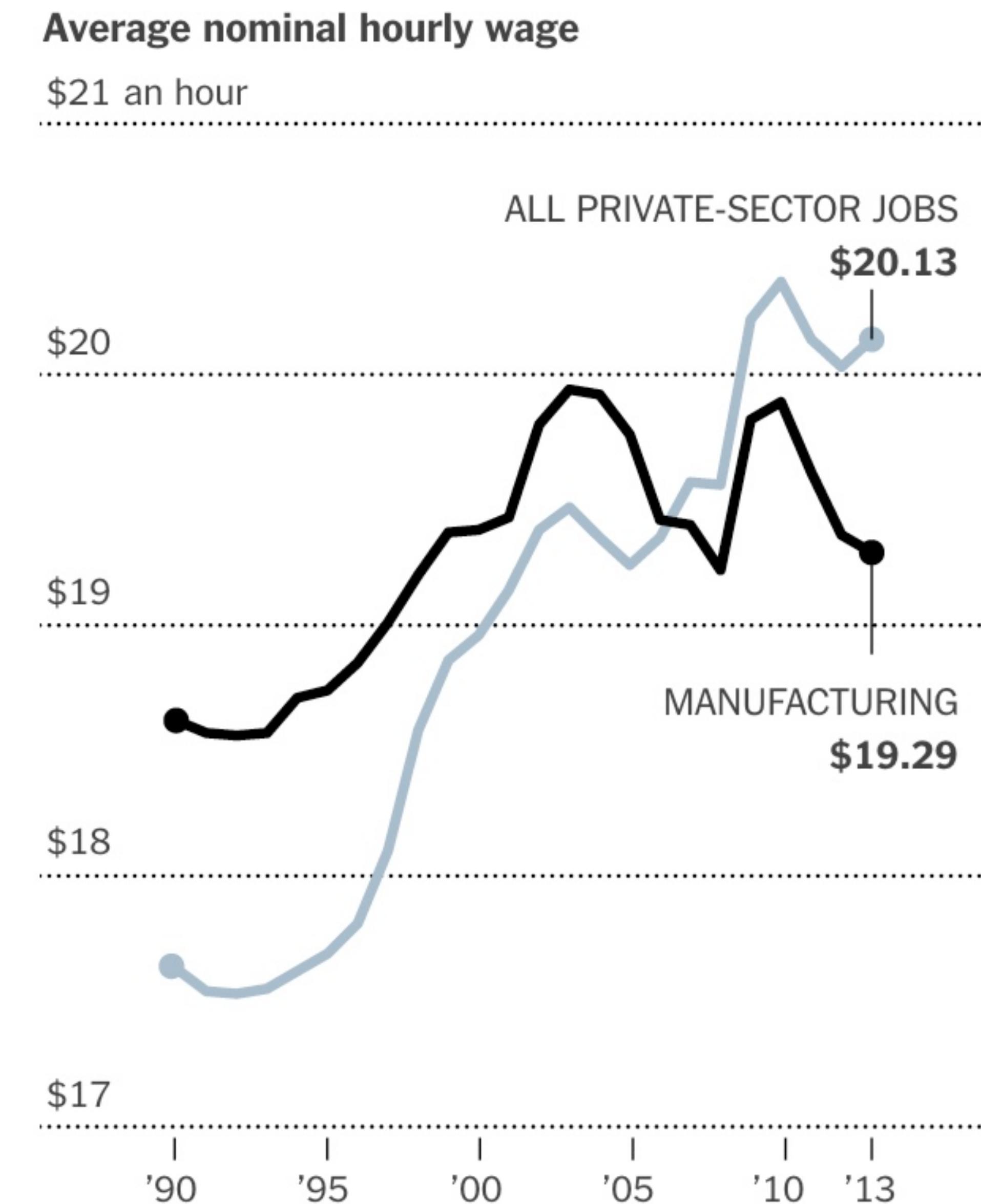


Practice: How might we distill this graph?

Private sector jobs have increased wages

Manufacturing wages have stagnated

Manufacturing jobs used to pay better than average, but have trailed since 2005



How might we distill this slide?

From theory to practice

- Although many white papers discuss inter-network wireless roaming, no services announced
- Strexcorp has built a working network environment with 802.1X wireless access-points and separate Access Controllers combined with an efficient RADIUS server for the first time
- The solution has been in testing for the last six months
 - No major problems have occurred

This is an example of “burying the lead”

StrexCorp has built the first
deployable wireless roaming network

- Although many white papers discuss inter-network wireless roaming, no services announced
- Strexcorp has built a working network environment with 802.1X wireless access-points and separate Access Controllers combined with an efficient RADIUS server for the first time
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No major problems have occurred

Your slide's message goes in the title

Supporting evidence

Assertion-evidence approach
Alley 2006

Practice

Choose 2-3 insights

Distill into a complete sentence

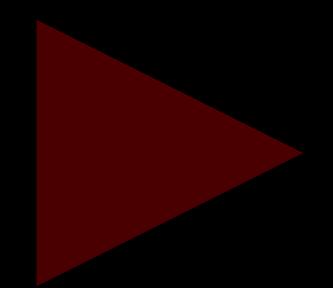
Clear visualization is a 2-step process:

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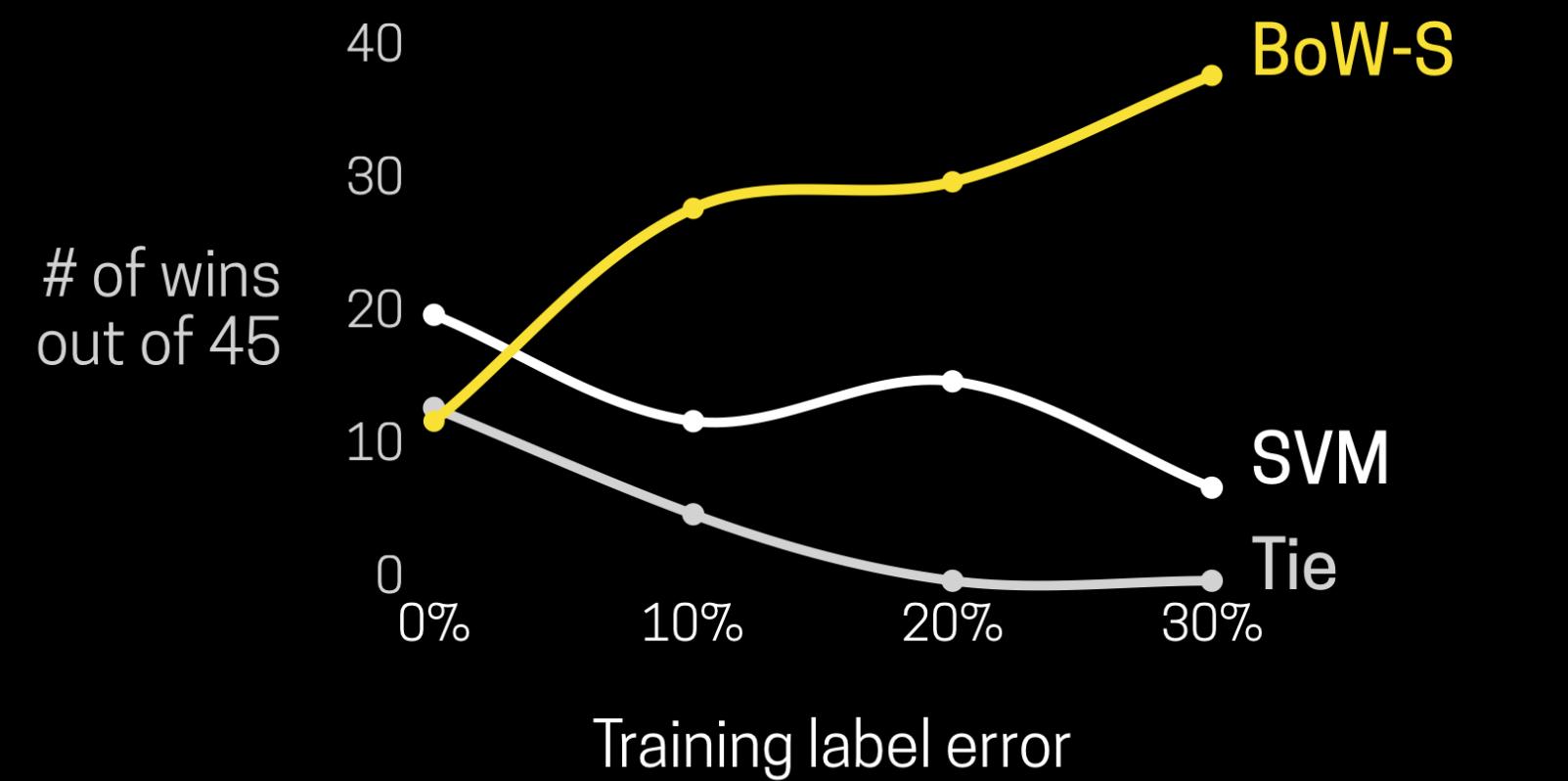
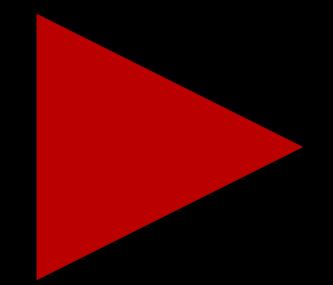
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BoW-S outperforms SVM on noisy data

BoW-S outperforms SVM on noisy data



Your slide's message goes in the title

Supporting evidence

Assertion-evidence approach
Alley 2006

Your slide's message goes in the title

Supporting evidence
With visual emphasis on the
crux of the argument

Assertion-evidence approach
Alley 2006

3 tools to align
visual emphasis

3 tools to align visual emphasis

1. Show hierarchy

StrexCorp has built the first deployable wireless roaming network

- Although many white papers discuss inter-network wireless roaming, no services announced
- Strexcorp has built a working network environment with 802.1X wireless access-points and separate Access Controllers combined with an efficient RADIUS server
- The solution has been in testing for the last six months

No major problems have occurred

Slide contents must be evidence, not speaker notes

StrexCorp has built the first
deployable wireless roaming network

- Although many white papers discuss inter-network wireless roaming, no services announced
- Strexcorp has built a working network environment with 802.1X wireless access-points and separate Access Controllers combined with an efficient RADIUS server
- The solution has been in testing for the last six months
No major problems have occurred



Speaker notes

“Speaker notes” slides are not effective for two reasons

StrexCorp has built the first deployable wireless roaming network

- Although many white papers discuss inter-network wireless roaming, no services announced
- Strexcorp has built a working network environment with 802.1X wireless access-points and separate Access Controllers combined with an efficient RADIUS server
- The solution has been in testing for the last six months

No major problems have occurred

Speaker notes split the audience's attention

And miss the opportunity to add visual value

Impose a hierarchy on information

StrexCorp has built the first
deployable wireless roaming network

- Although many white papers discuss inter-network wireless roaming, no services announced
- Strexcorp has built a working network environment with 802.1X wireless access-points and separate Access Controllers combined with an efficient RADIUS server
- The solution has been in testing for the last six months

No major problems have occurred

Impose a hierarchy on information

StrexCorp has built the first
deployable wireless roaming network

Previously only theoretical

Based on industry standards
802.1x, efficient RADIUS server

No major problems
in 6 months of testing

Impose a hierarchy on information

StrexCorp has built the first
deployable wireless roaming network

Previously only theoretical

Based on industry standards

802.1x, efficient RADIUS server

No major problems
in 6 months of testing

Important

Most important

Supporting detail

Which would you rather read from the back of a room?

StrexCorp has built the first deployable wireless roaming network

Previously only theoretical

Based on industry standards

802.1x, efficient RADIUS server

No major problems
in 6 months of testing

StrexCorp has built the first deployable wireless roaming network

- Although many white papers discuss inter-network wireless roaming, no services announced
- Strexcorp has built a working network environment with 802.1X wireless access-points and separate Access Controllers combined with an efficient RADIUS server
- The solution has been in testing for the last six months
No major problems have occurred

Which would you rather read from the back of a room?

StrexCorp has built the first deployable wireless roaming network

Previously only theoretical

Based on industry standards

802.1x, efficient RADIUS server

No major problems
in 6 months of testing

From theory to practice

- Although many white papers discuss inter-network wireless roaming, no services announced
- Wirlab has built a working network environment with 802.1X wireless access-points and separate Access Controllers combined with an efficient RADIUS server
- The solution has been in testing for the last six months
 - No major problems have occurred

Impose hierarchy on information
with three layers of emphasis

Background

Data

Emphasis

Impose hierarchy on information with three layers of emphasis

Background

Reduce emphasis on visual elements
that are not data

- Eliminate it
- Make it small
- Make it a neutral color
or less saturated

Impose hierarchy on information with three layers of emphasis

Emphasis

Align visual emphasis
with your main message

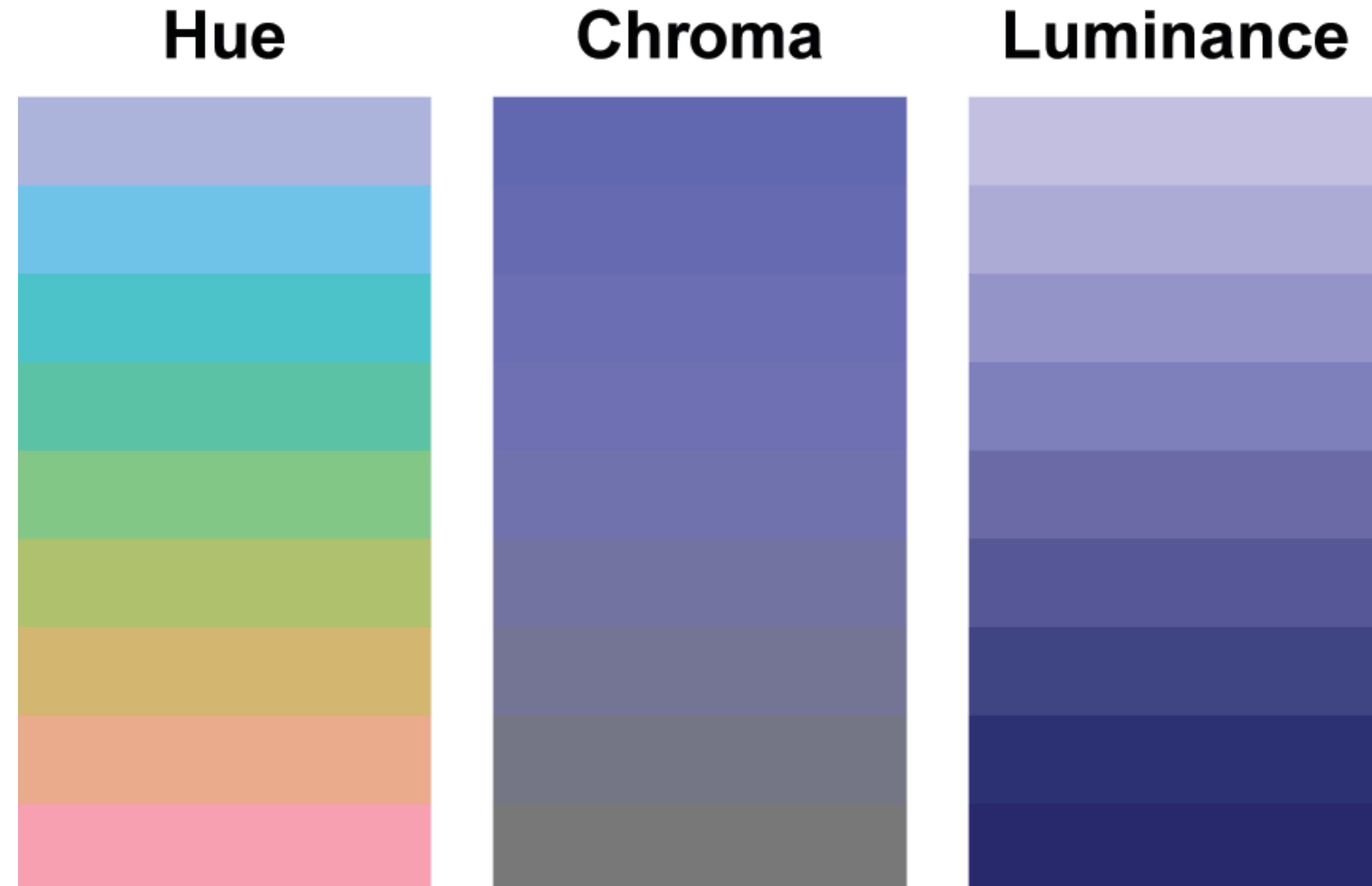
- Make it large
- Use an accent color
- Increase chroma
- Make it bold

Impose hierarchy on information with three layers of emphasis

Emphasis

Align visual emphasis with your main message

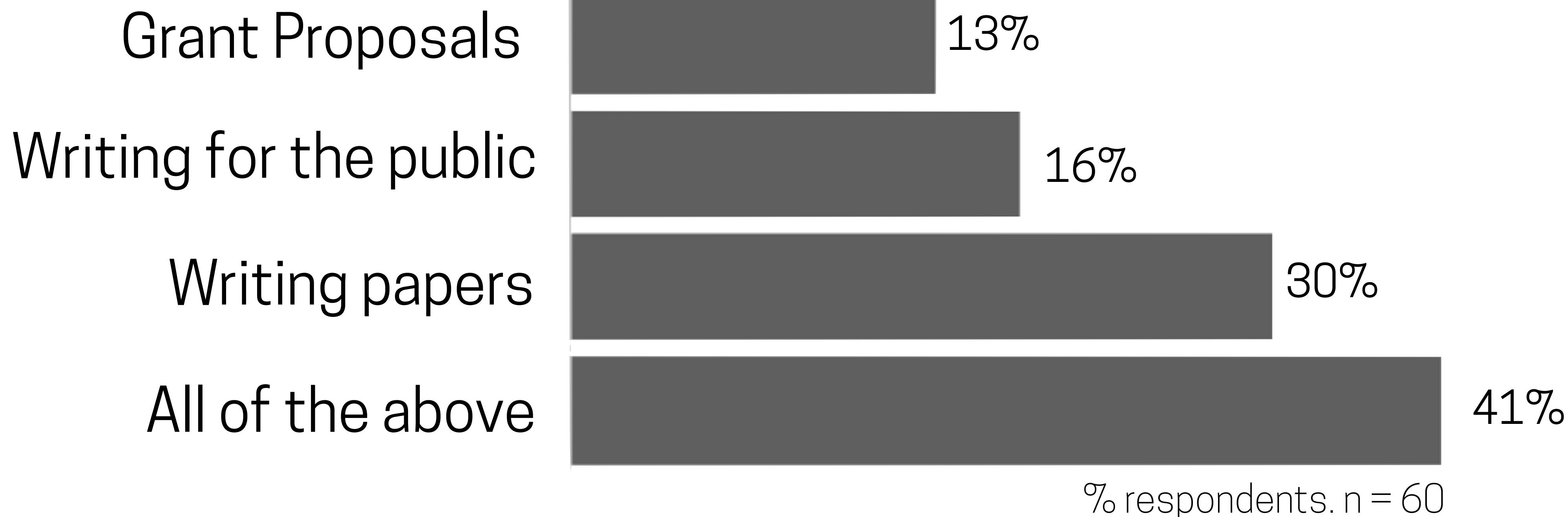
- Make it large
- Use an accent color
- Increase chroma
- Make it bold



How might we align emphasis with this title?

Students are interested in many topics in writing

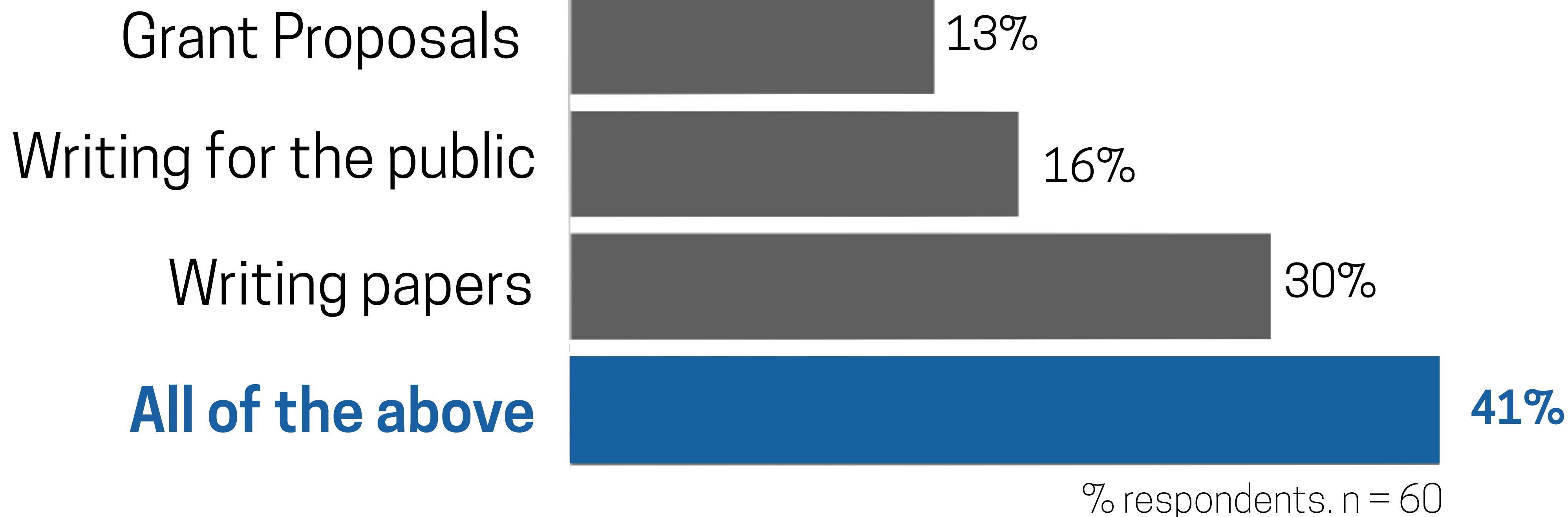
What should this writing course cover?



How might we align emphasis with this title?

Students are interested in many topics in writing

What should this writing course cover?



Emphasis changes, data stays the same

Grad students are
shockingly naïve

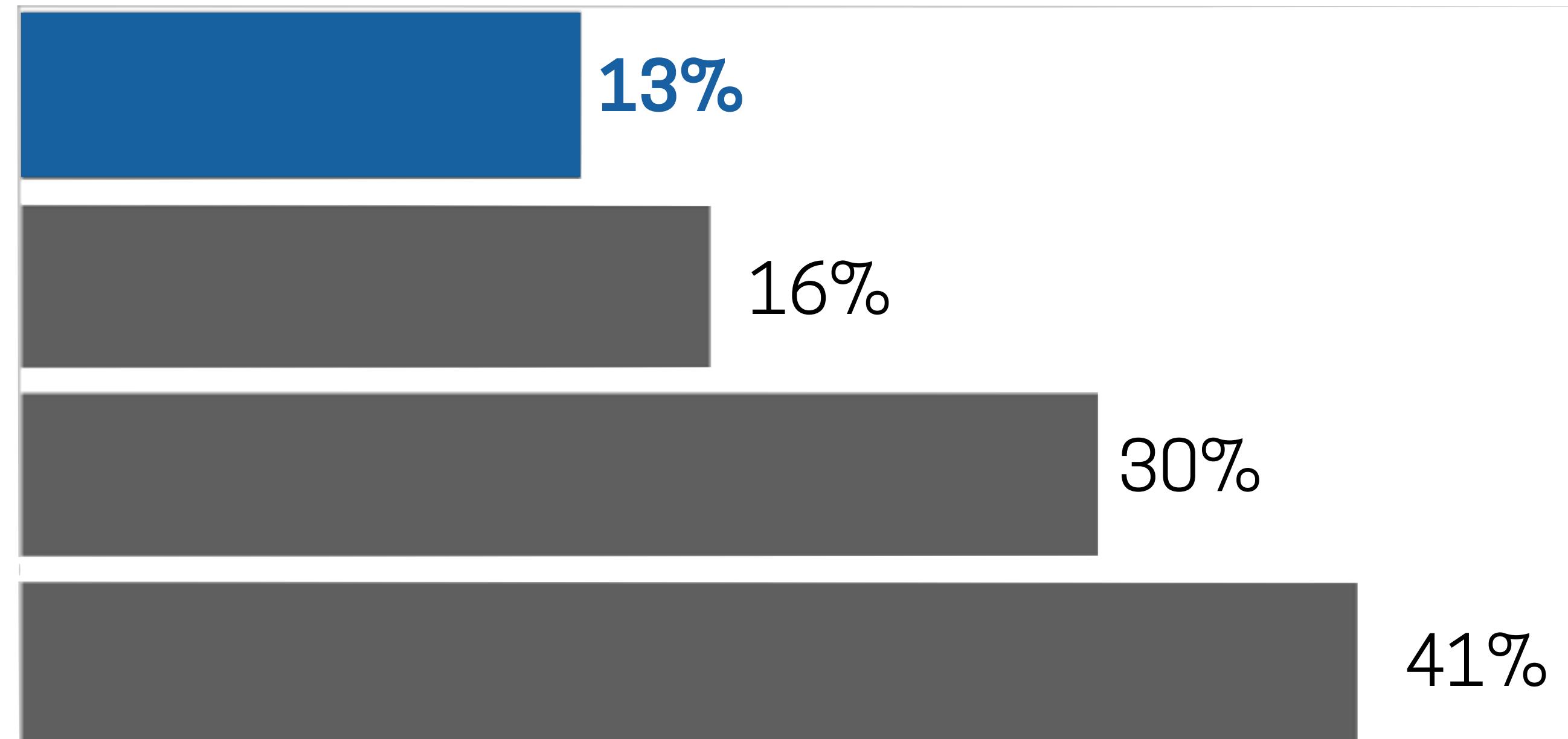
What should this writing course cover?

Grant Proposals

Writing for the public

Writing papers

All of the above



% respondents. n = 60

1. Show hierarchy with three layers of emphasis

Background

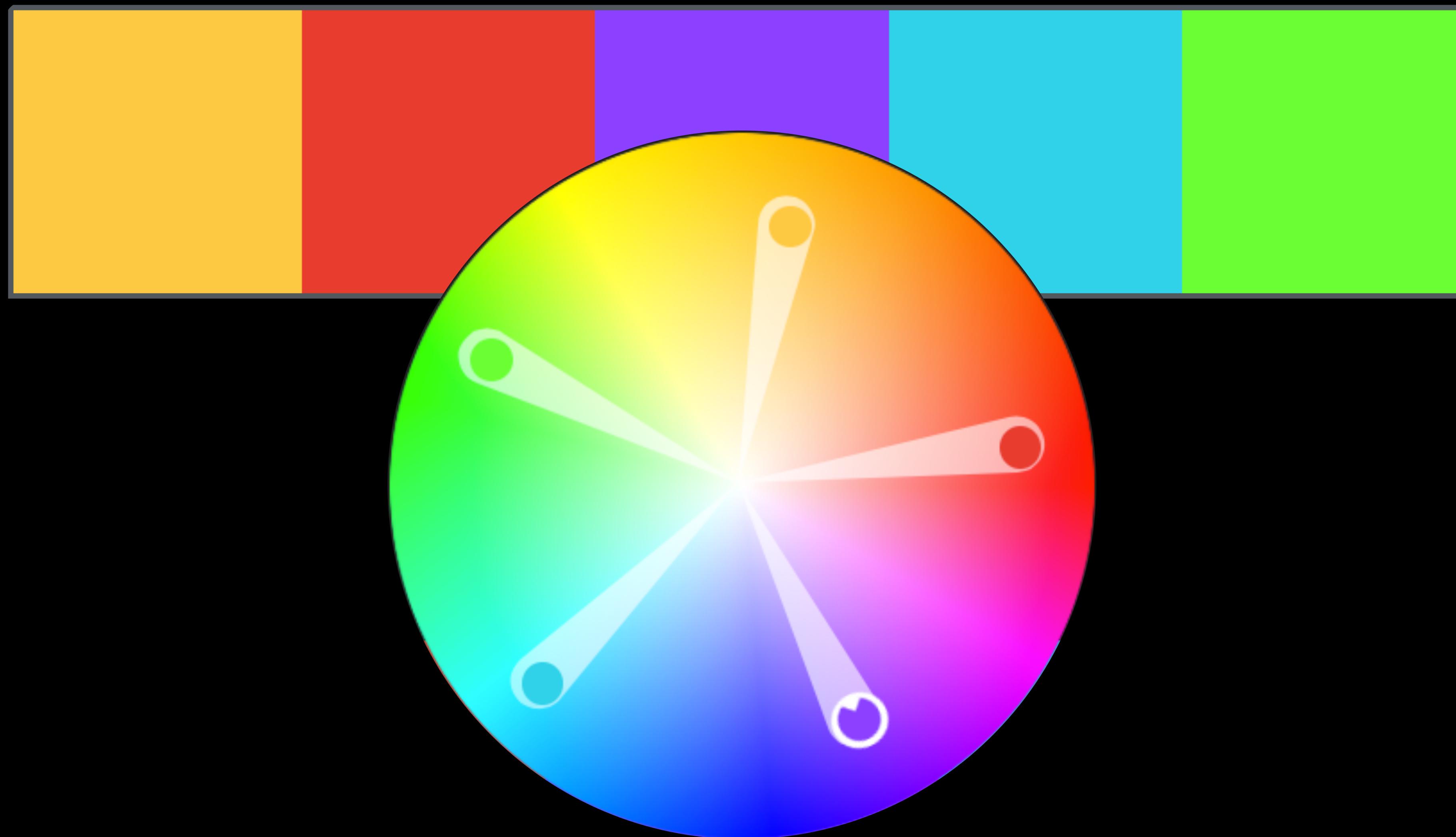
Data

Emphasis

and with color logic

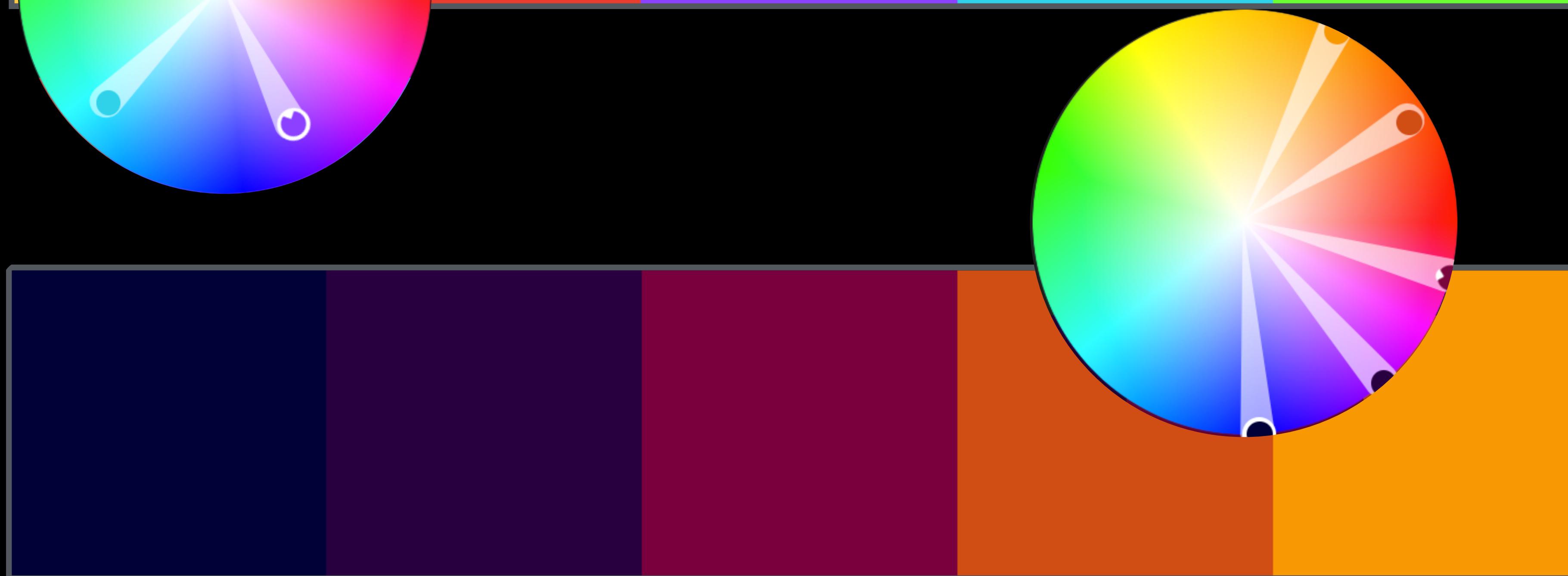
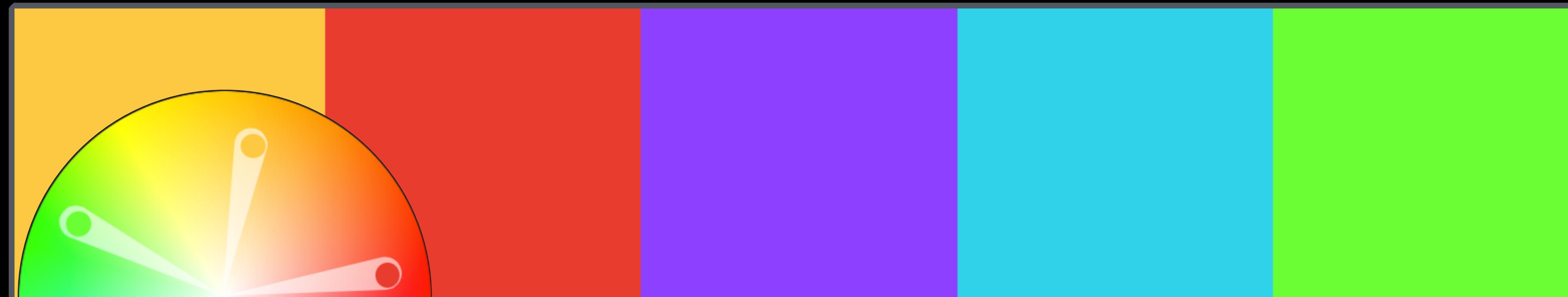
1. Qualitative

Equally distributed hues imply categories without hierarchy



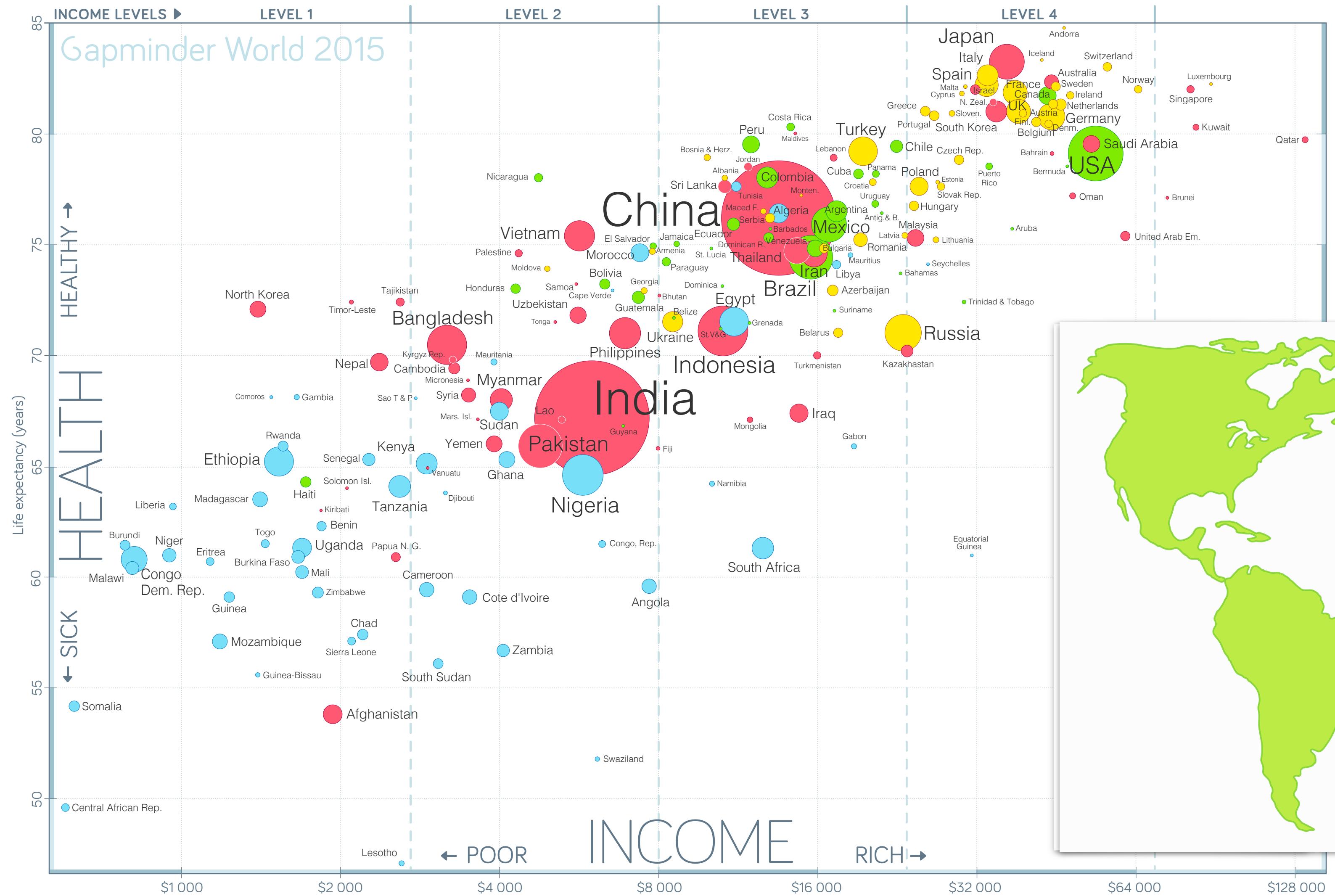
1. Qualitative

Equally distributed hues imply categories without hierarchy



1. Qualitative

Equally distributed hues imply
categories without hierarchy



Example: World Regions

1. Qualitative

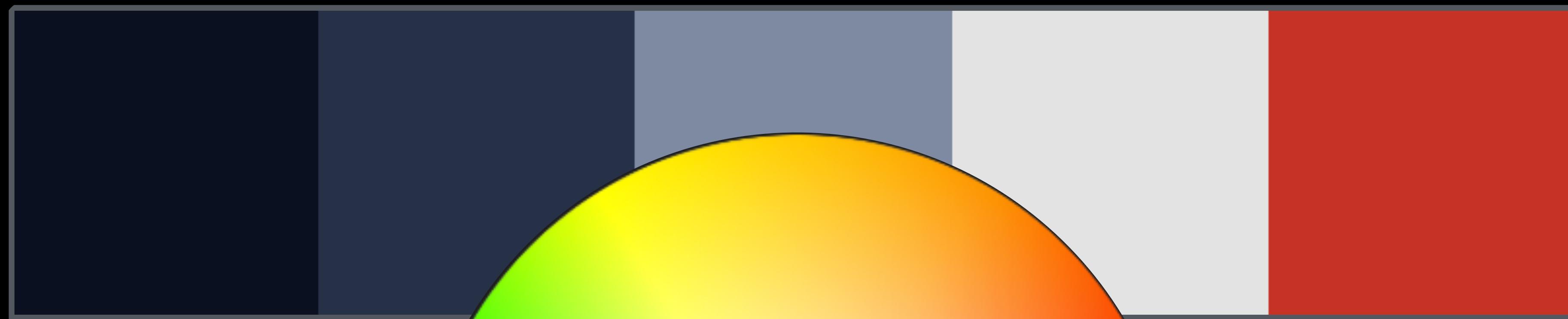


Equally distributed hues imply categories without hierarchy

Lack of hierarchy
is often a problem

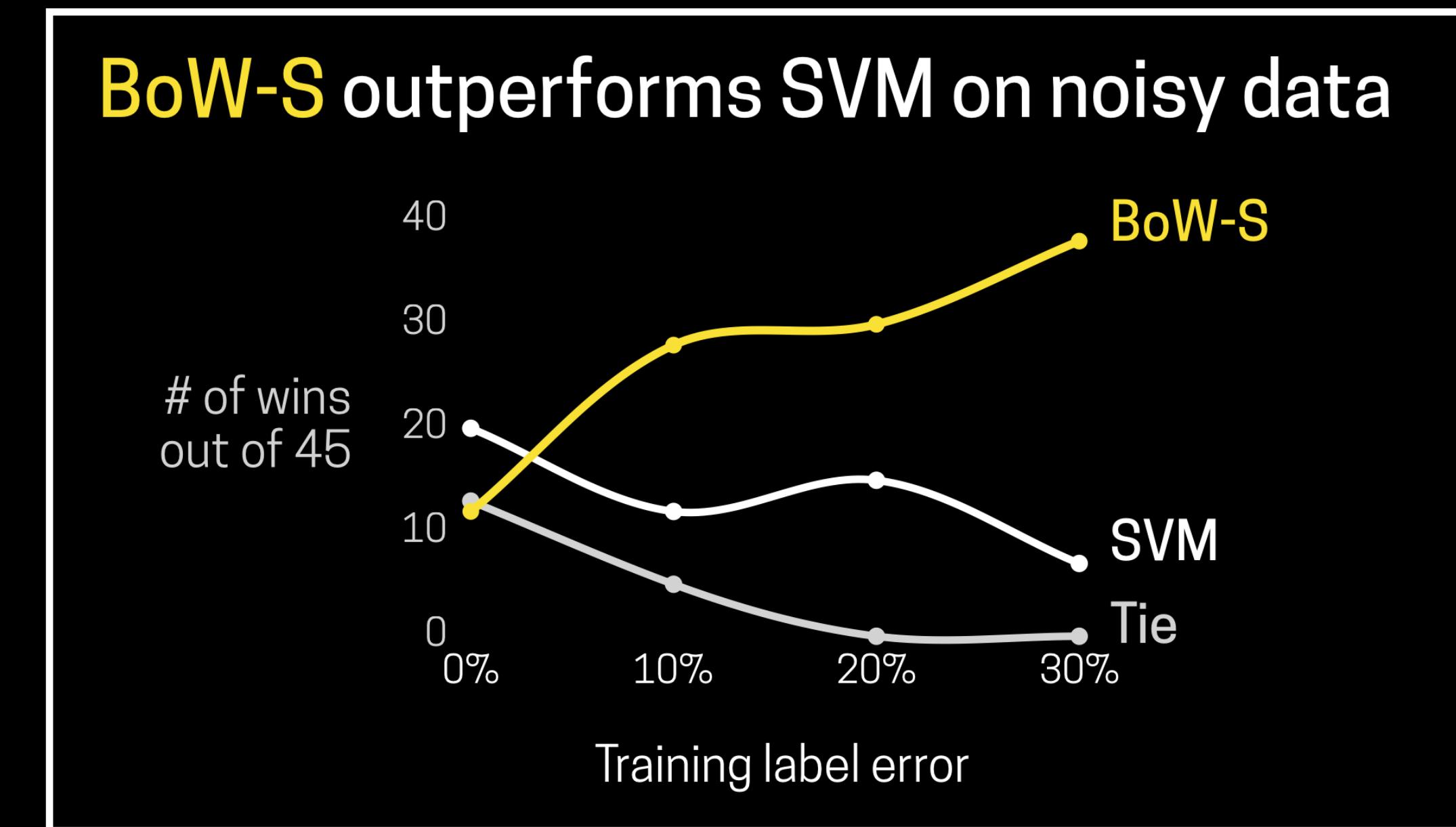
2. Accent

One contrasting hue provides emphasis



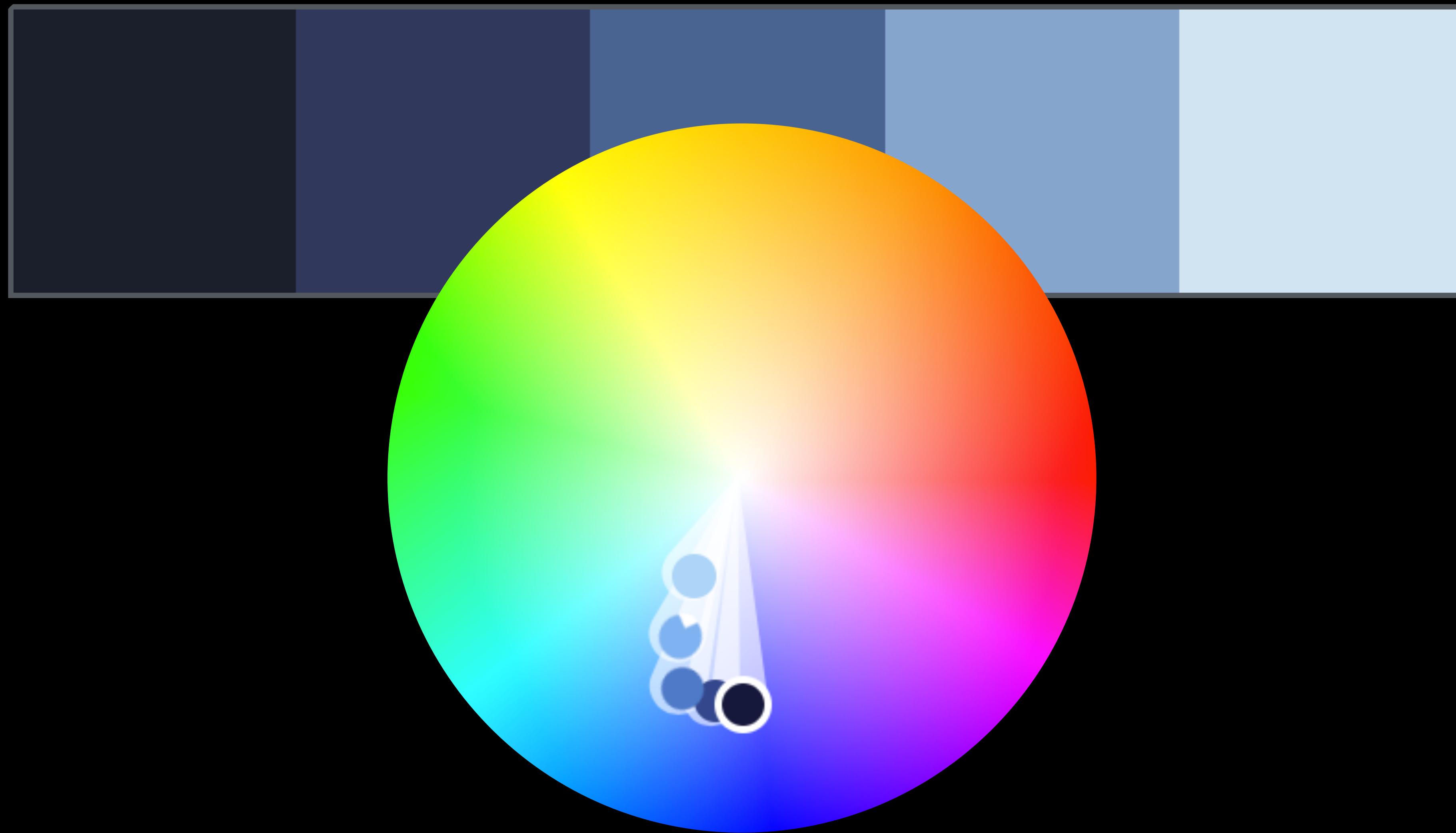
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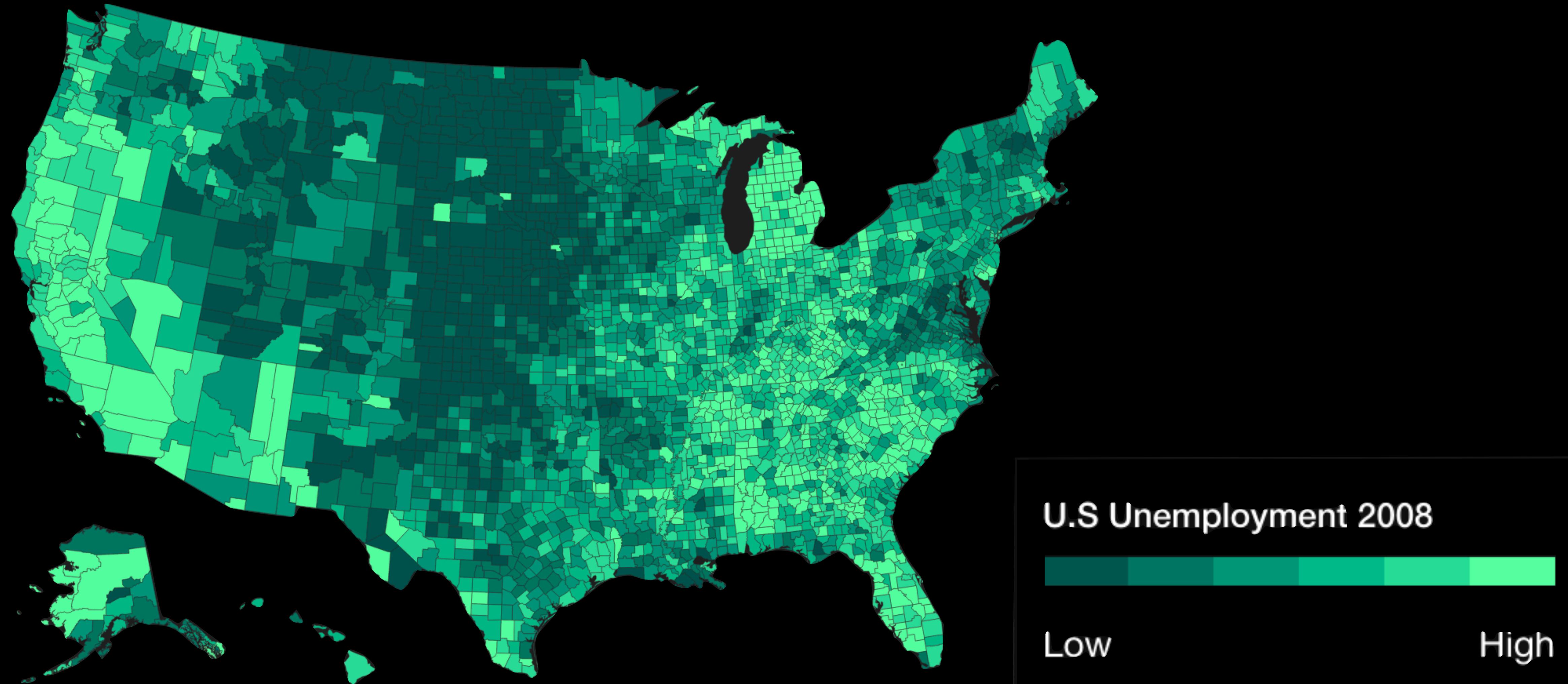
3. Sequential

Same hue, changing saturation
implies a continuous variable



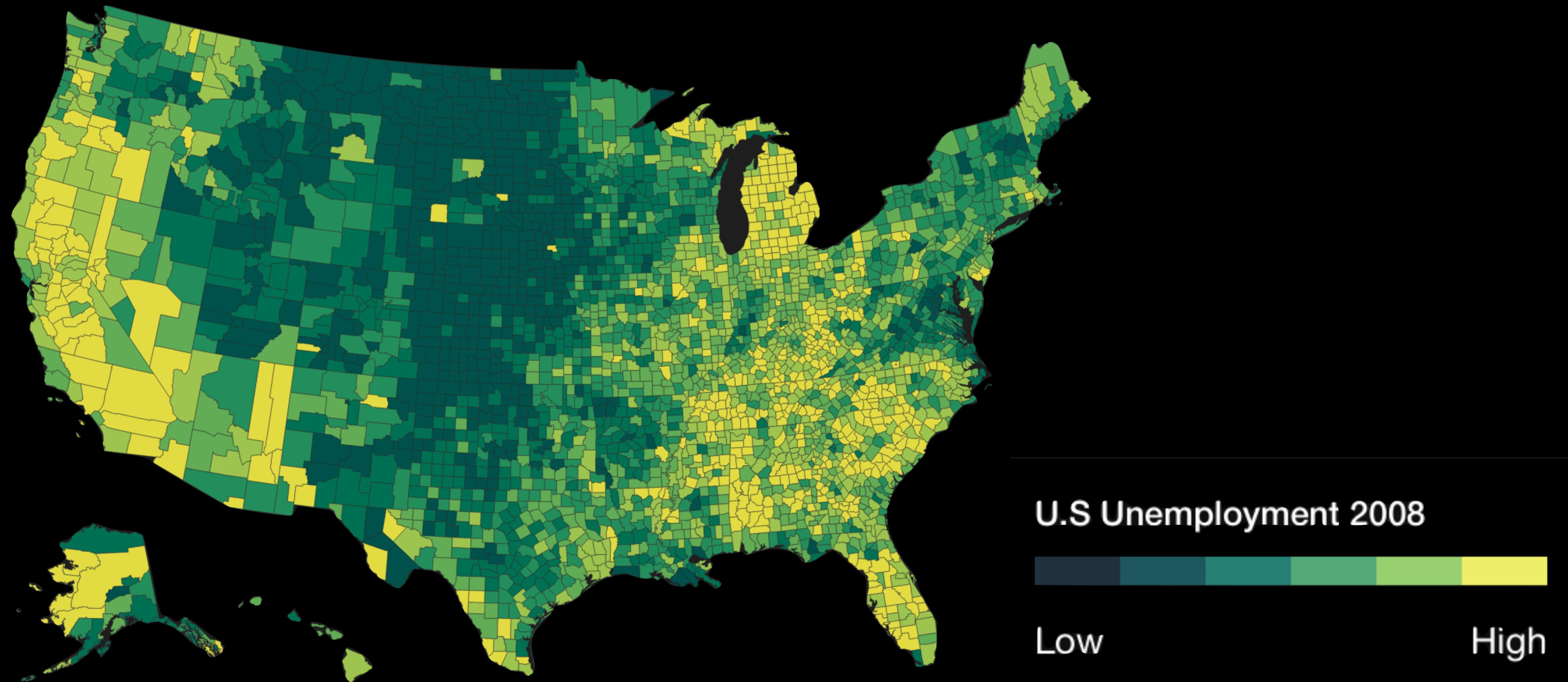
3. Sequential

Same hue, changing saturation
implies a continuous variable



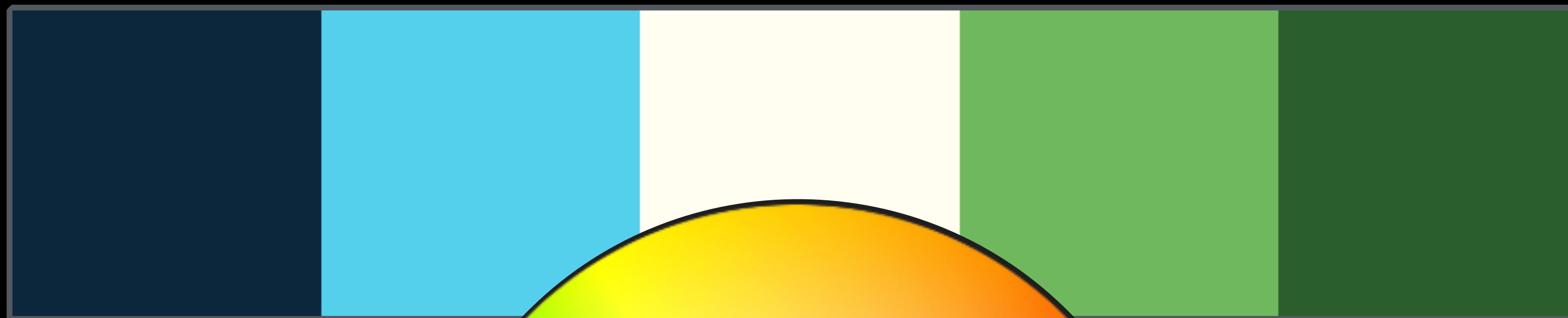
3. Sequential

Multi hue, changing saturation
implies a continuous variable



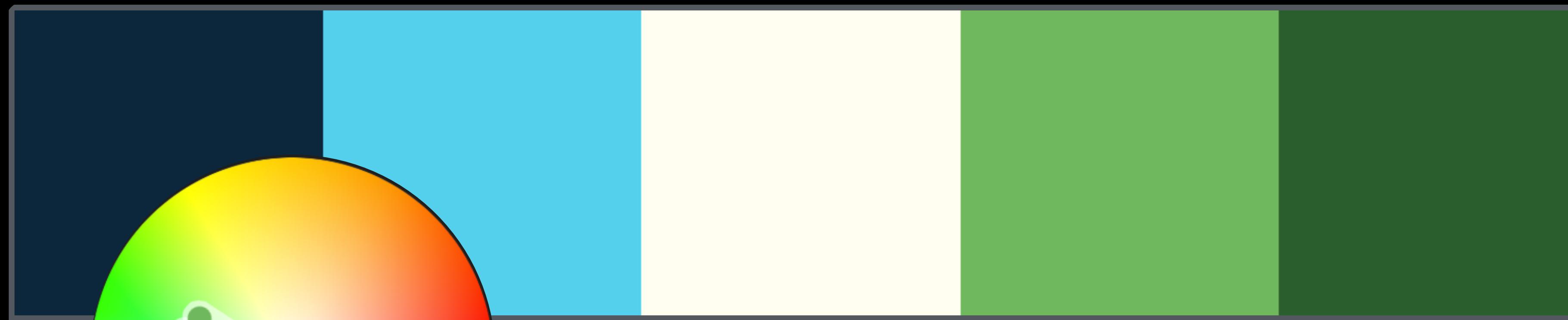
4. Divergent

Movement from a neutral center



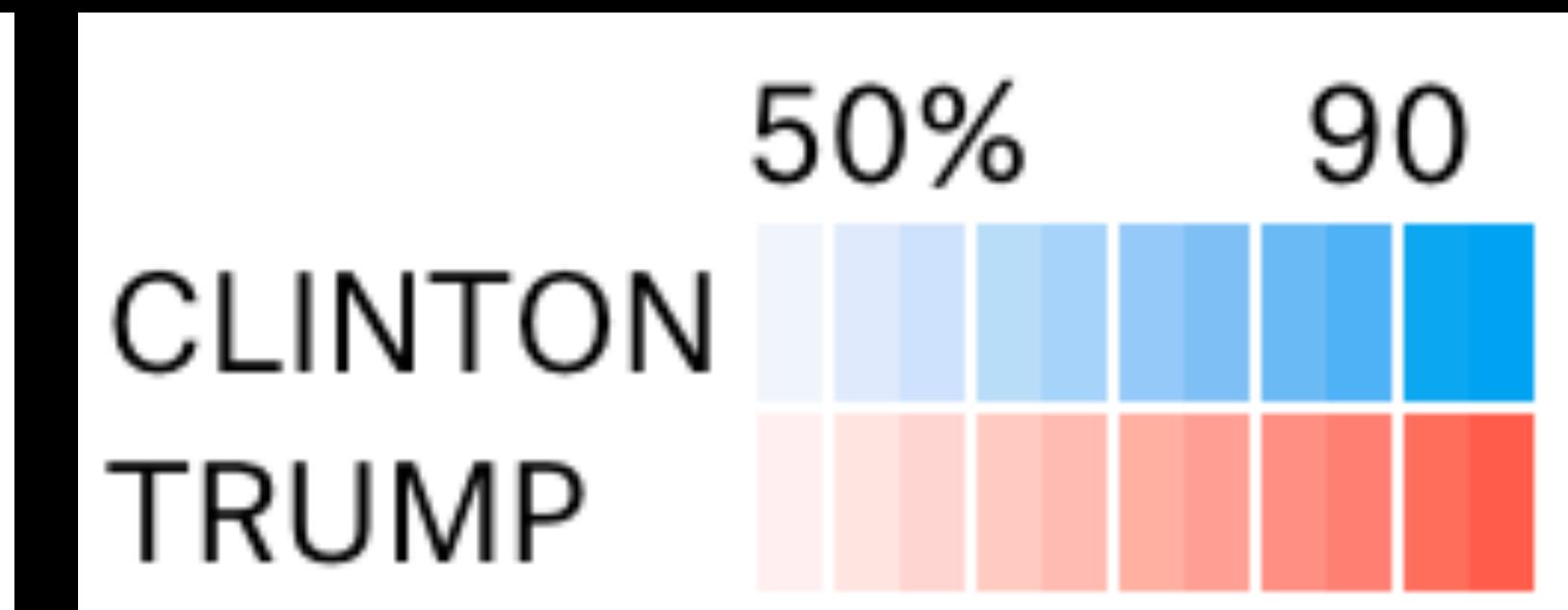
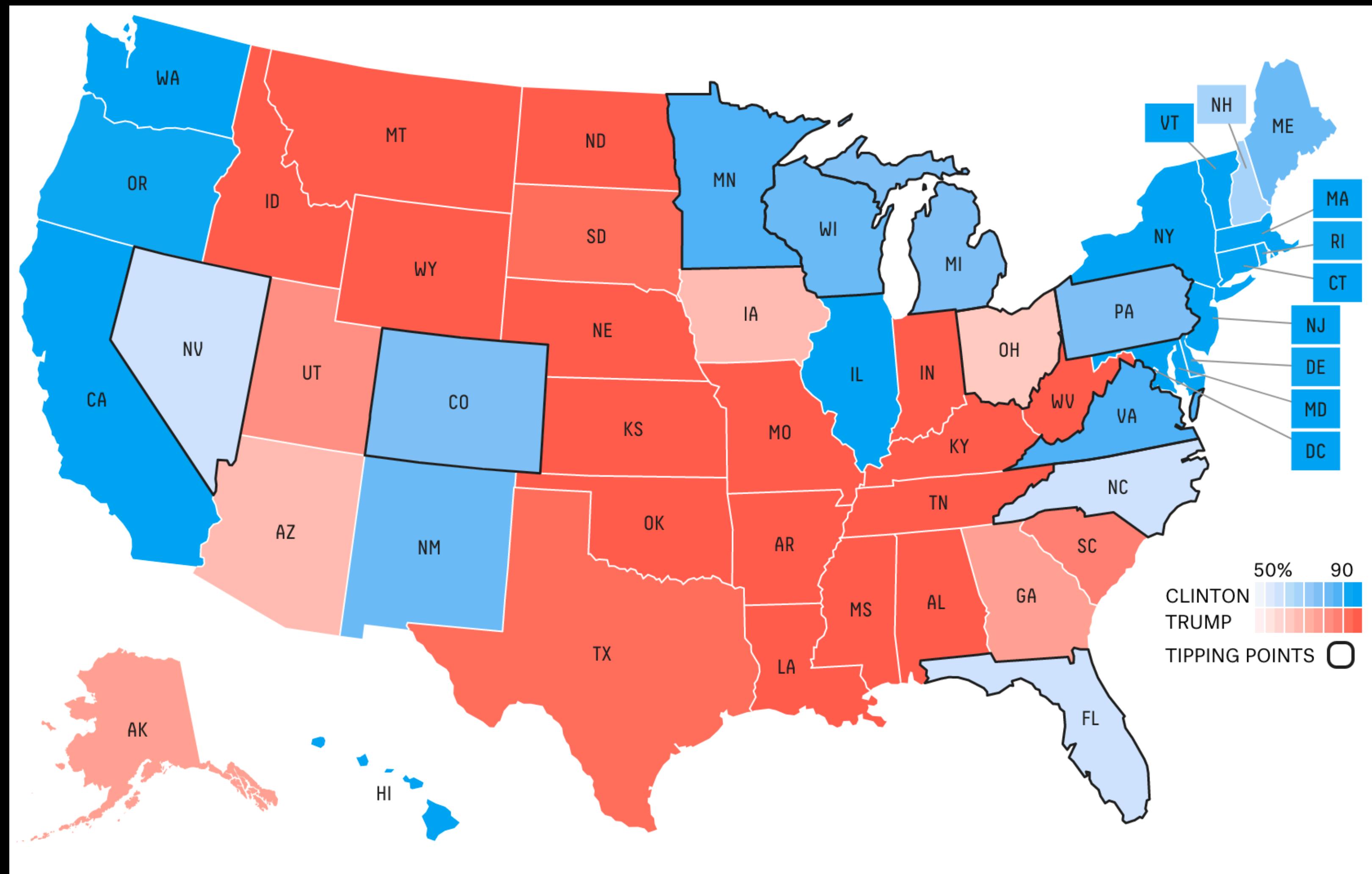
4. Divergent

Movement from a neutral center



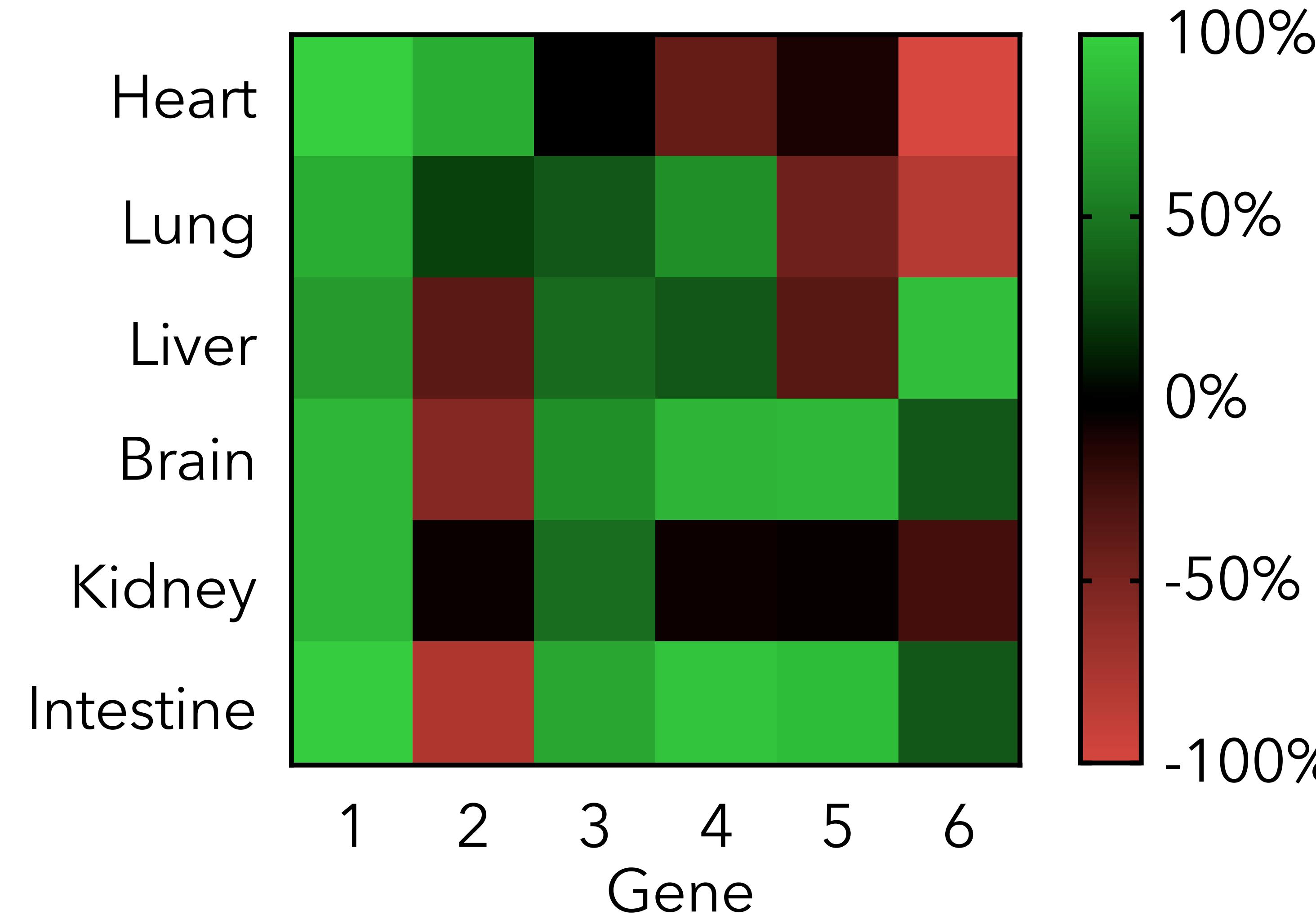
4. Divergent

Movement from a neutral center
Example: political maps

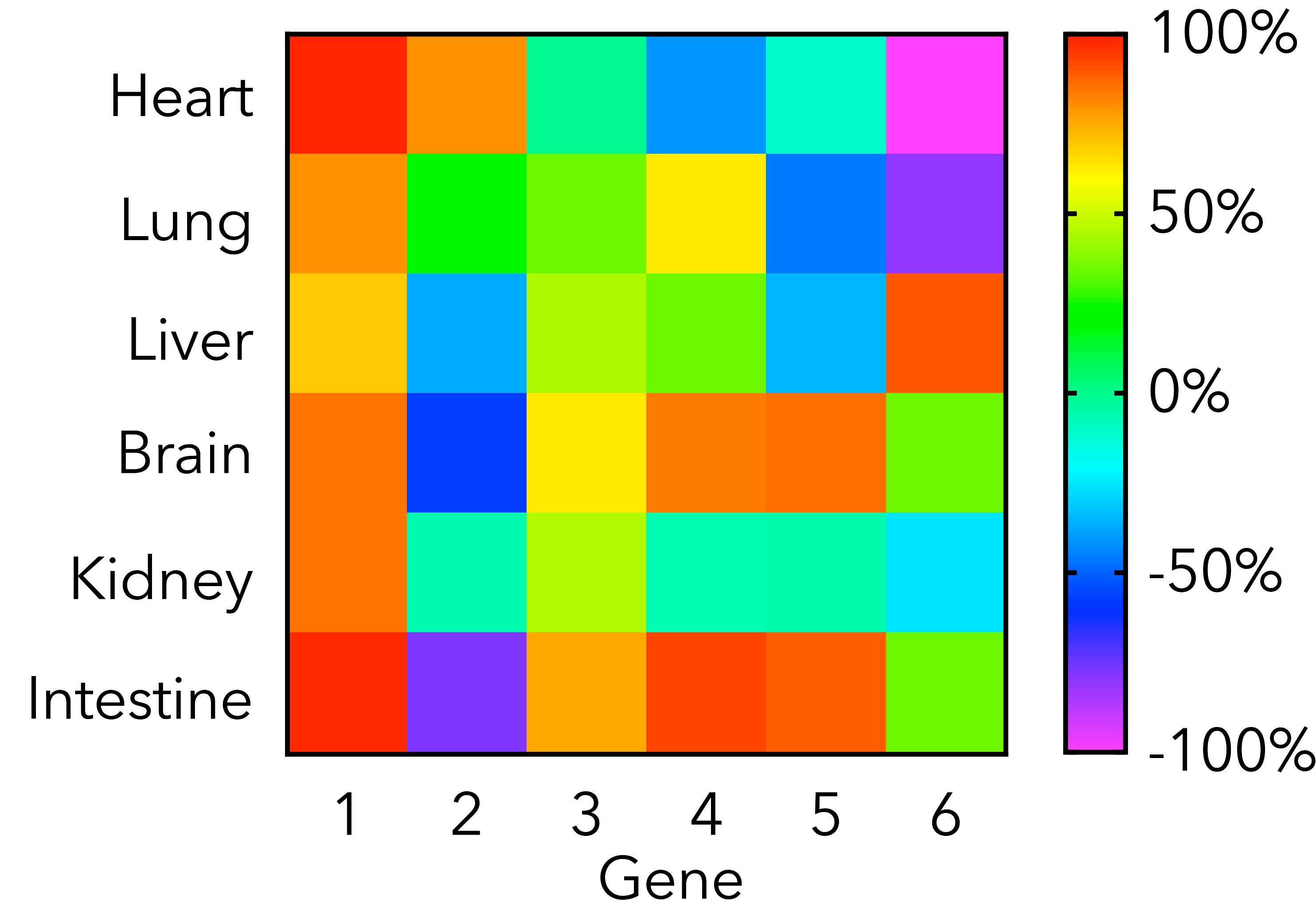


4. Divergent

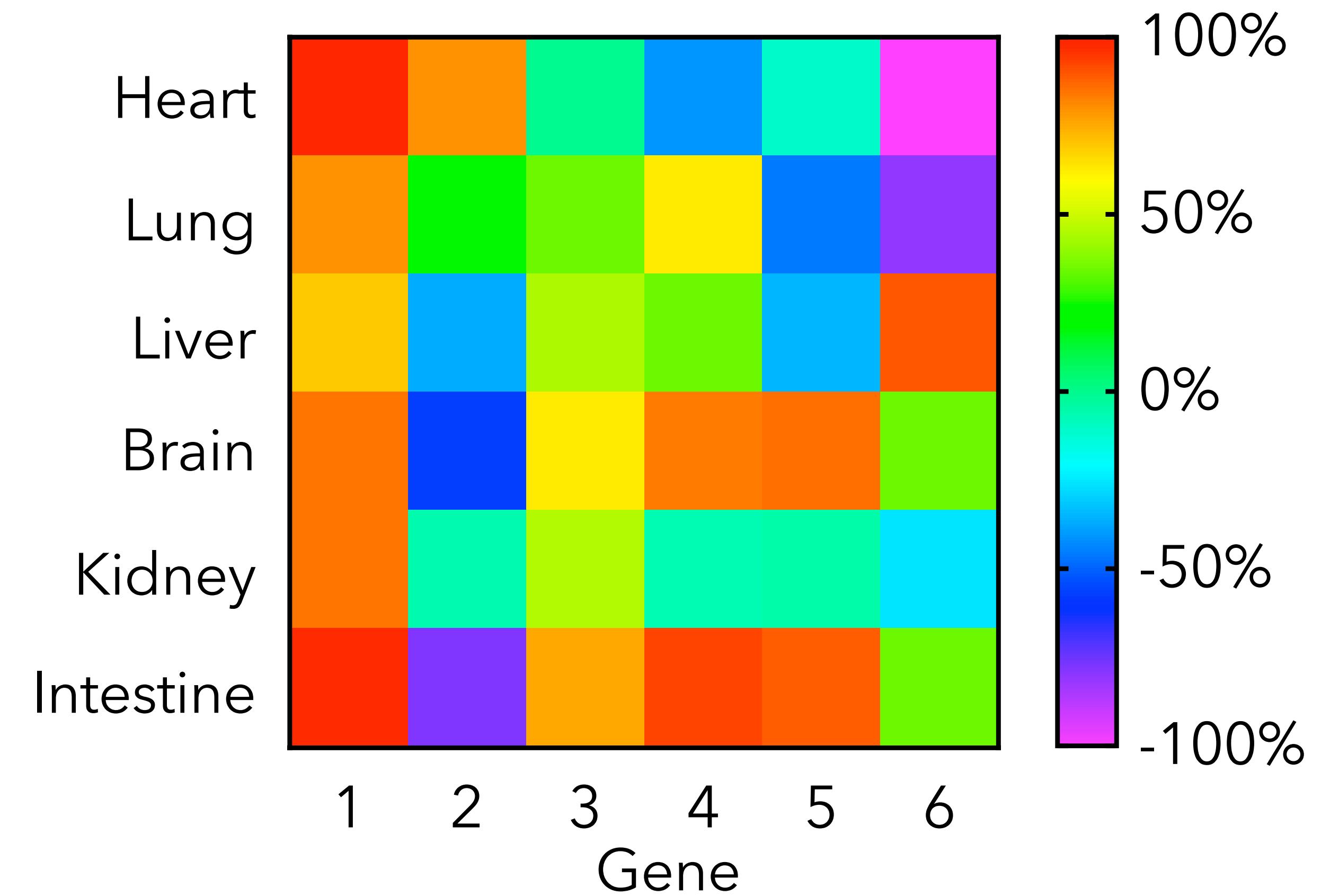
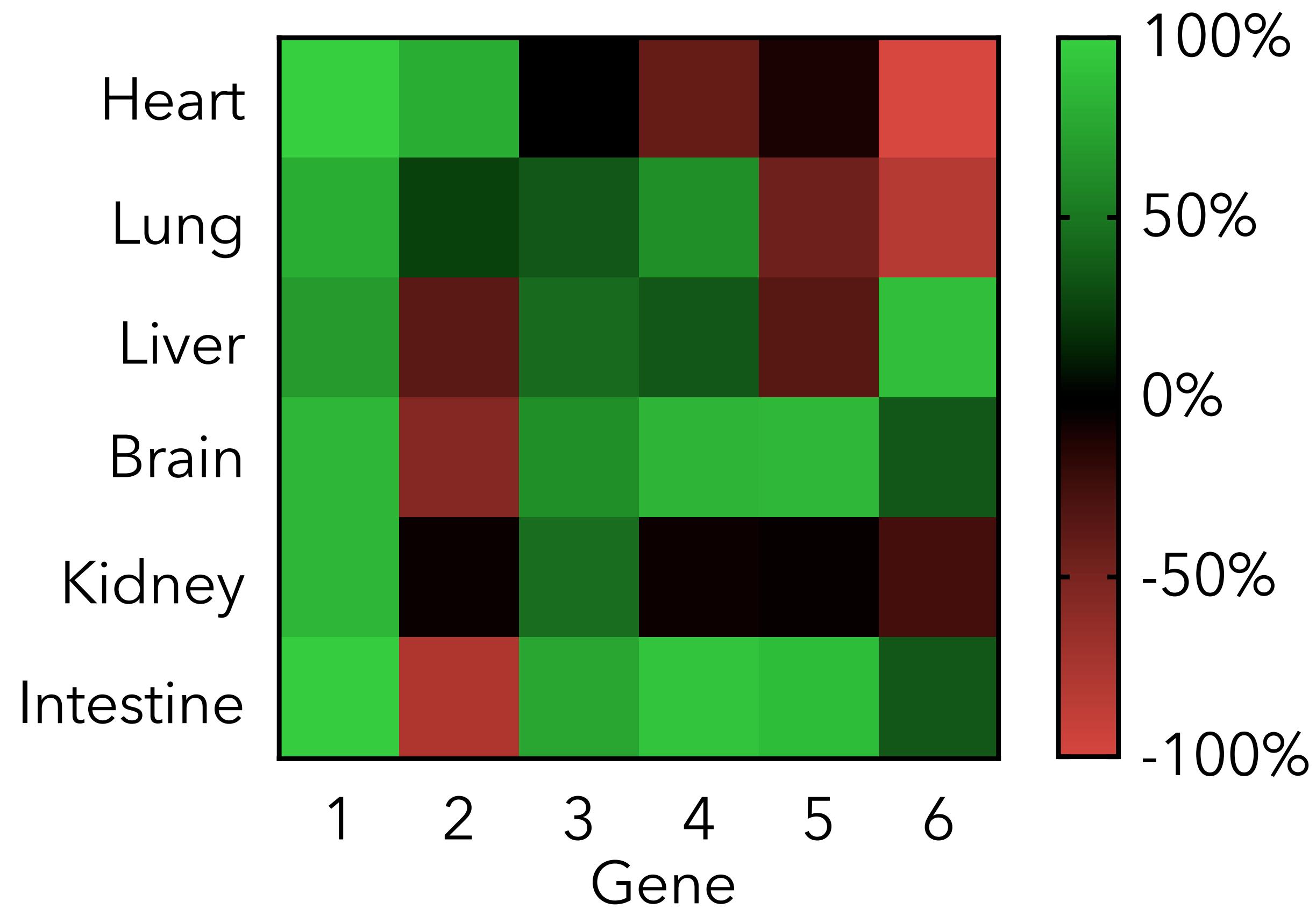
Movement from a neutral center
Example: gene expression heatmap



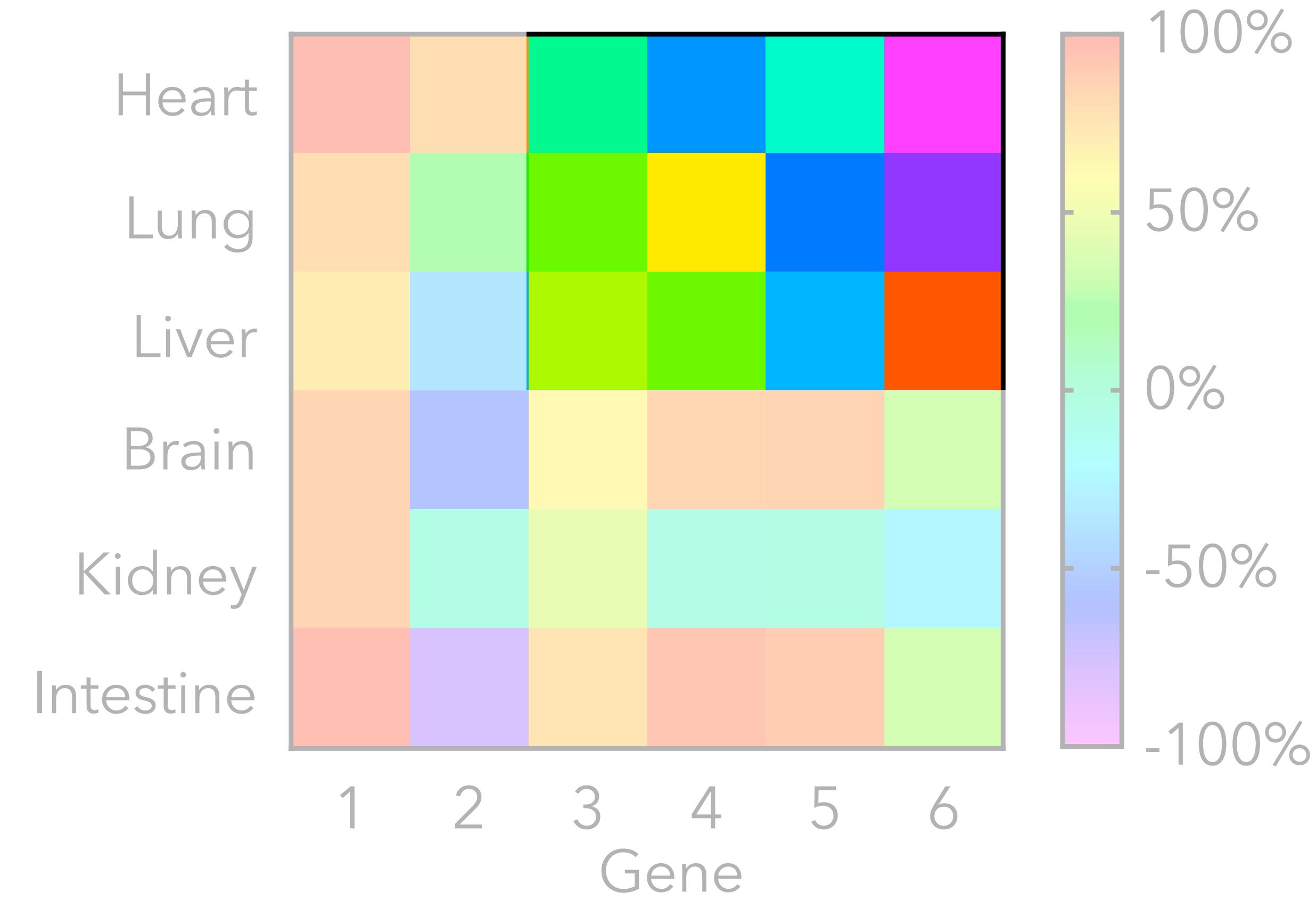
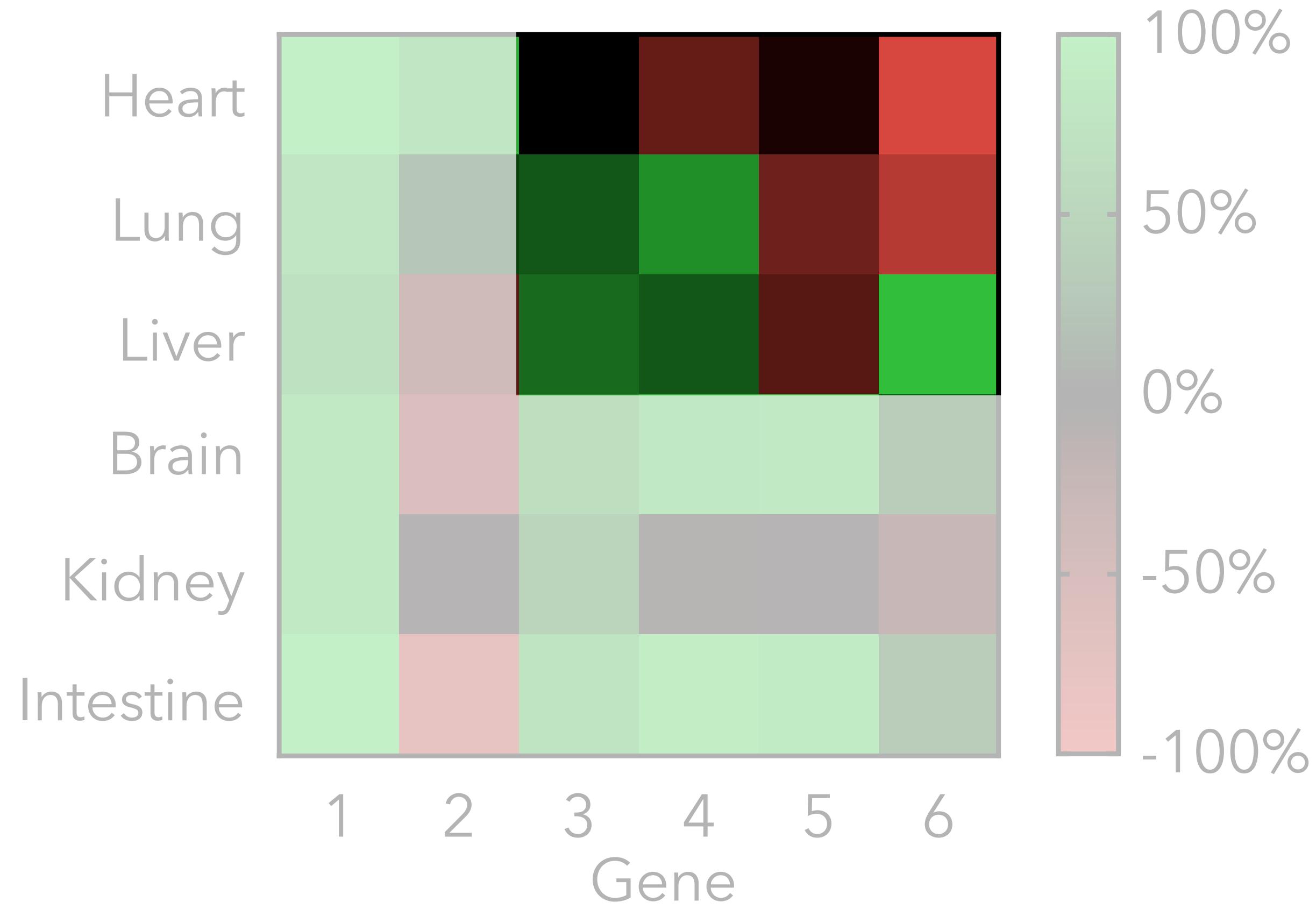
Rainbow obscures patterns



Visual design isn't making data pretty



Visual design isn't making data **pretty** it's making data **clear**



Color relationships imply data relationships

Qualitative

Distributed hues imply equal categories

Accent

One contrasting hue provides emphasis

Sequential

Continuous hue implies continuous variable

Divergent

Polar colors imply movement from a neutral center

Color relationships imply data relationships

Qualitative

Distributed hues imply equal categories

Accent

One contrasting hue provides emphasis

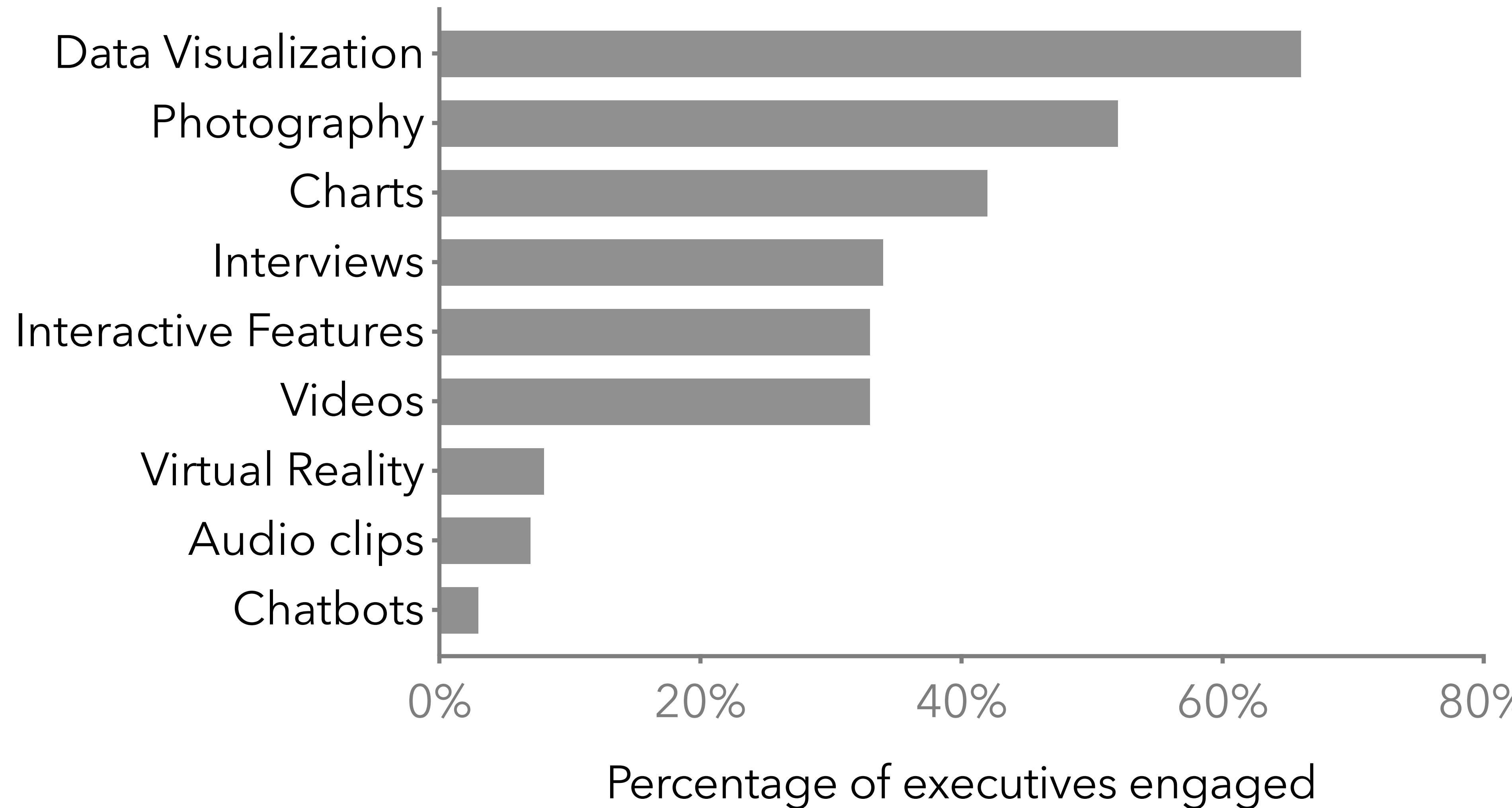
Sequential

Continuous hue implies continuous variable

Divergent

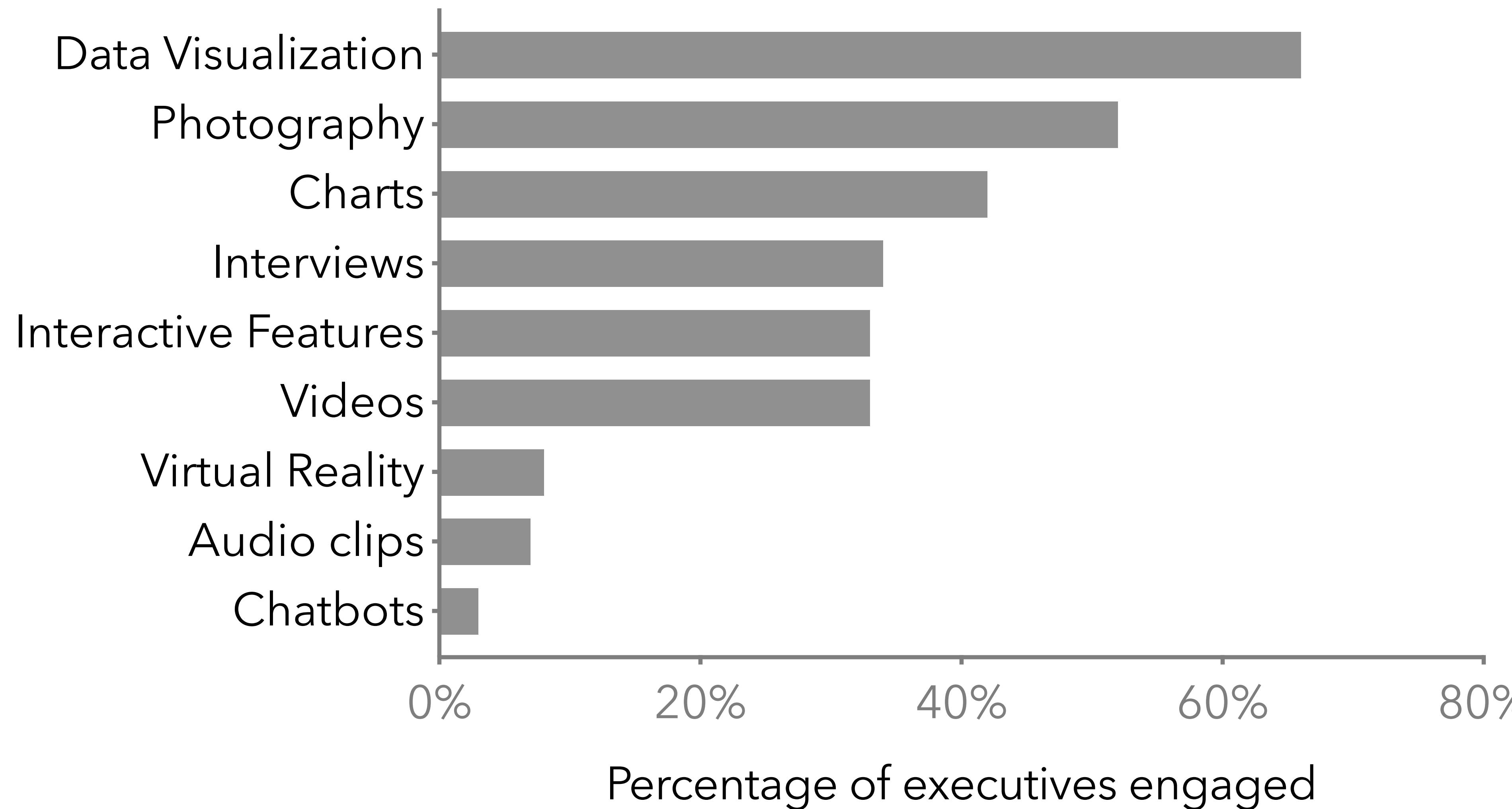
Polar colors imply movement from a neutral center

What's a conclusion you could draw from these data?



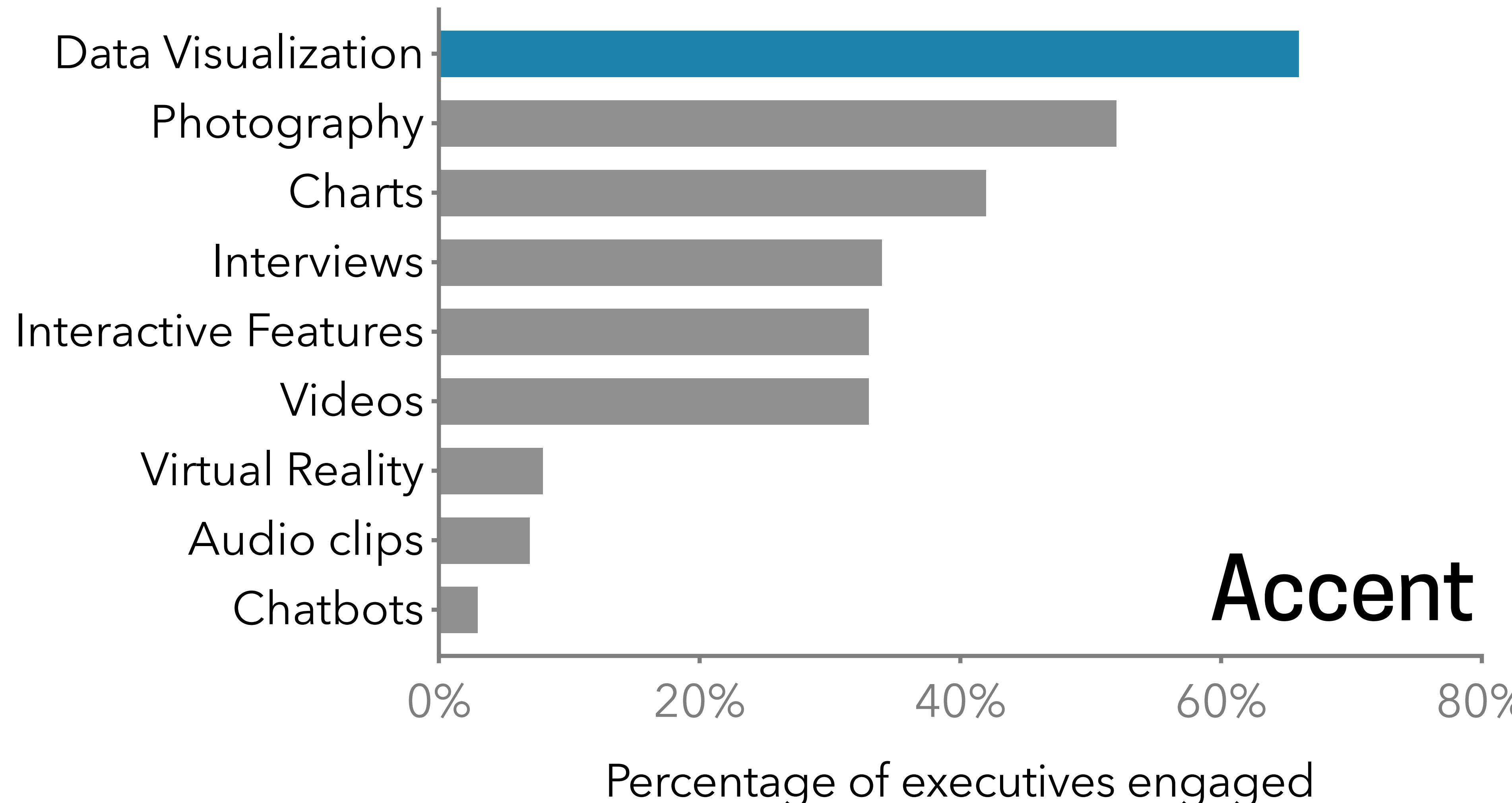
Quartz Global Executives
Study (GES, 2018)

Data visualization is the most engaging format for executives



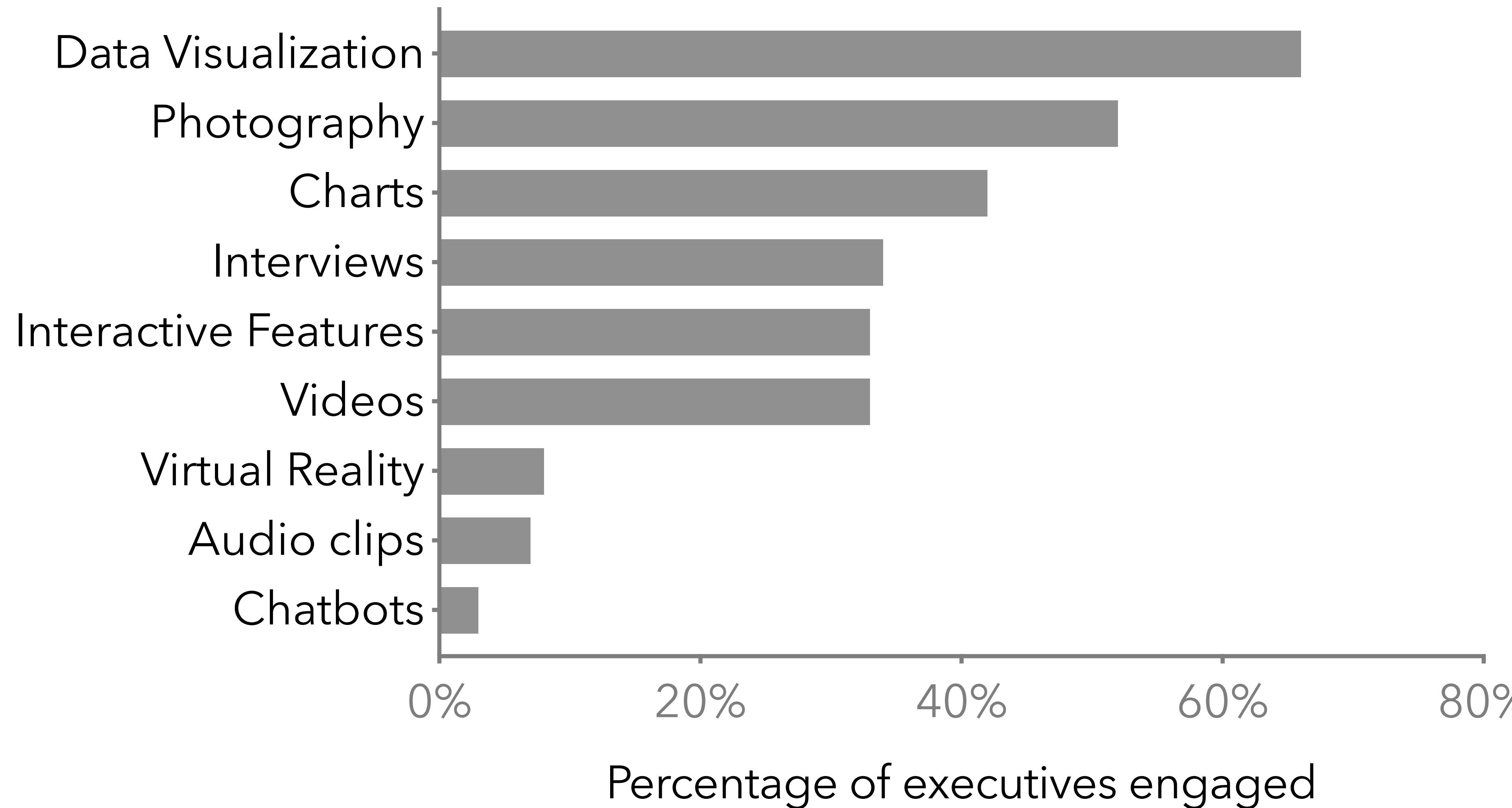
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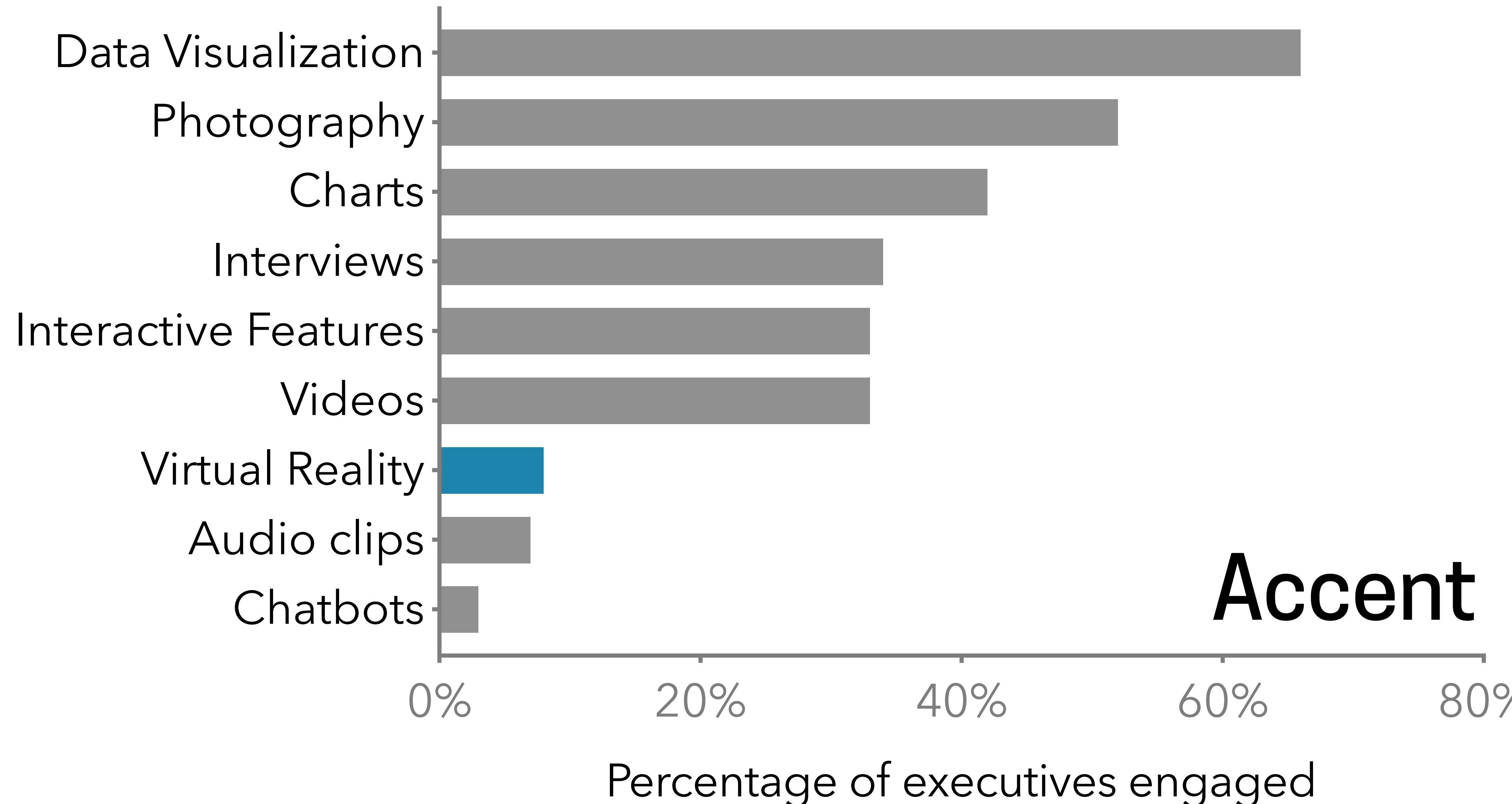
Quartz Global Executives
Study (GES, 2018)

Virtual reality has a long way to go



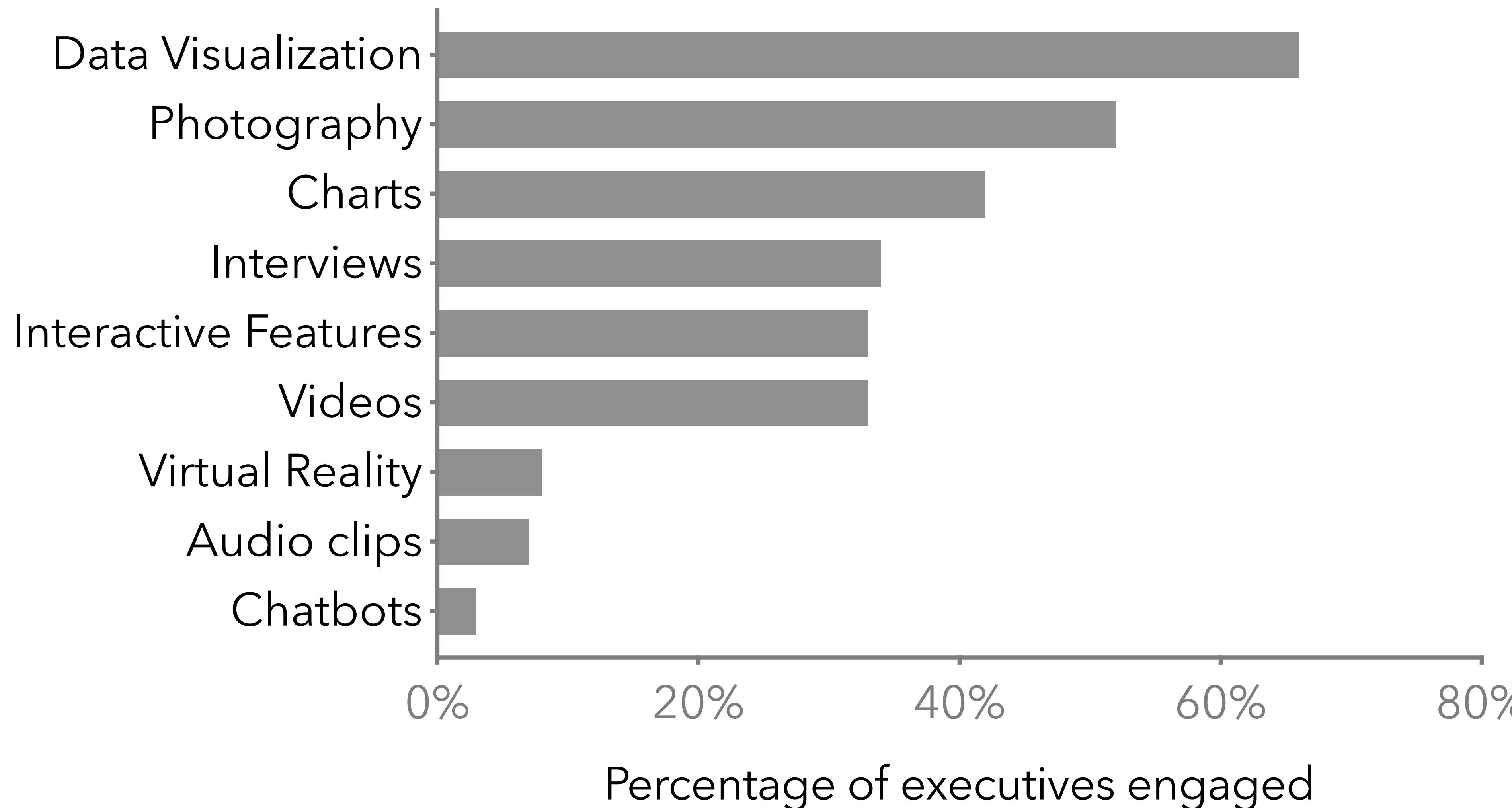
Quartz Global Executives
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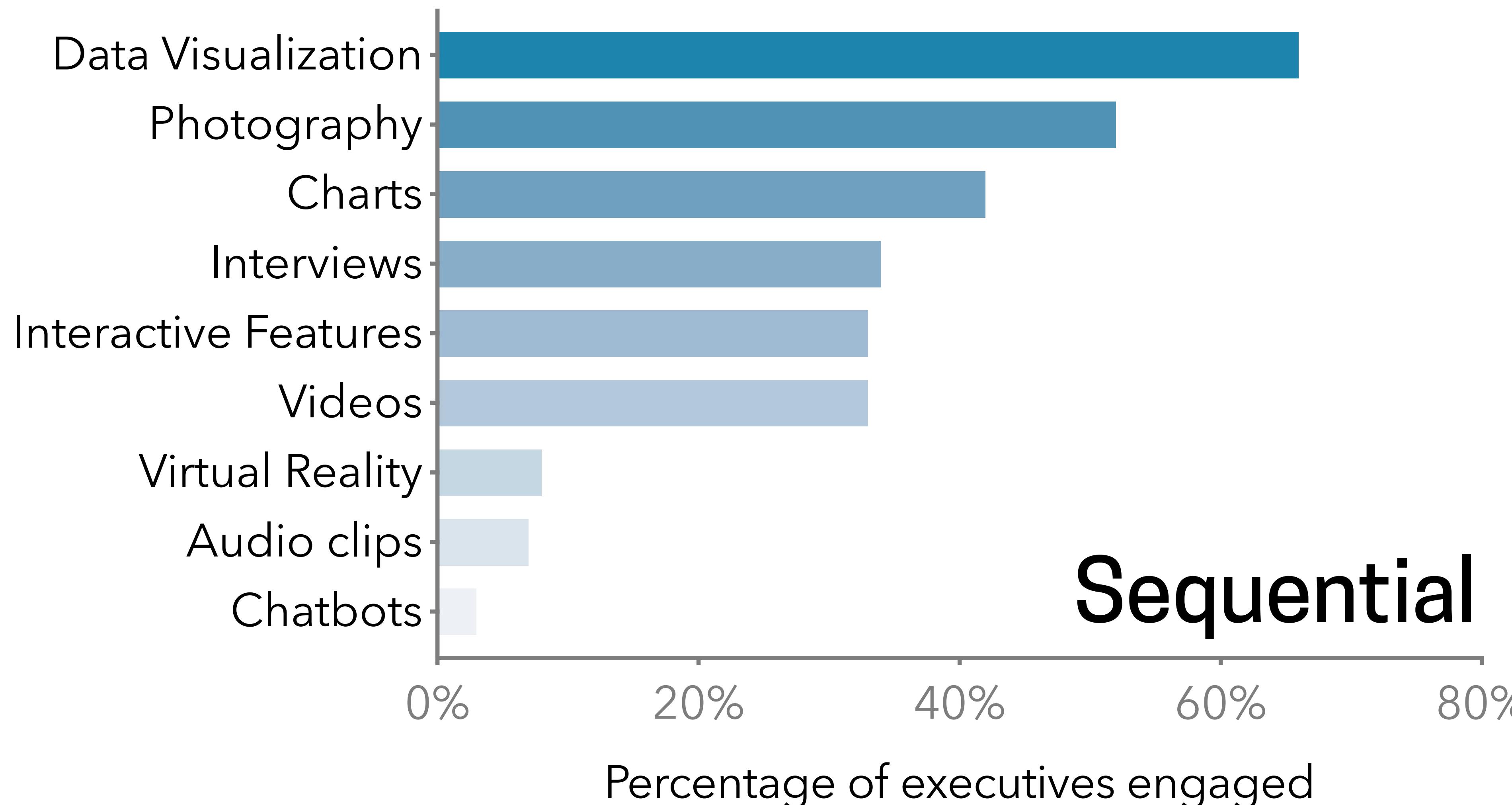


Quartz Global Executives
Study (GES, 2018)

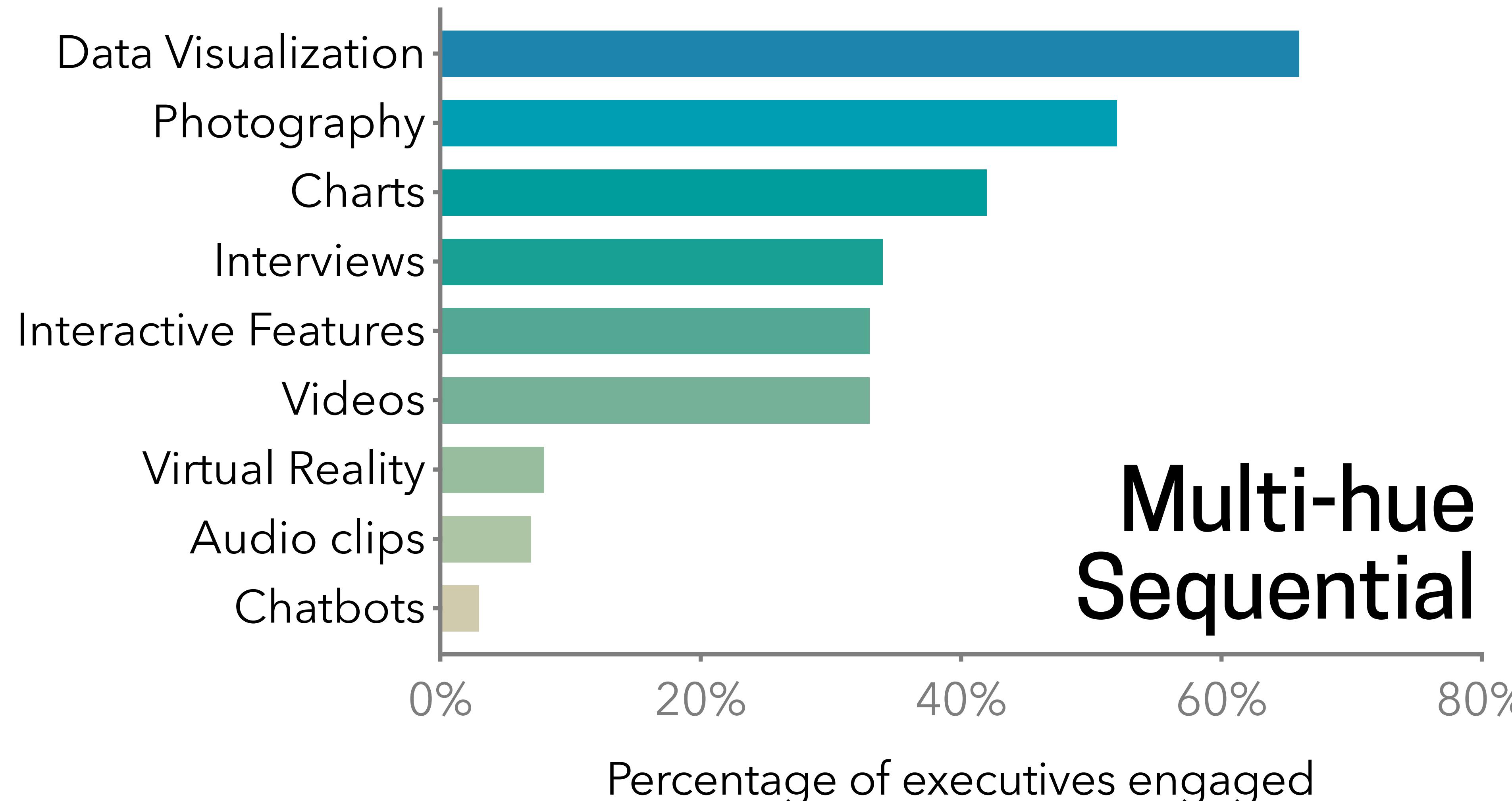
The format of content shows a wide range of engagement



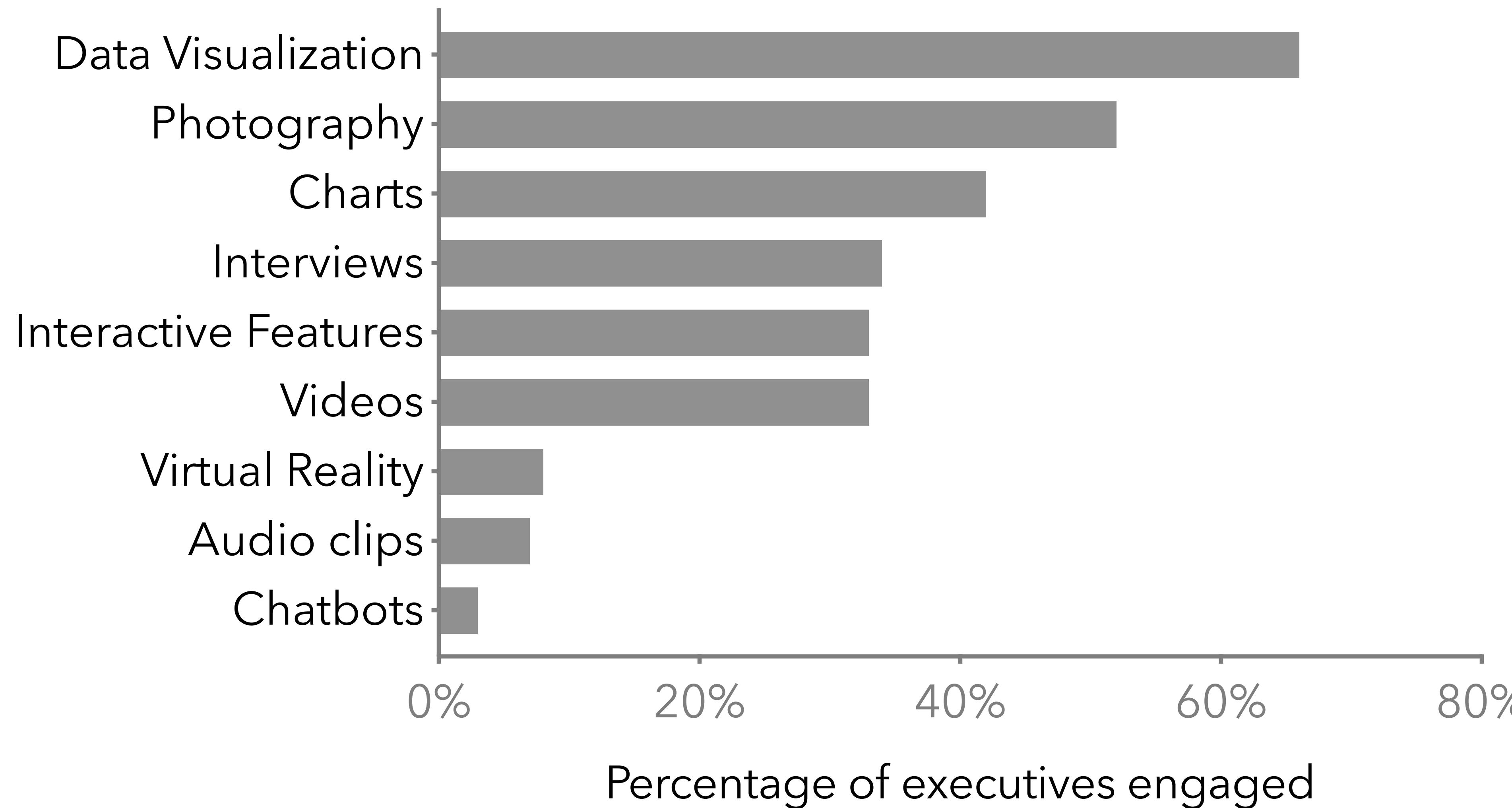
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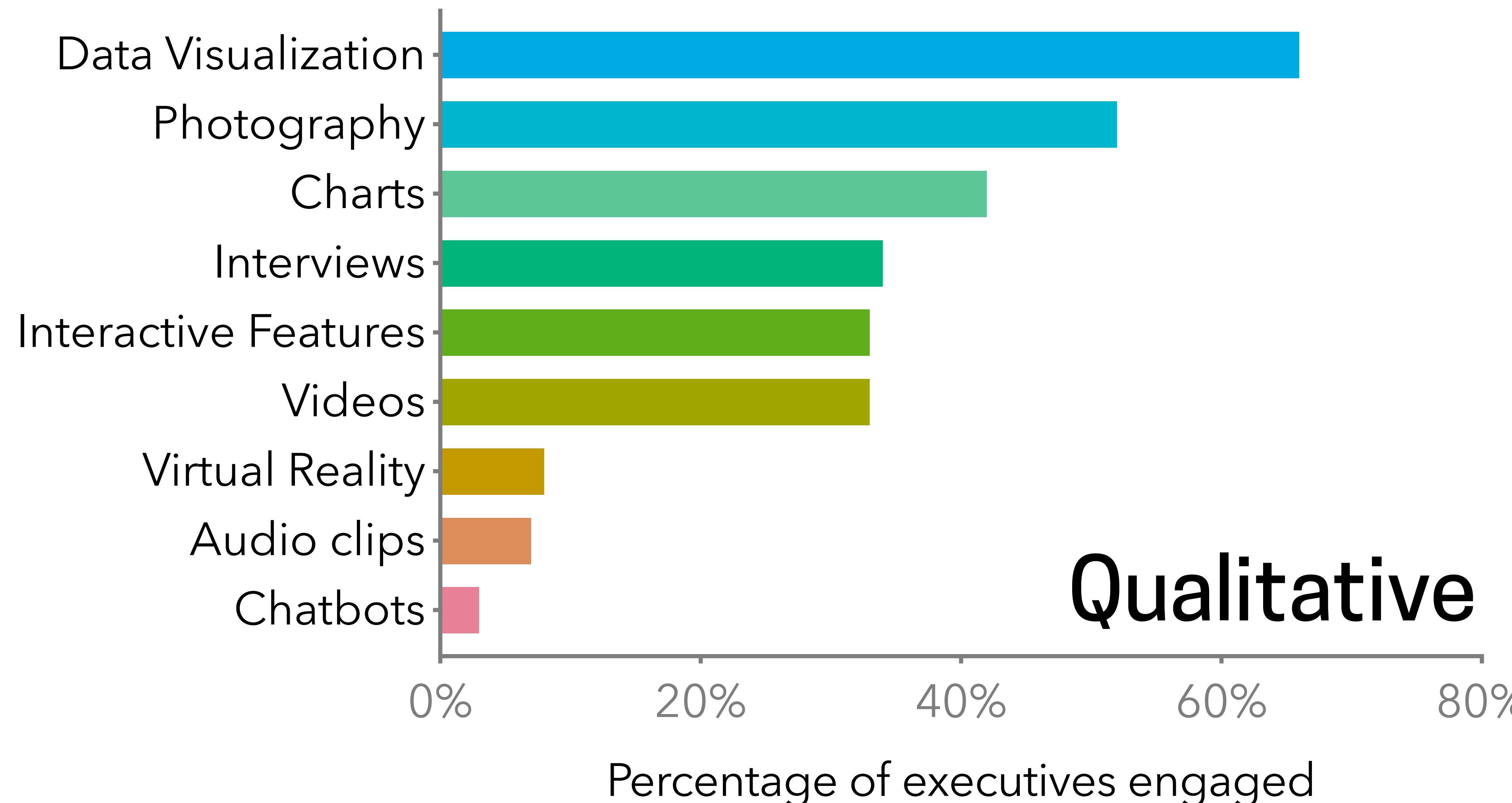
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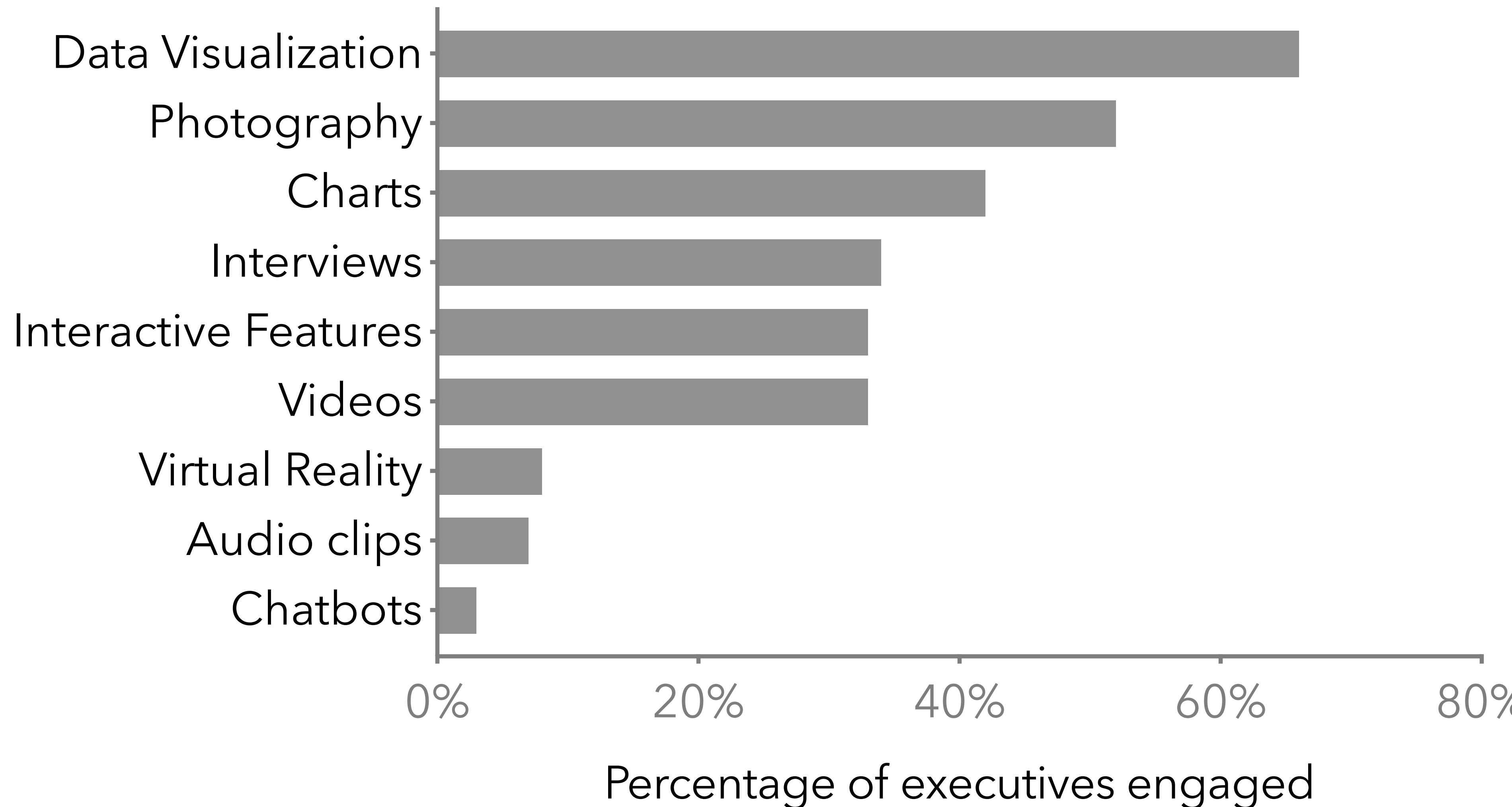
There are many ways to engage with CEOs



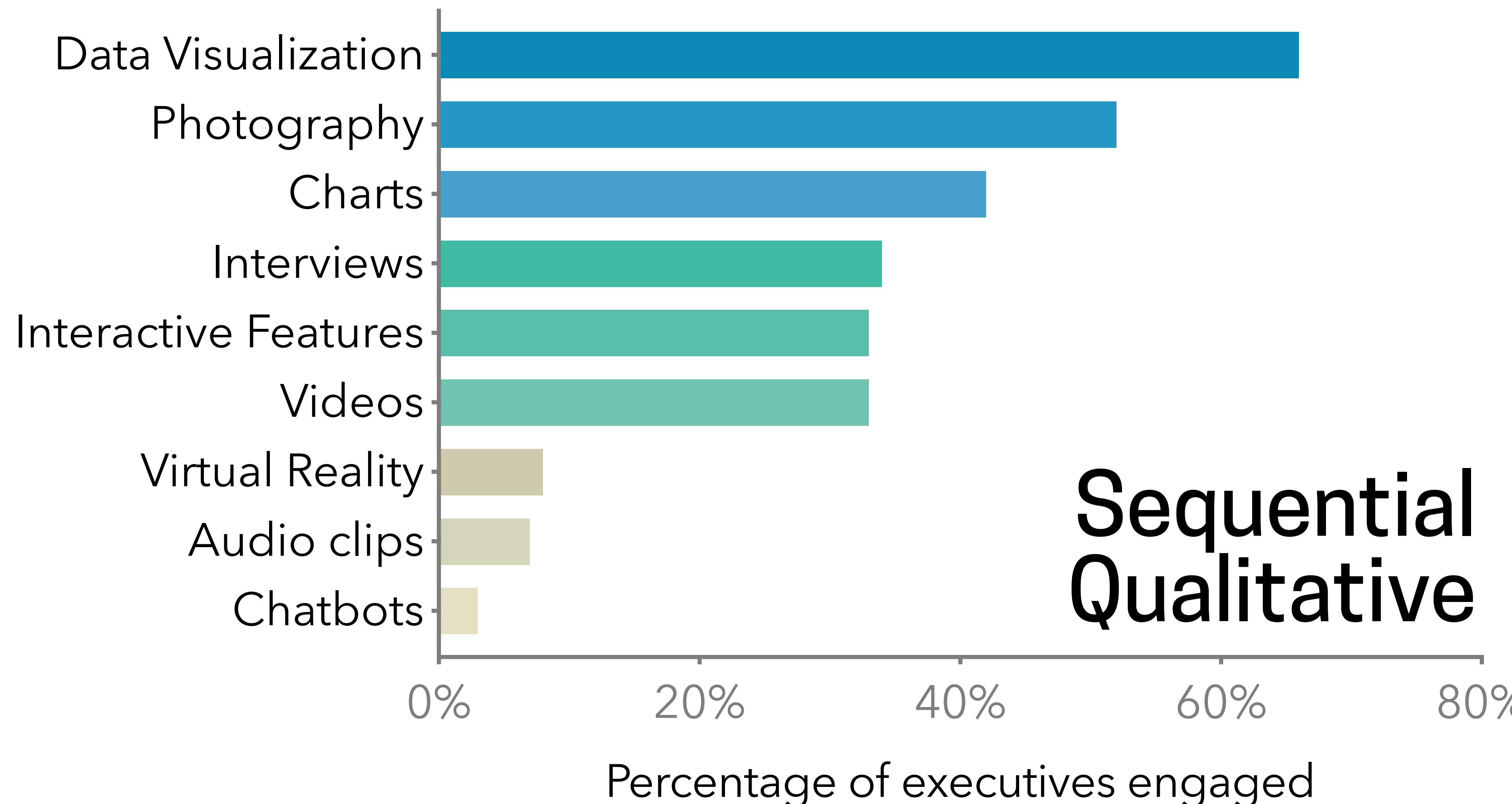
There are many ways to engage with CEOs



The format of content shows three tiers of efficacy



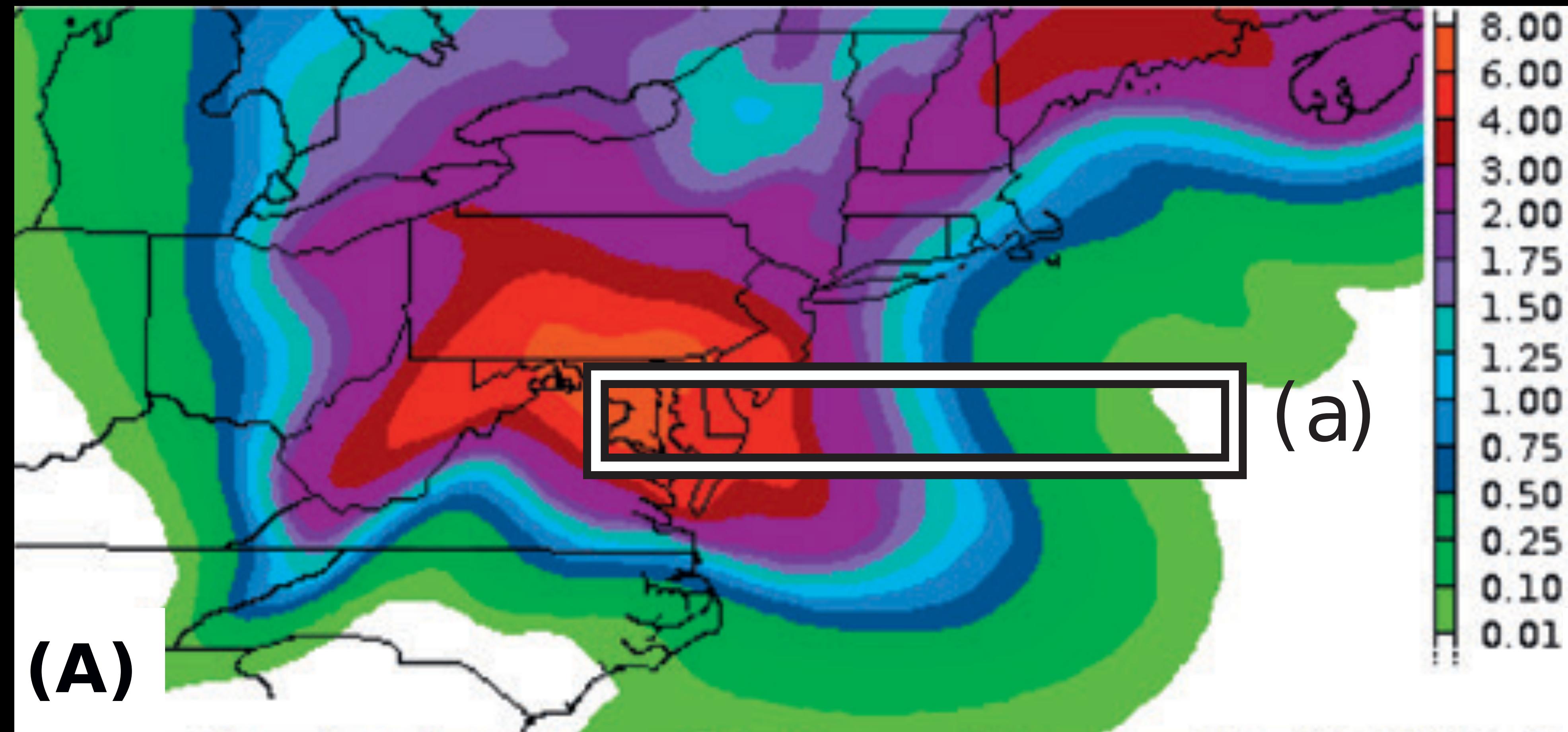
The format of content shows three tiers of efficacy



What does color imply about the data?

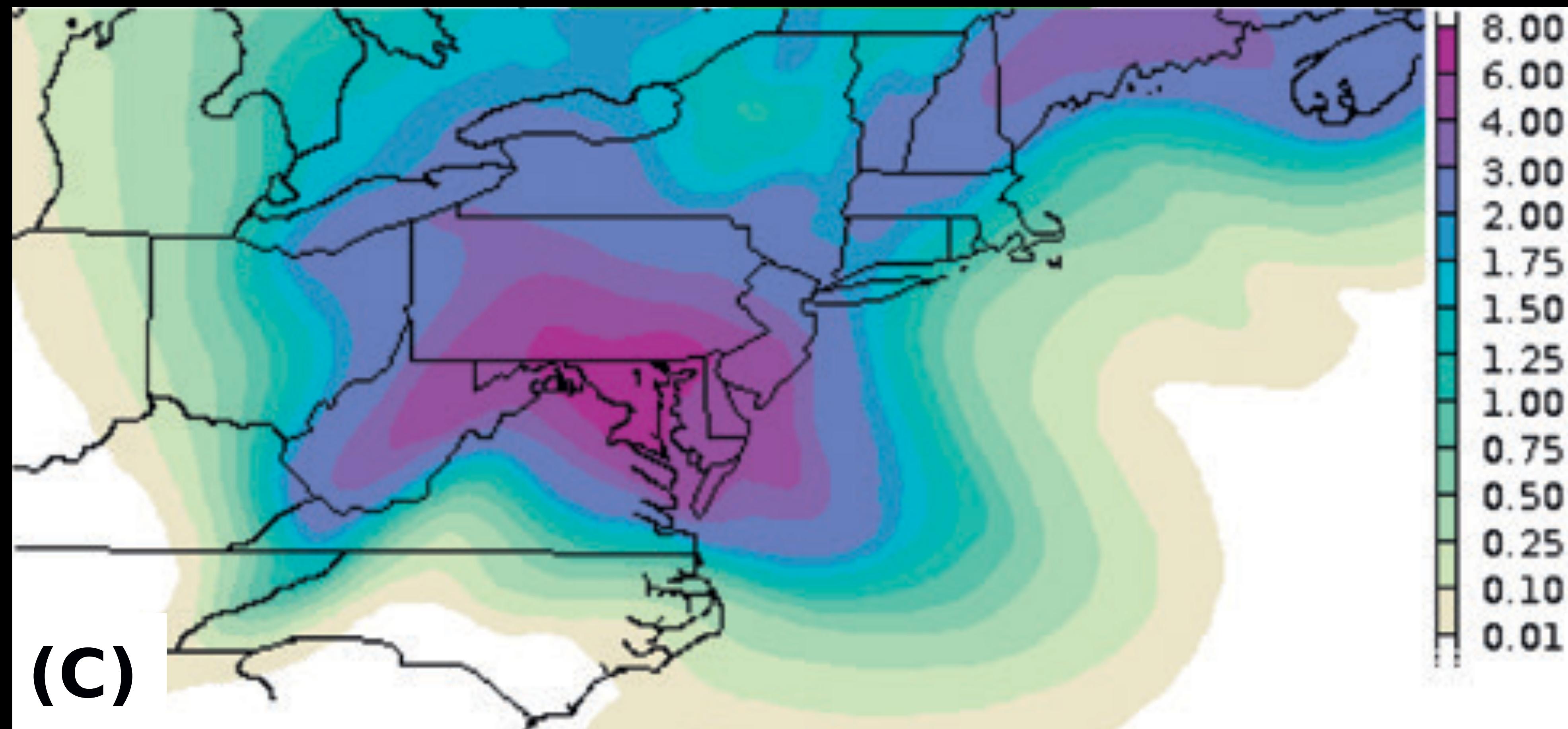
Precipitation in hurricane Sandy

Qualitative?



What does color imply about the data?

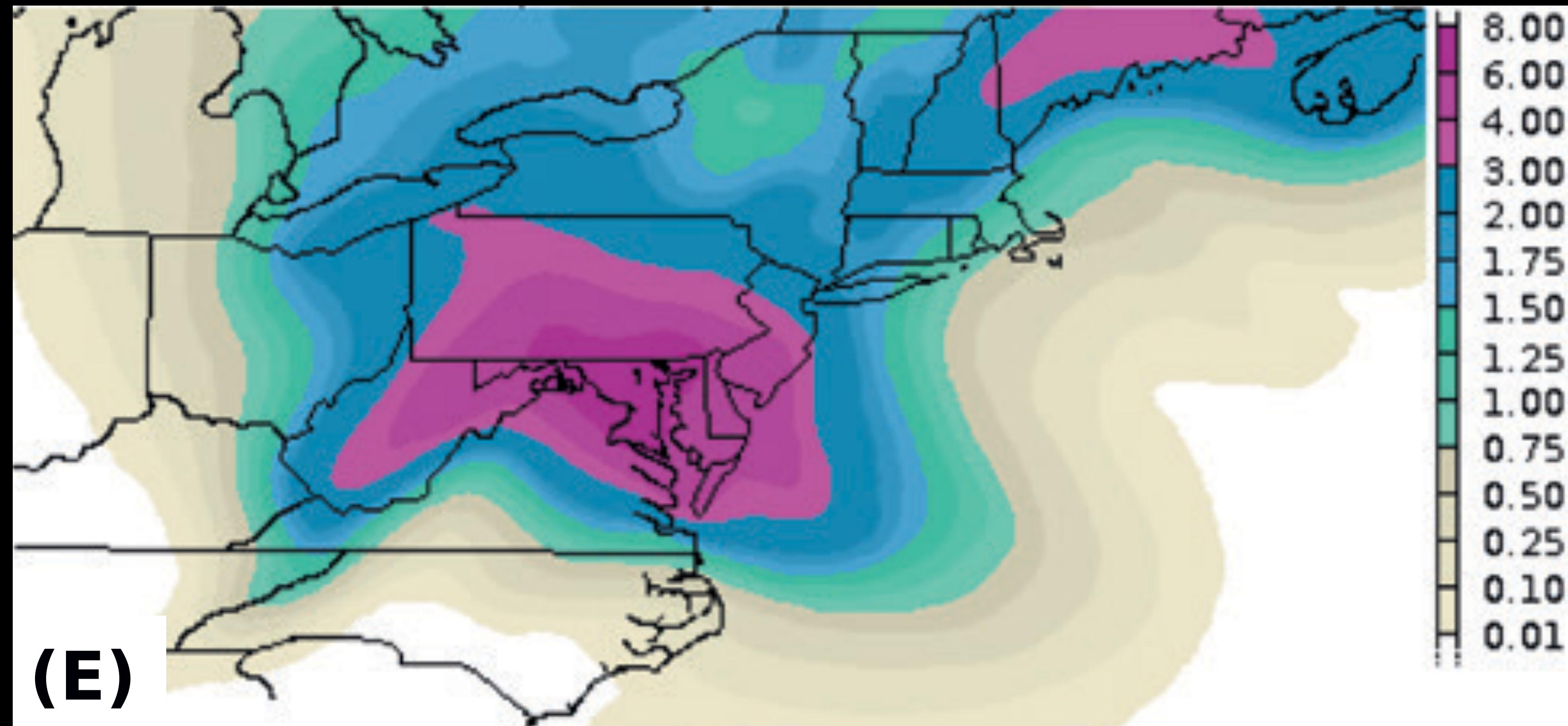
Precipitation in hurricane Sandy



What does color imply about the data?

Precipitation in hurricane Sandy

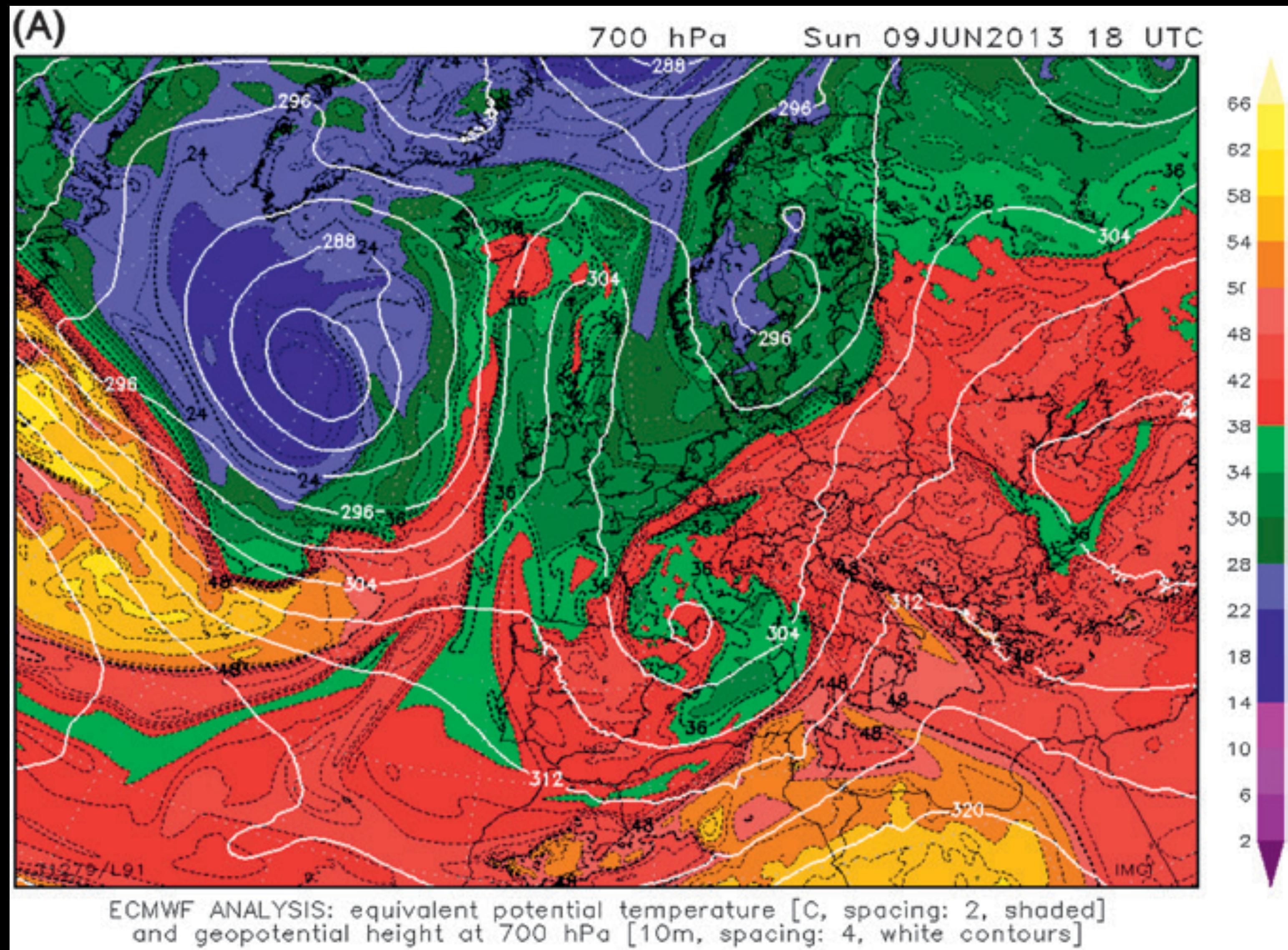
Sequential
Qualitative



What does color imply about the data?

Temperature

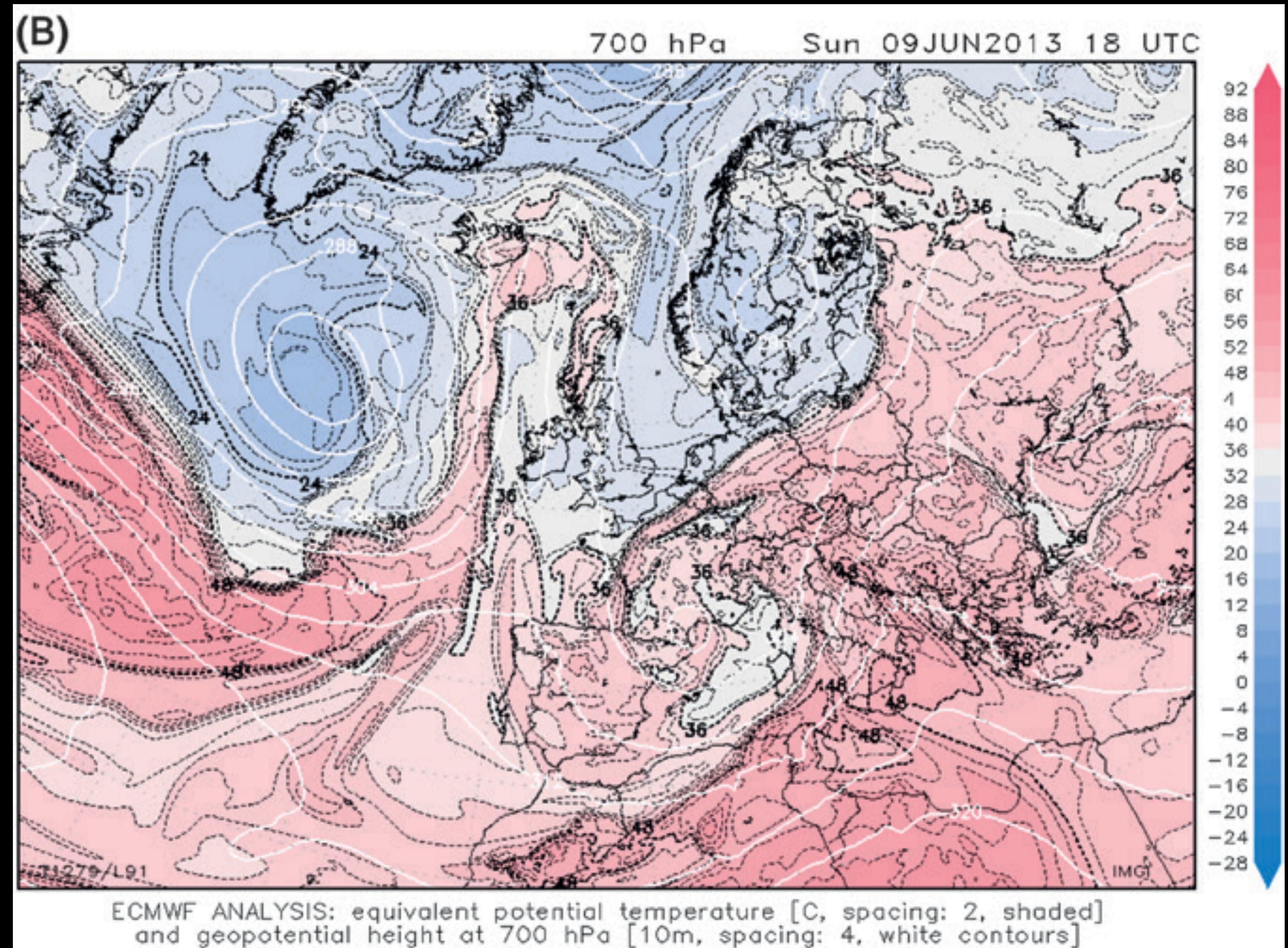
Qualitative



What does color imply about the data?

Temperature above
and below freezing

Divergent



3 tools to align visual emphasis

1. Show hierarchy

Background
Data
Emphasis

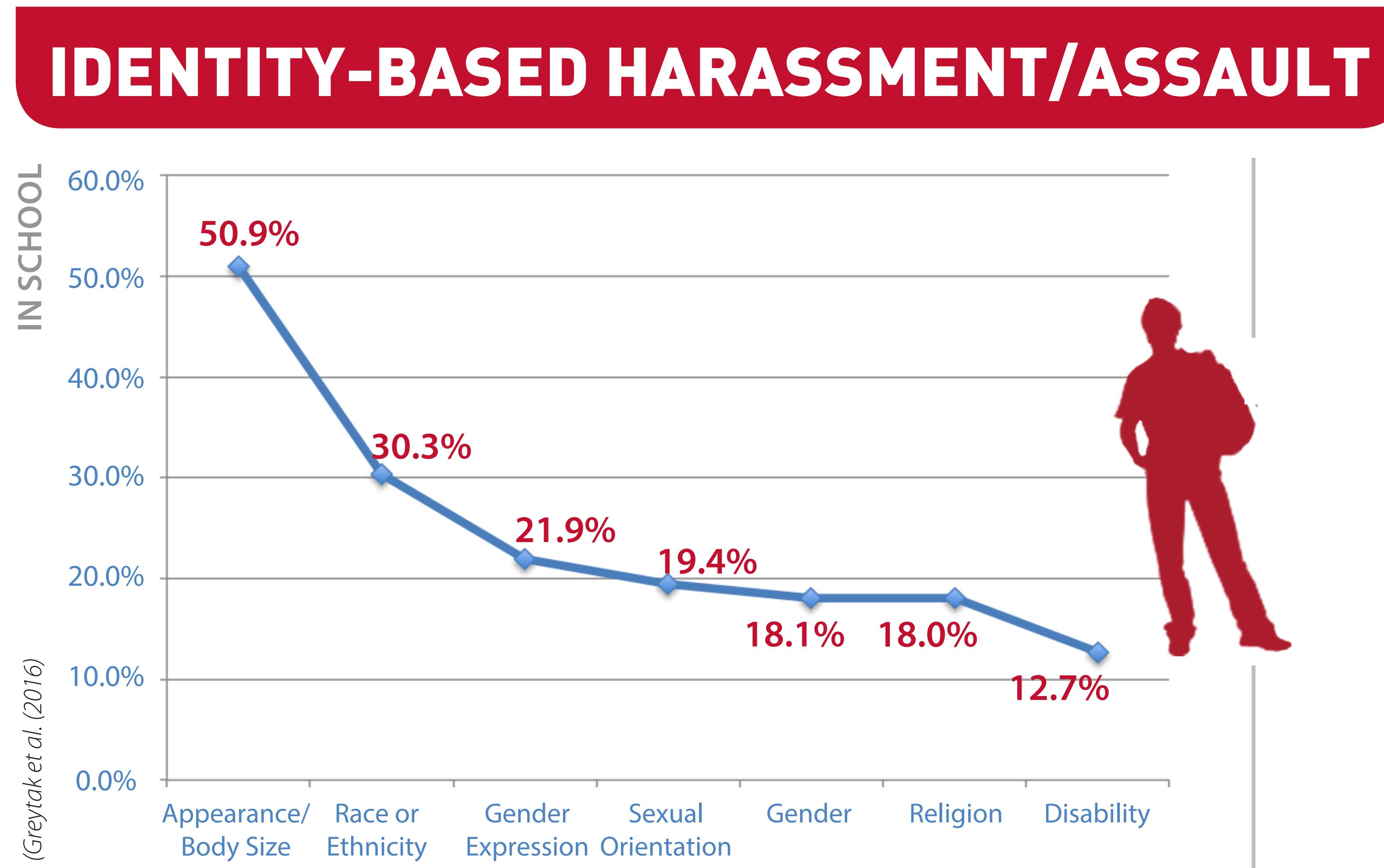
Qualitative
Accent
Sequential
Divergent

3 tools to align visual emphasis

1. Show hierarchy

2. Align structure to argument

What's wrong with this graph?



This is a conflict of structure and argument

Do Errors Matter?

- Yes – Imputation, Haplotype reconstruction
- Maybe – GWAS for low frequency SNPs
- No – GS, genetic distance

Whether errors matter depends on the application

- Yes – Imputation, Haplotype reconstruction
- Maybe – GWAS for low frequency SNPs
- No – GS, genetic distance

Whether errors matter depends on the application

Errors **do** matter

Errors **may** matter

Errors **don't** matter

- Imputation
- Haplotype reconstruction

- GWAS for low frequency SNPs

- GS
- Genetic distance

WHERE WE DONATE VS. DISEASES THAT KILL US

Heart Disease Jump Rope for Heart
Diabetes Step Out: Walk to Stop Diabetes
Motor Neuron Disease (including ALS) ALS Ice Bucket Challenge

Suicide Out of Darkness Overnight Walk
HIV / AIDS Ride to End Aids
Chronic Obstructive Pulmonary Disease Fight for Air Climb

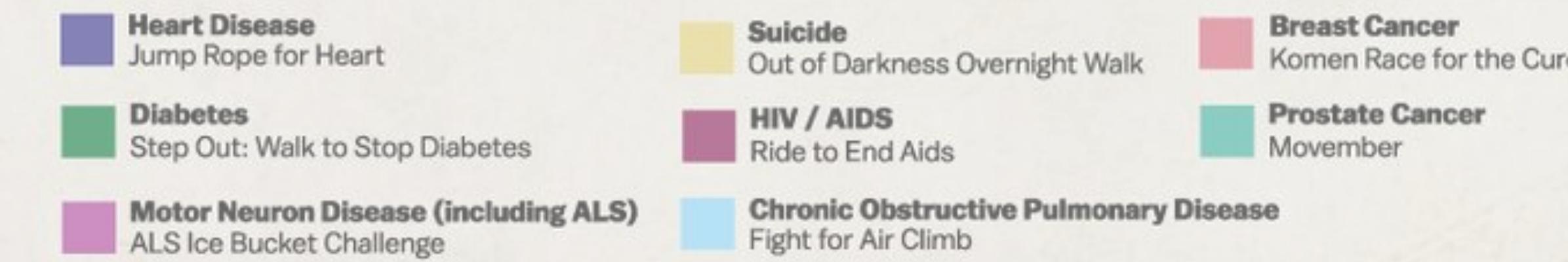
MONEY RAISED



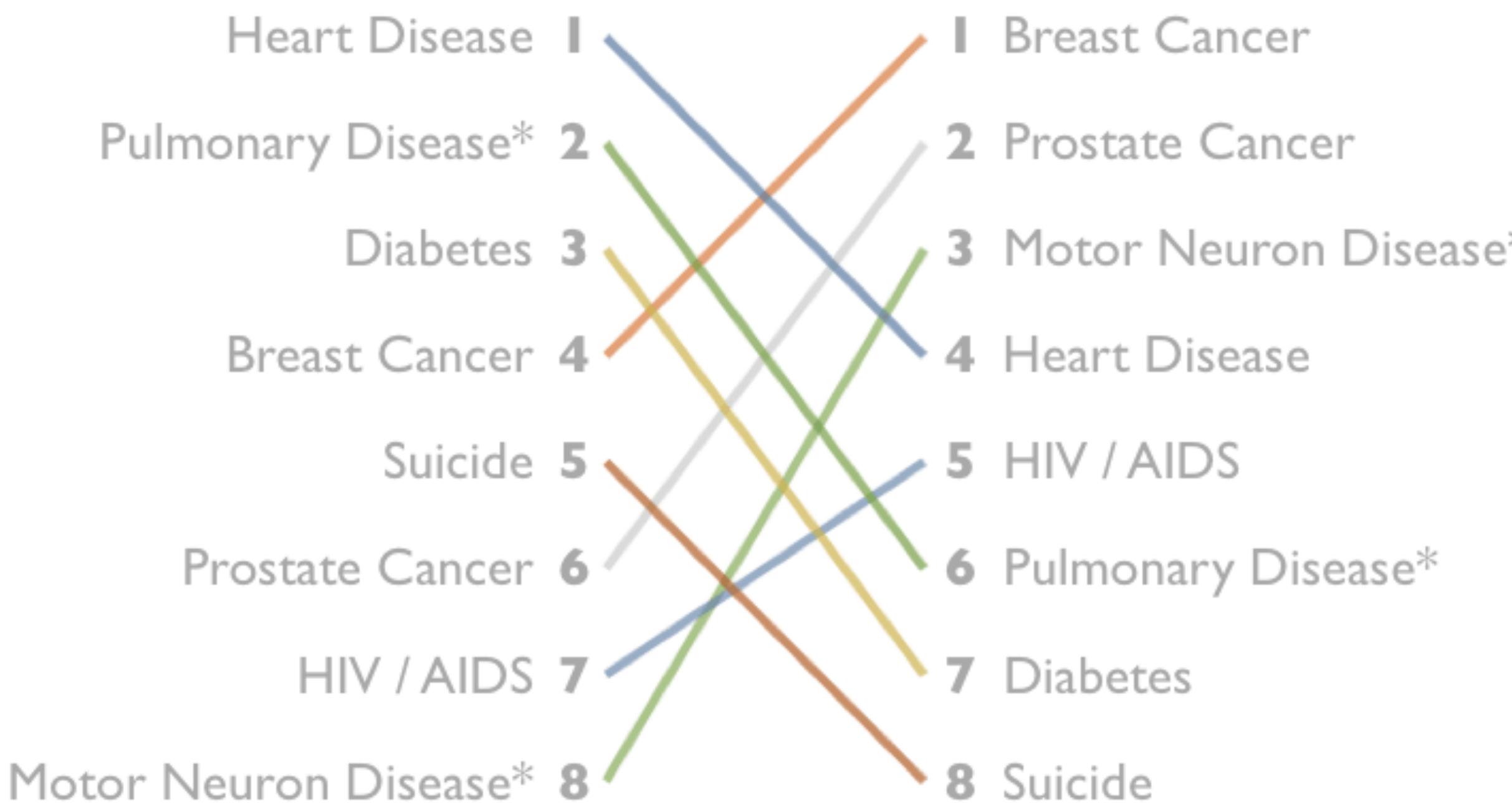
DEATHS (US)



WHERE WE DONATE VS. DISEASES THAT KILL US



Death Rank

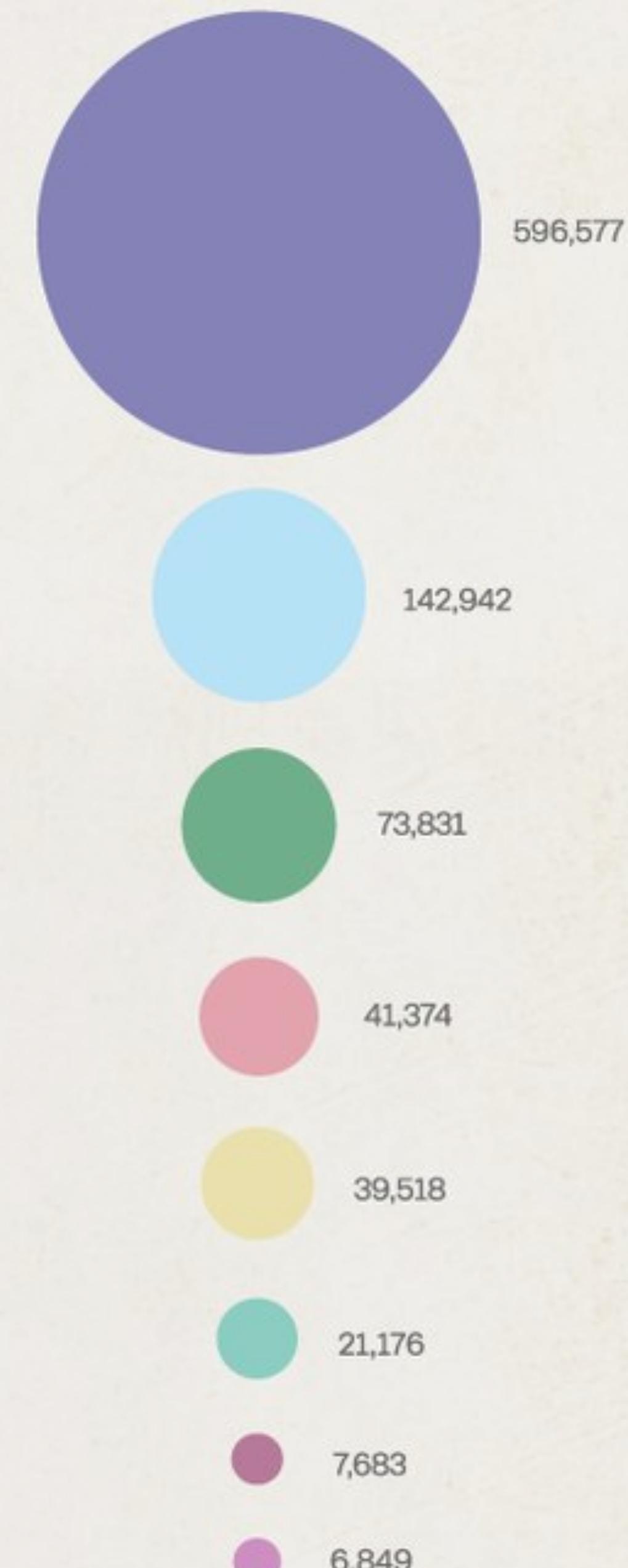


Donation Rank

MONEY RAISED



DEATHS (US)



Encyclopedia of visualizations



A project in beta by **ferd.io**

ALL FAMILY ▾ INPUT ▾ FUNCTION ▾ SHAPE ▾ Q i

Comparison

Concept visualisation

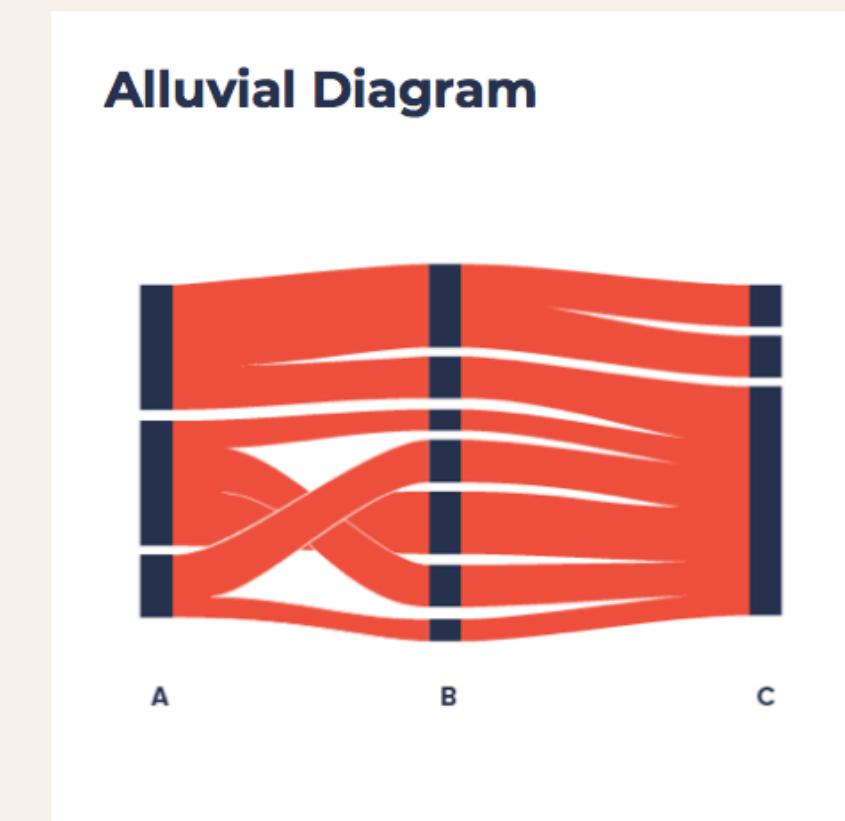
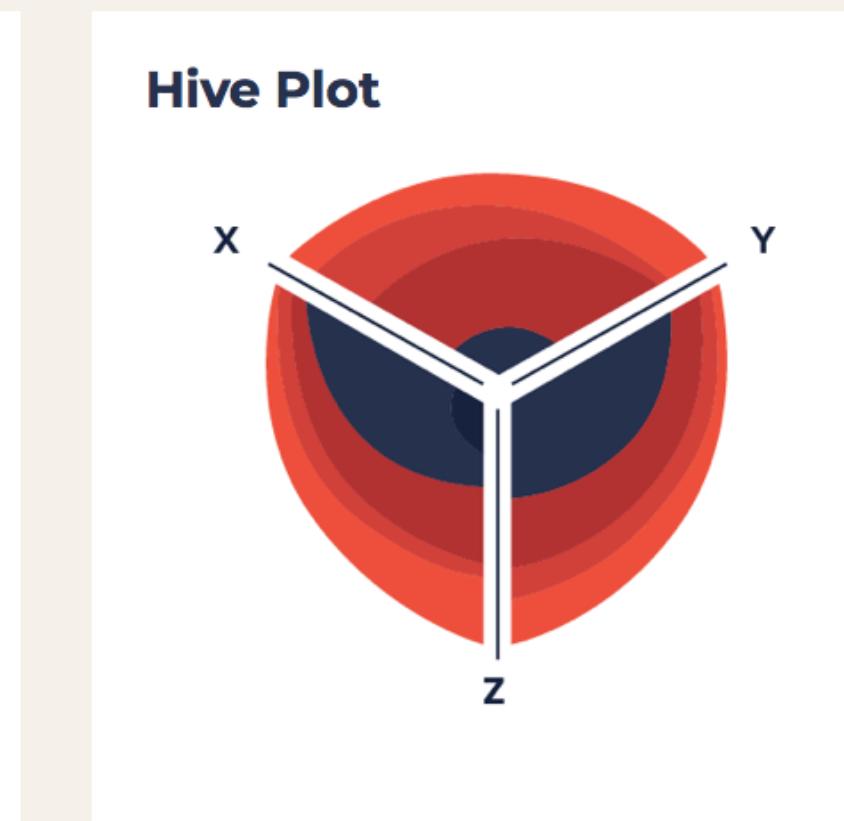
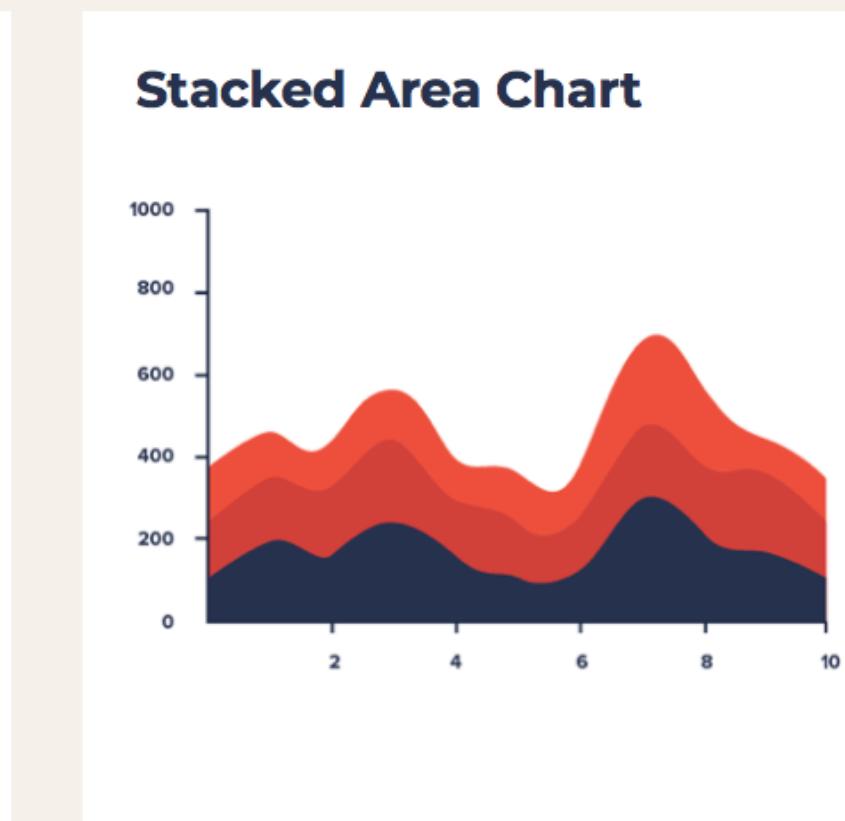
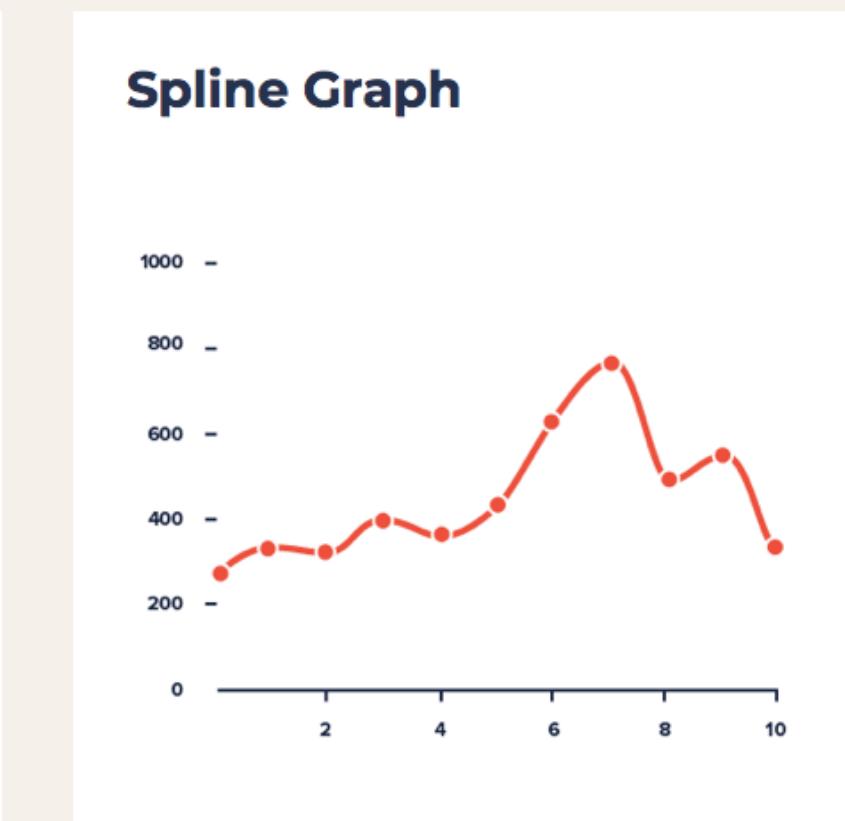
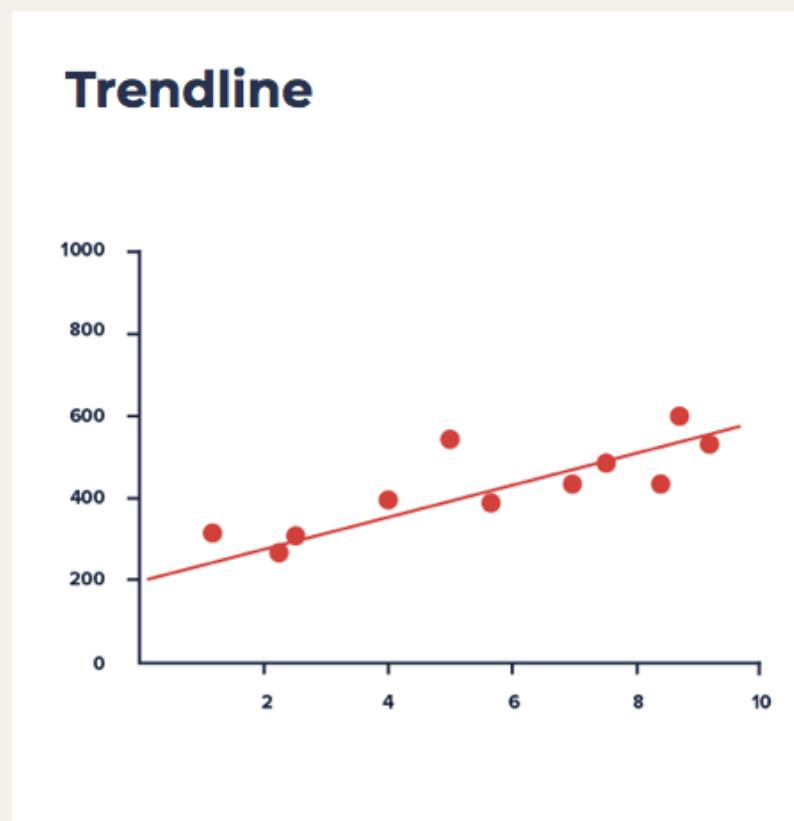
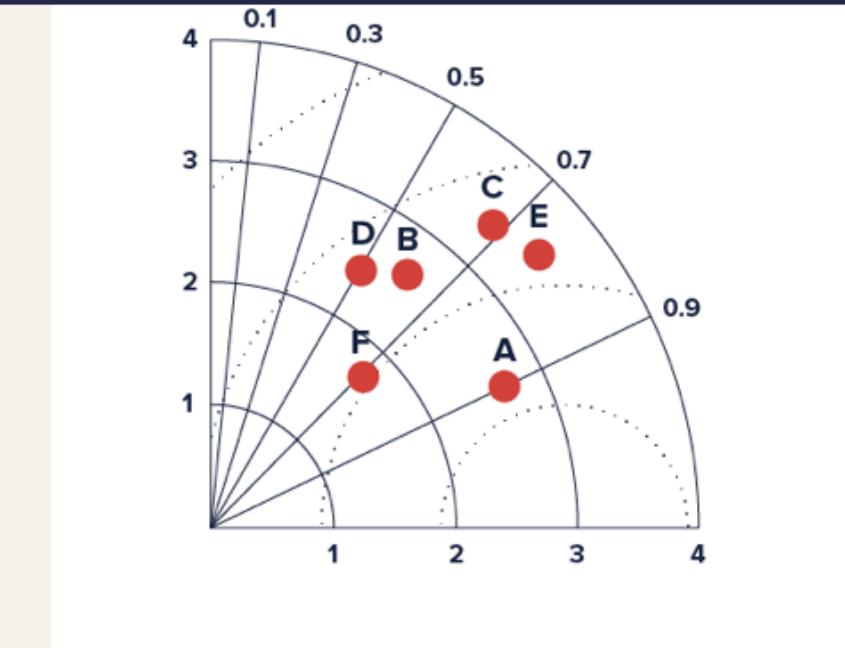
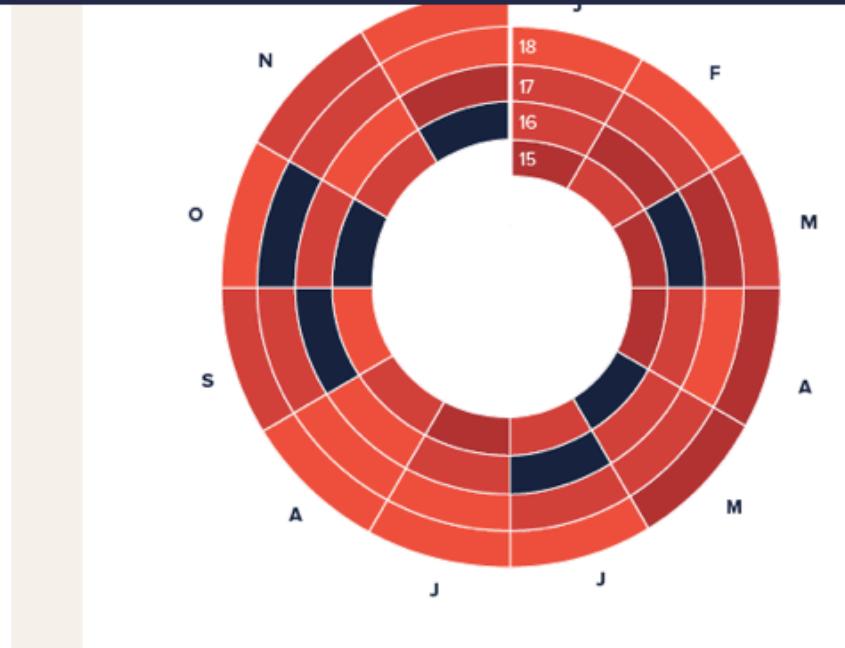
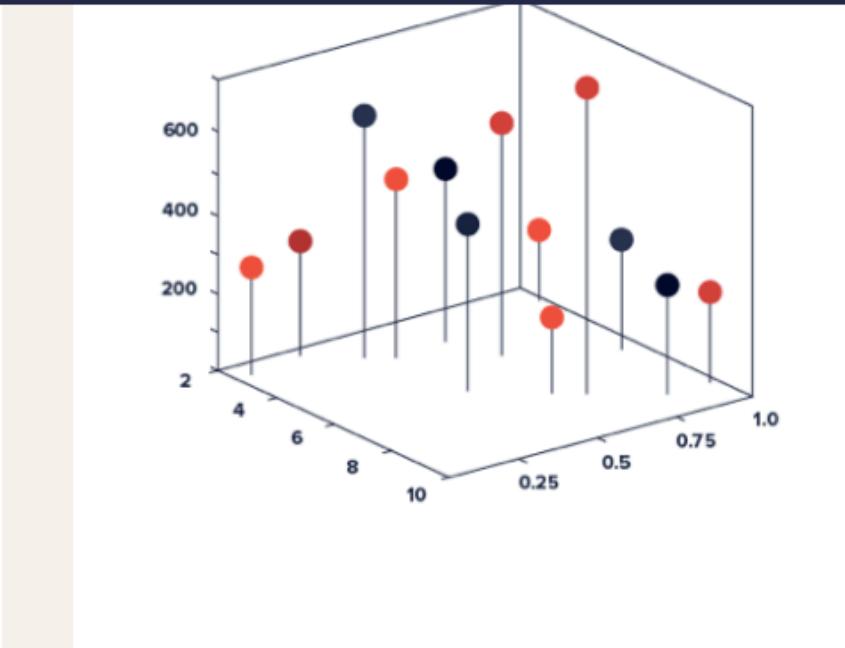
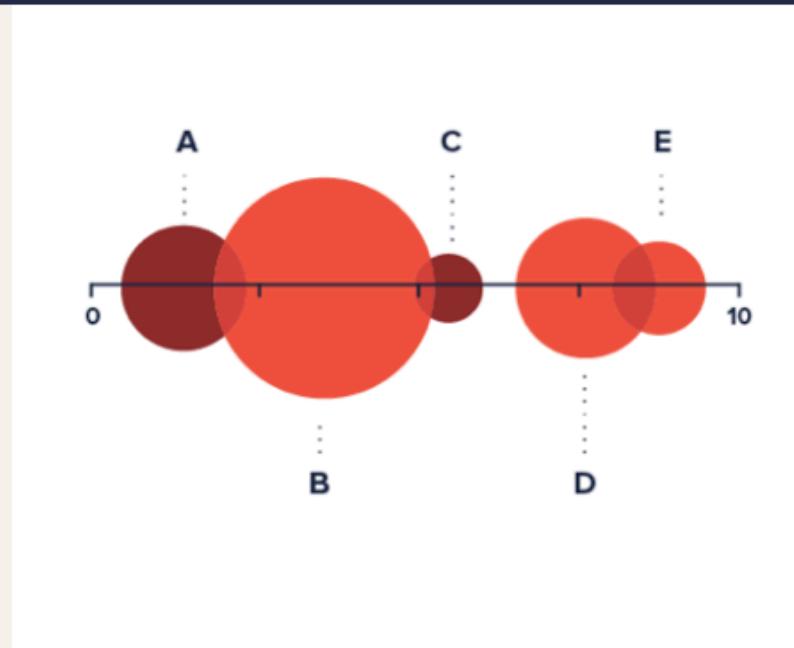
Correlation

Distribution

Geographical data

Part to whole

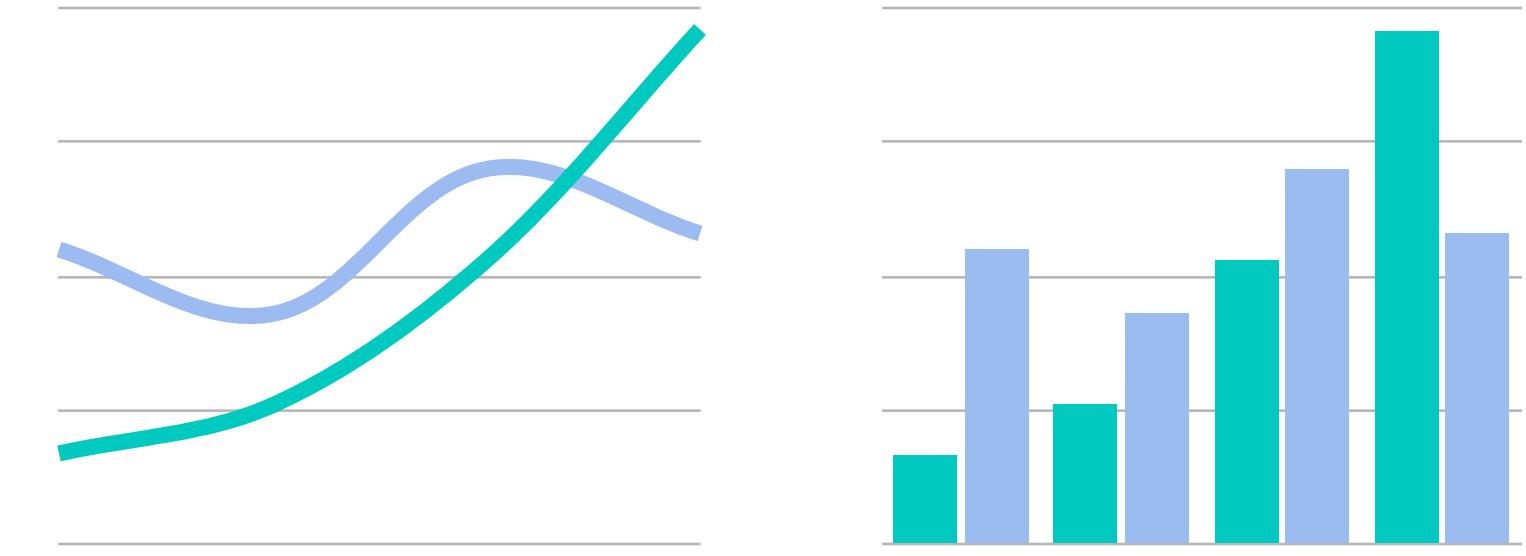
Trend over time



2. Align structure to argument

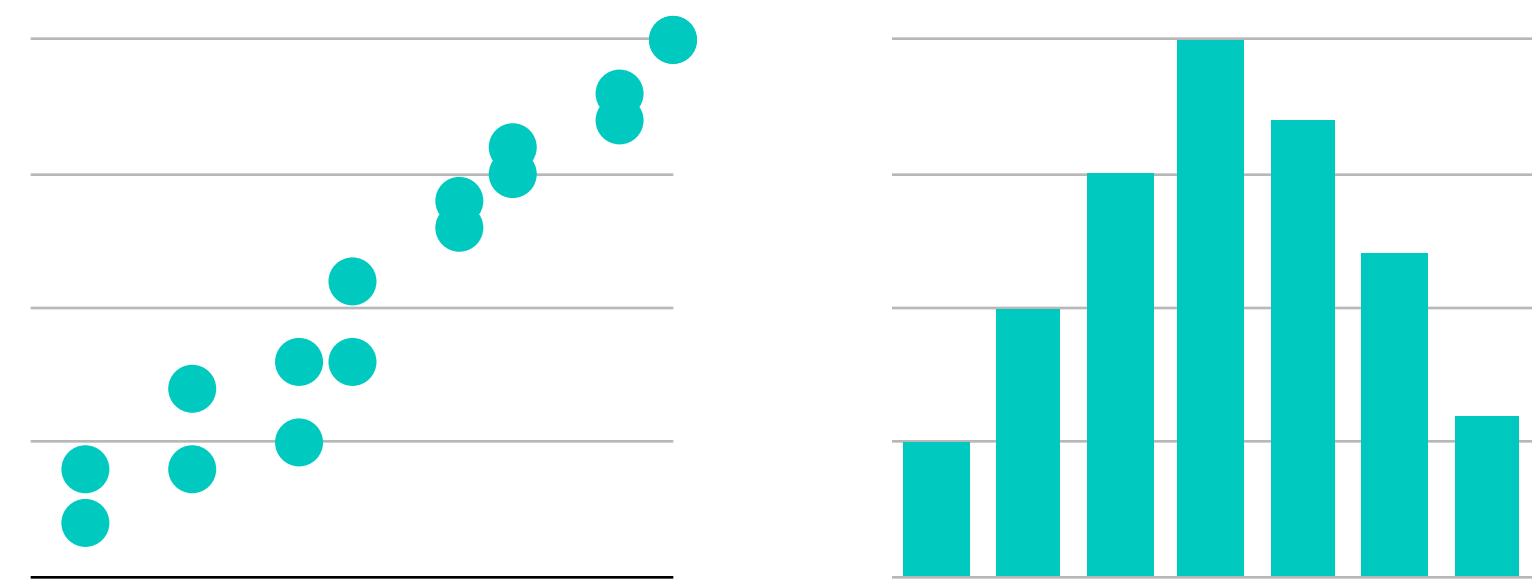
Comparison

Line, column



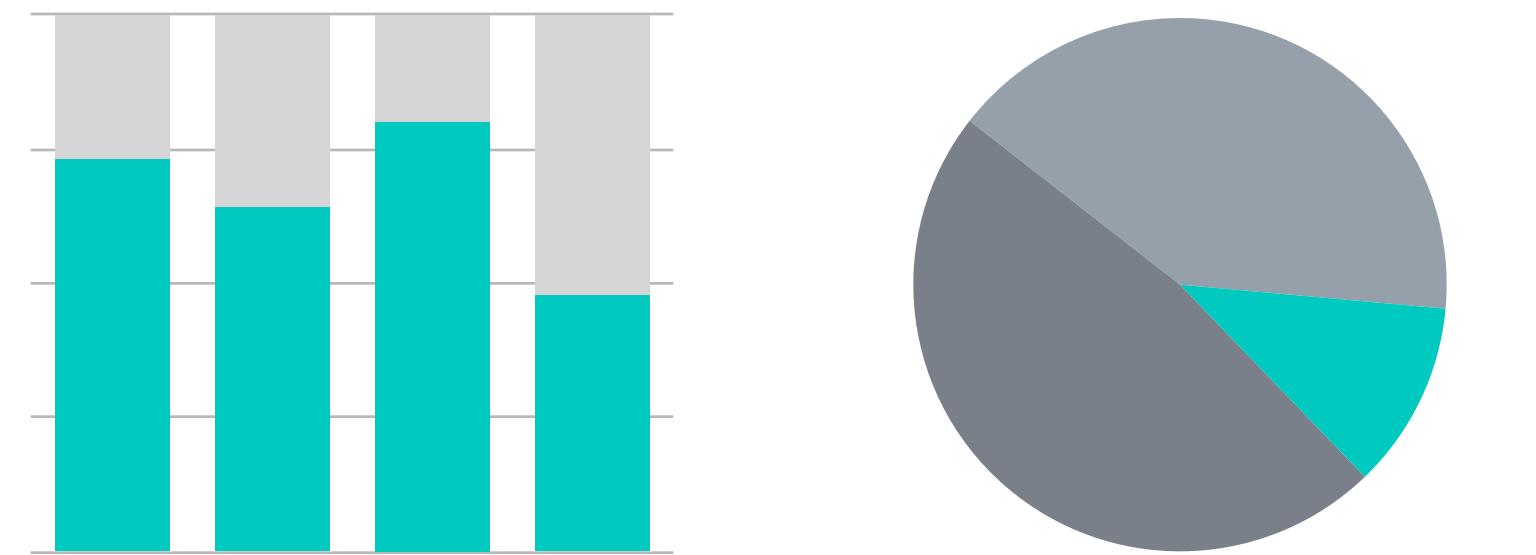
Distribution

Histograms, scatter



Composition

Stacked column, area, pie



3 tools to align visual emphasis

1. Show hierarchy
2. Align structure to argument
3. Make the key task easy

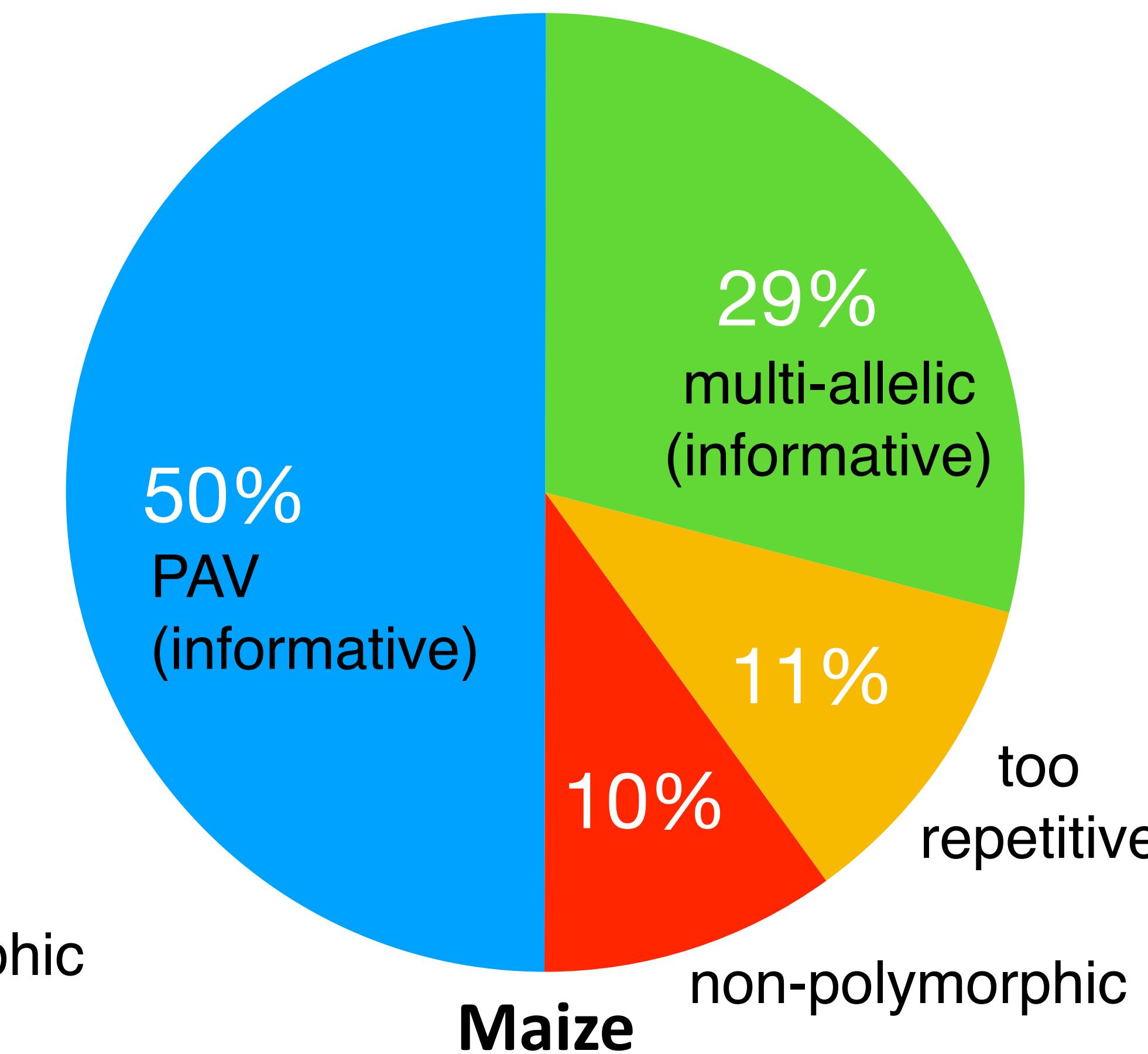
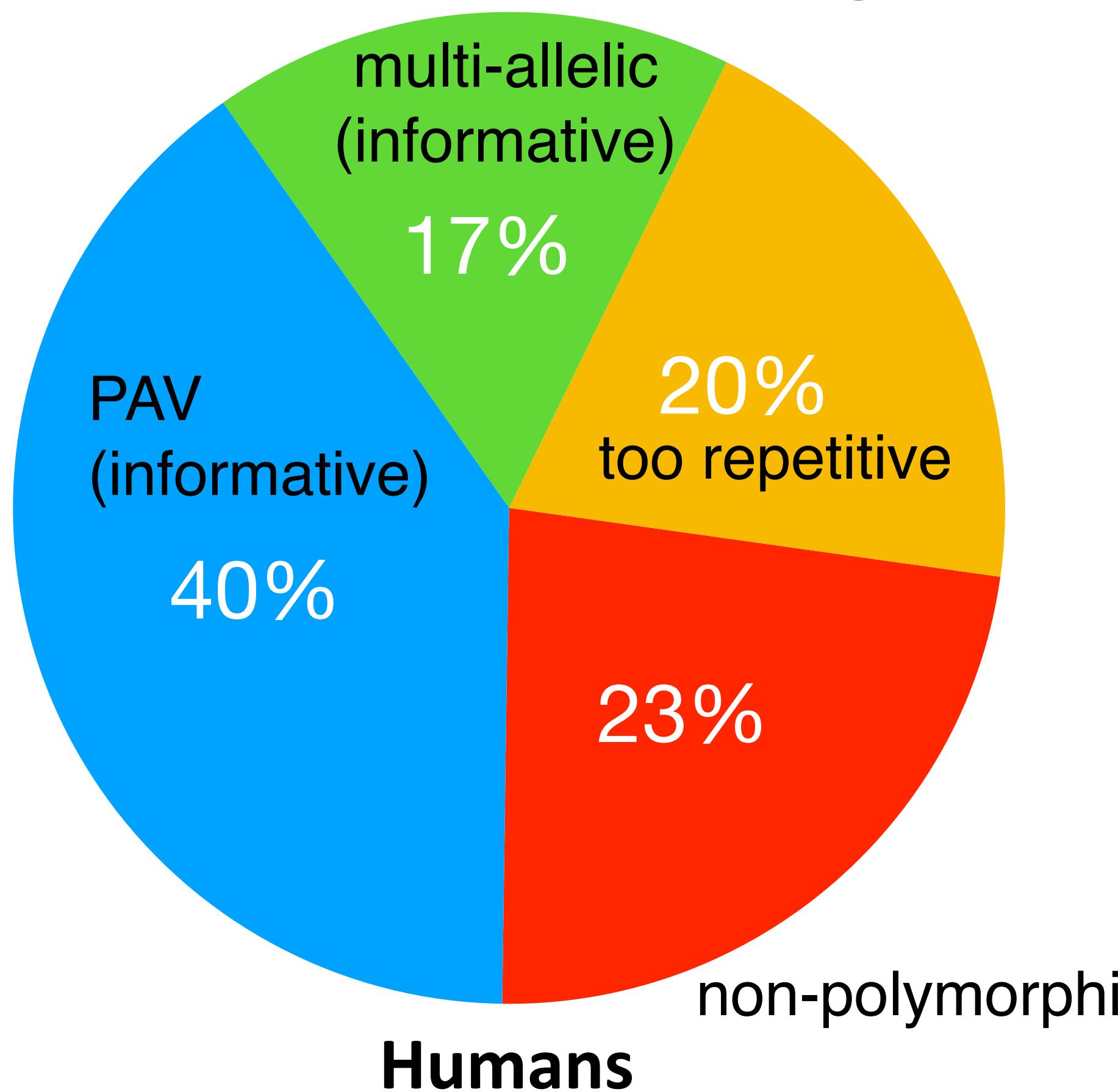
3. Make the key task easy

What is the key task required
to verify your assertion?

How might we make that task easier?

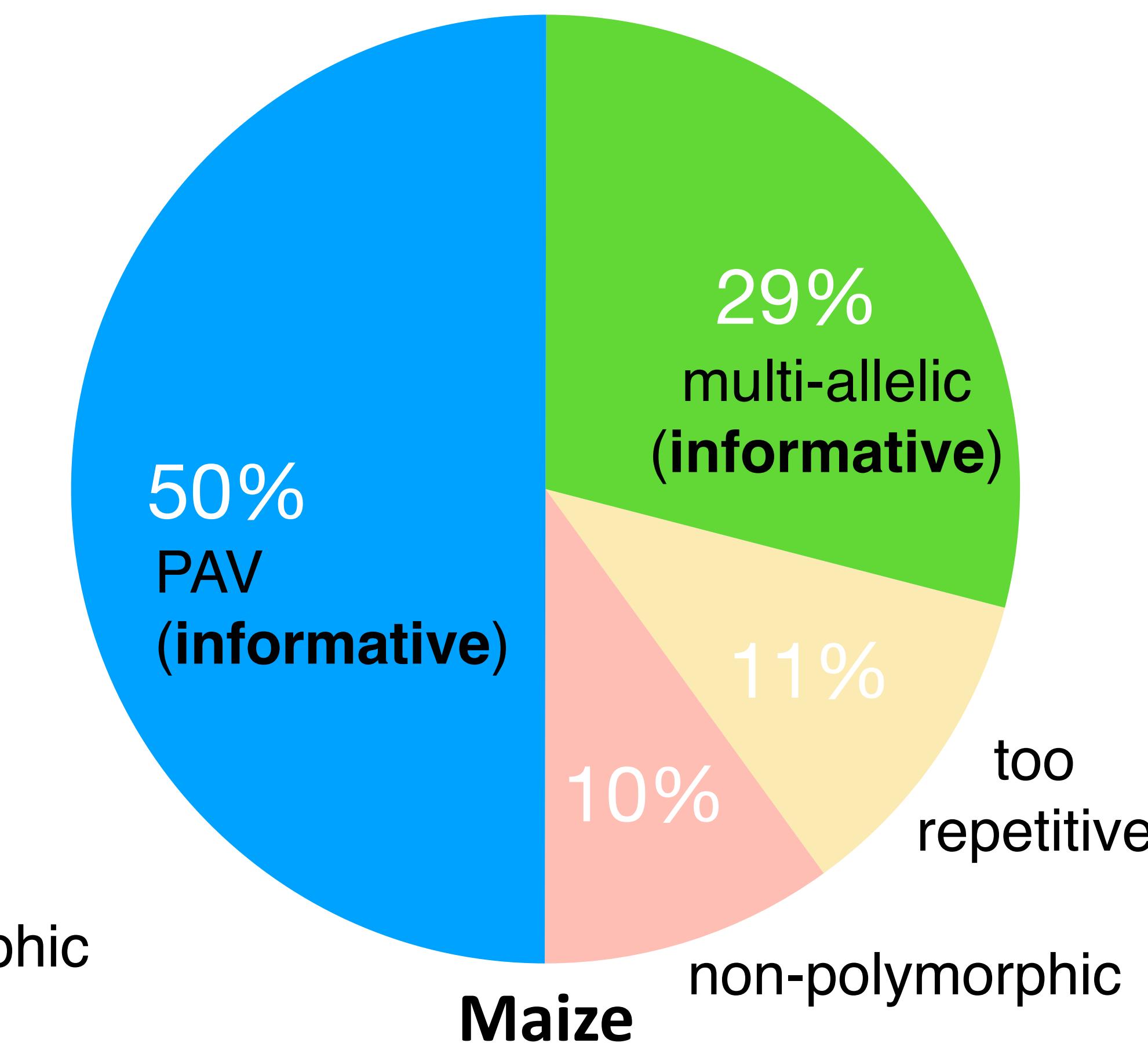
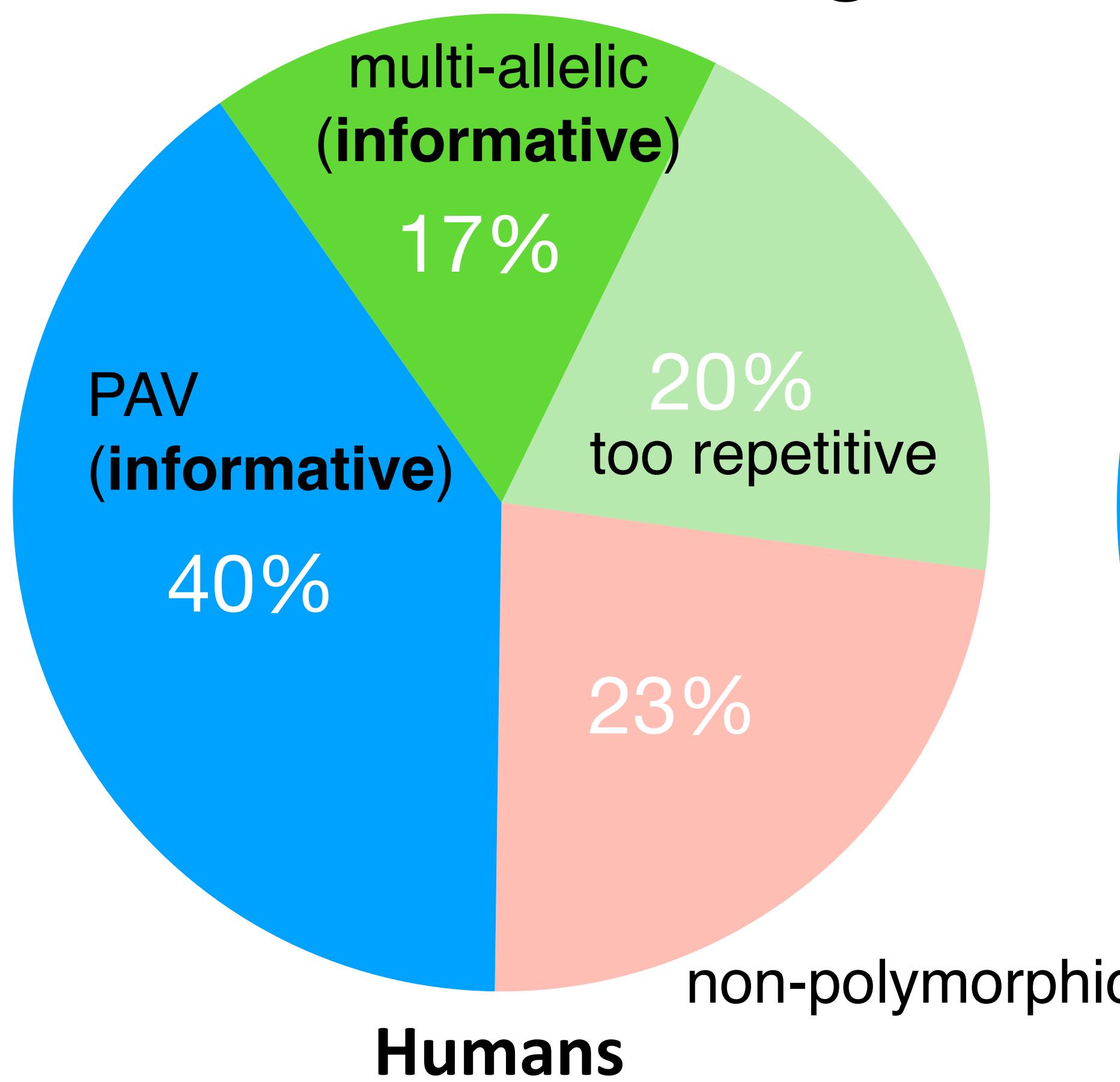
What's the key task?

Maize genome has more informative markers than the human genome



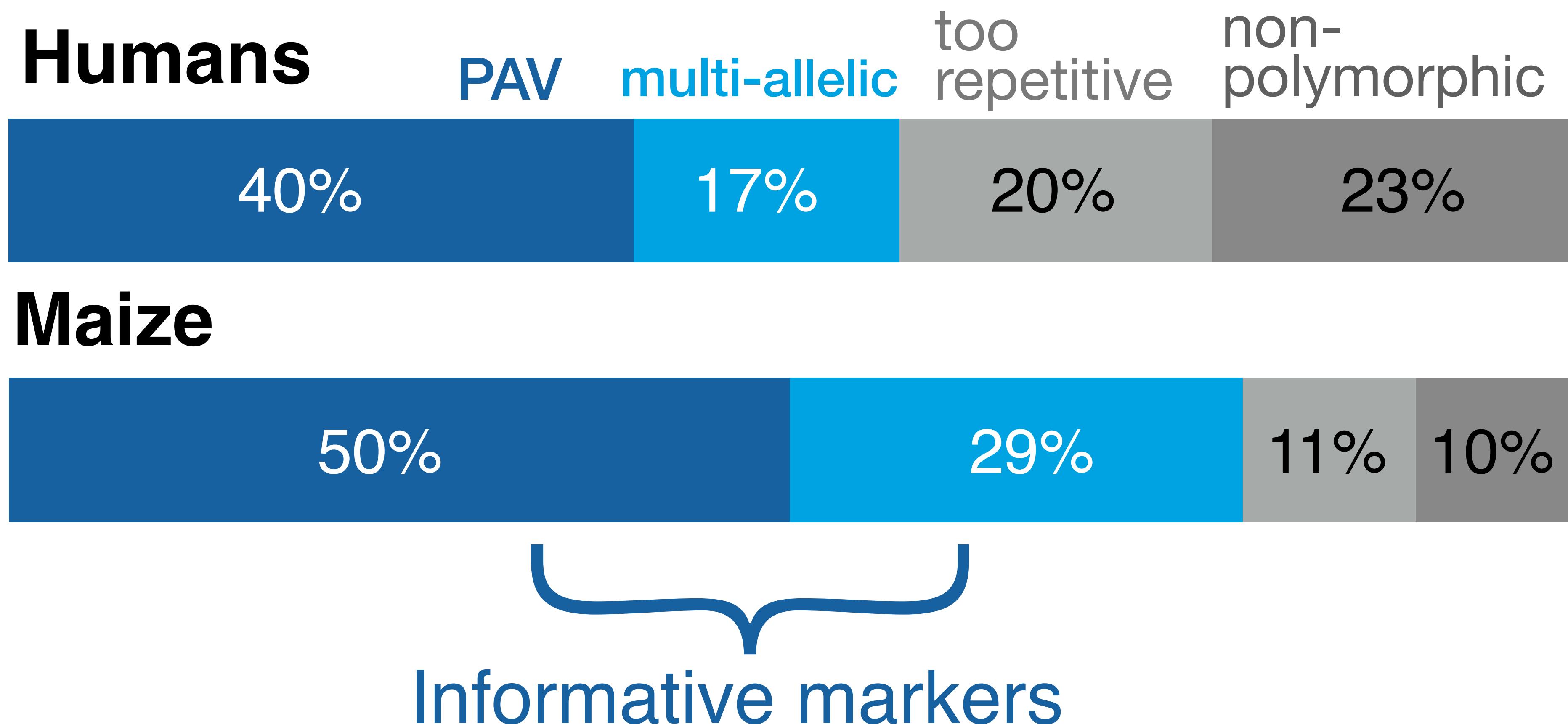
The key task is comparing informative markers

Maize genome has more informative markers than the human genome

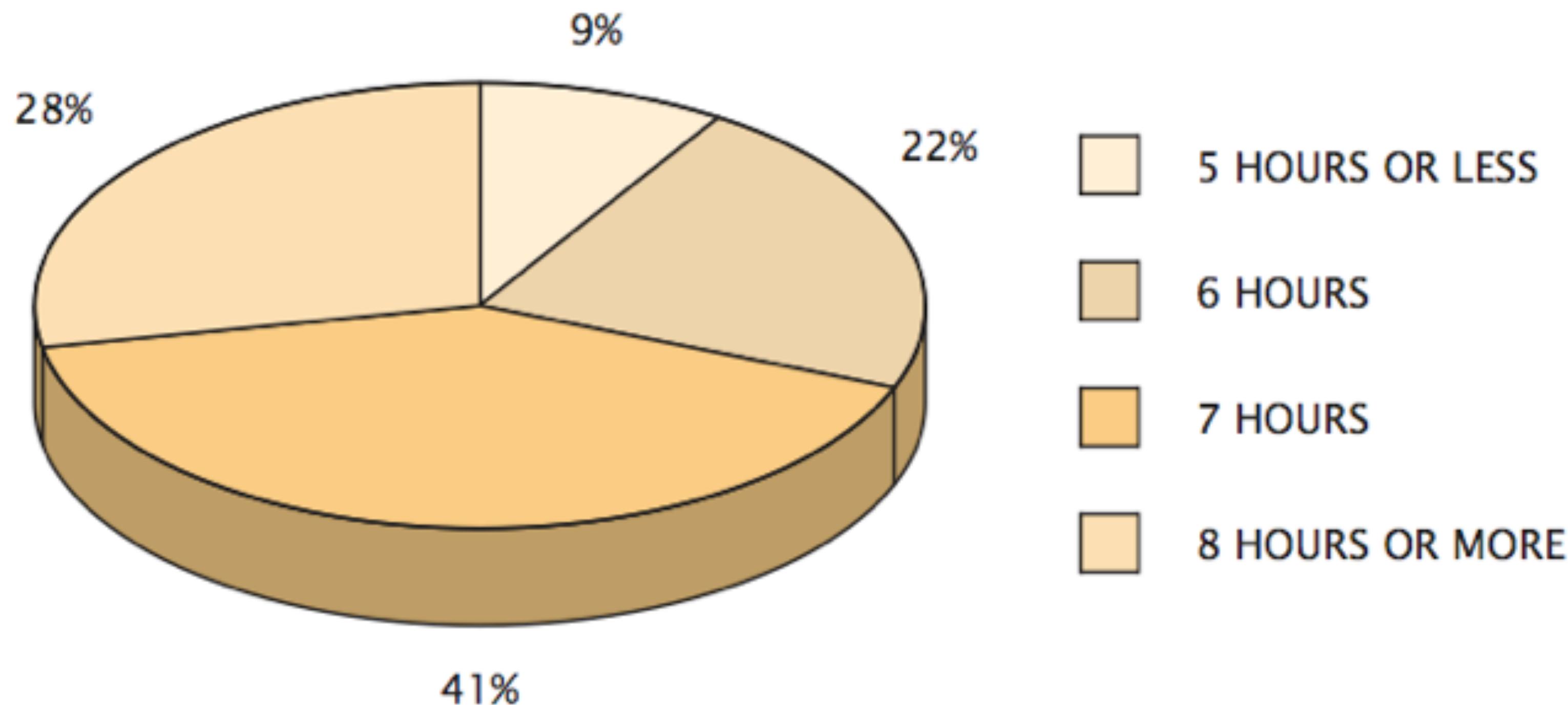


Minimize the effort required for the key task

Maize genome has more informative markers than the human genome

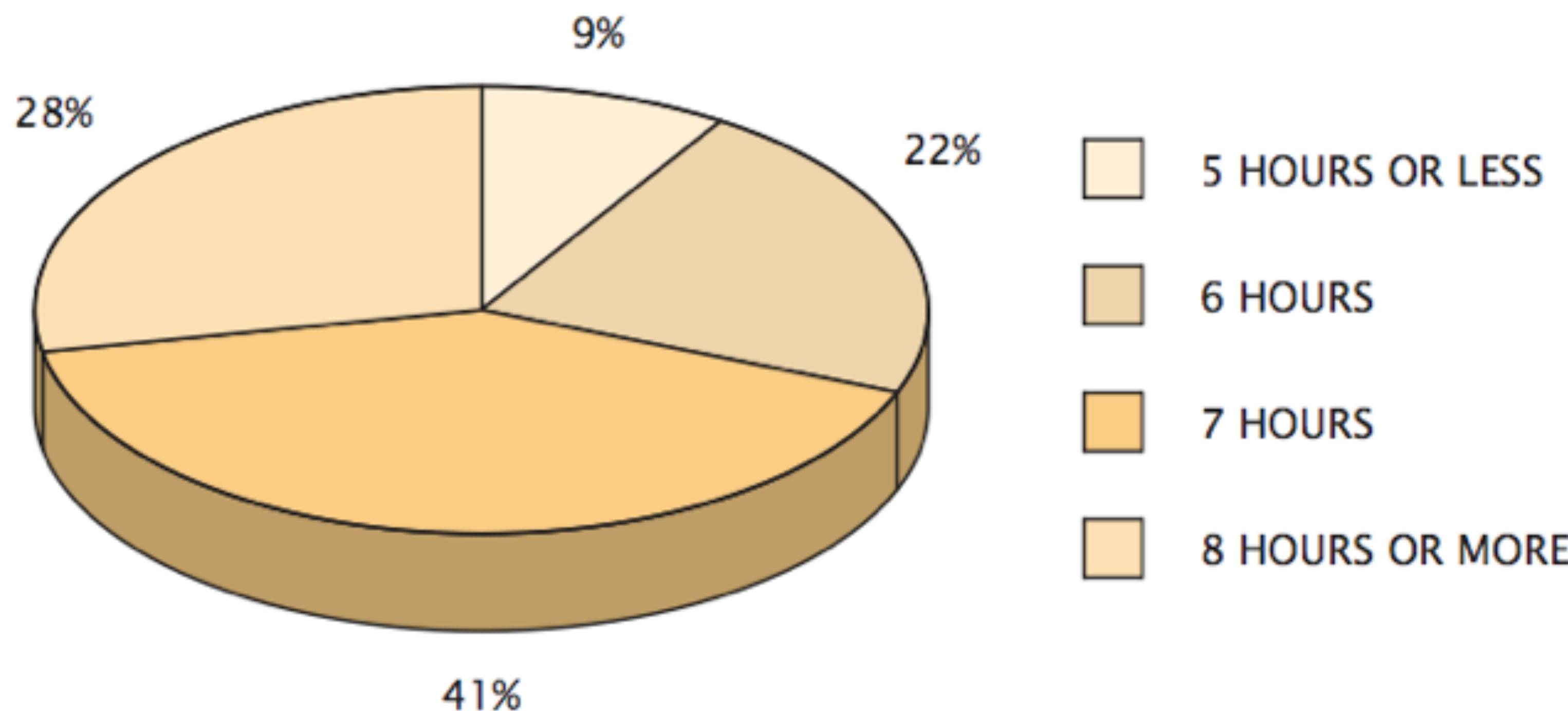


DISTRIBUTION OF THE NUMBER OF SLEEP HOURS FOR ADULTS



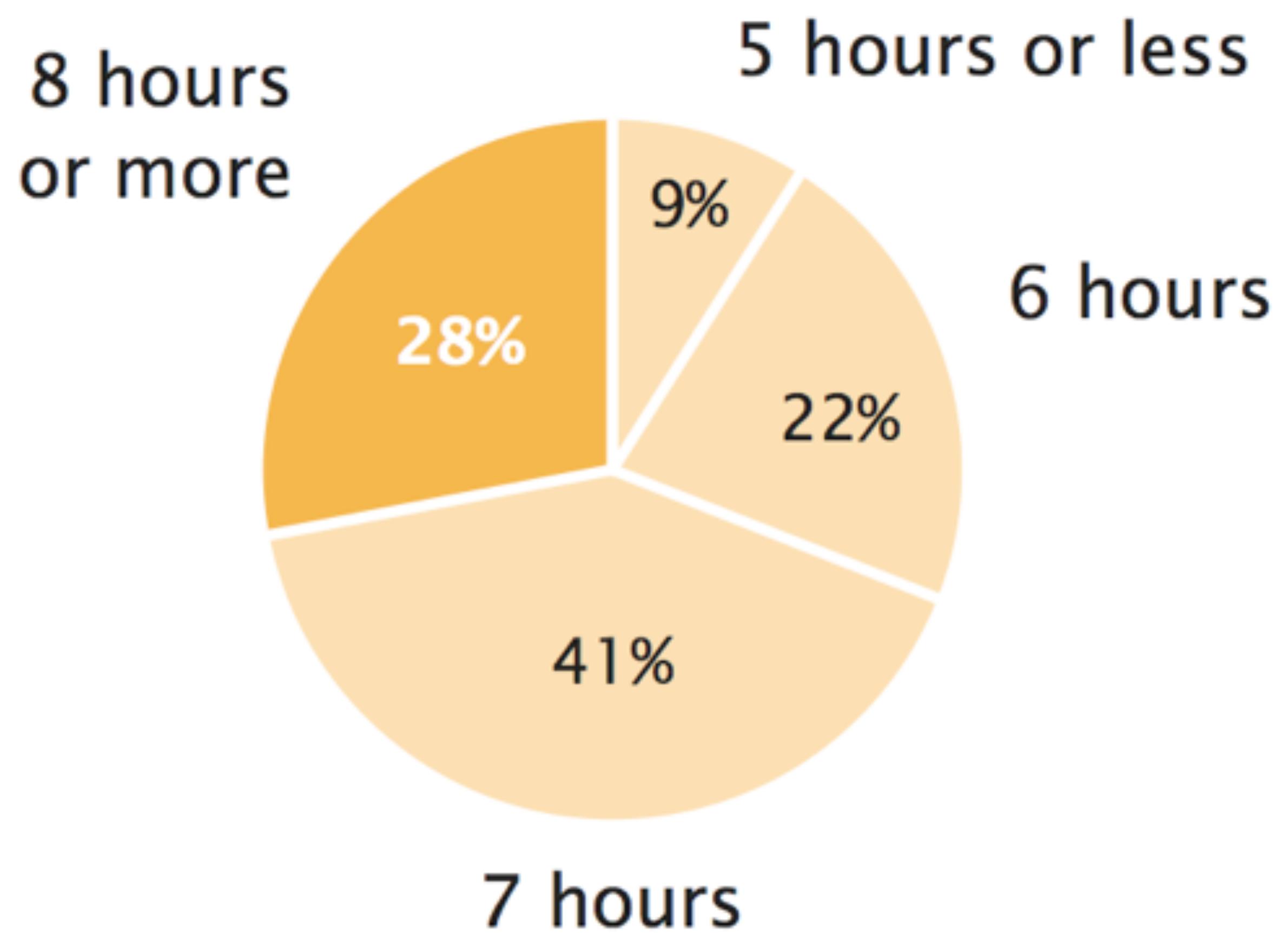
L'hebdo au féminin 106, p. 3, November 12, 1991

Only 28% of adults sleep
the recommended 8 hours



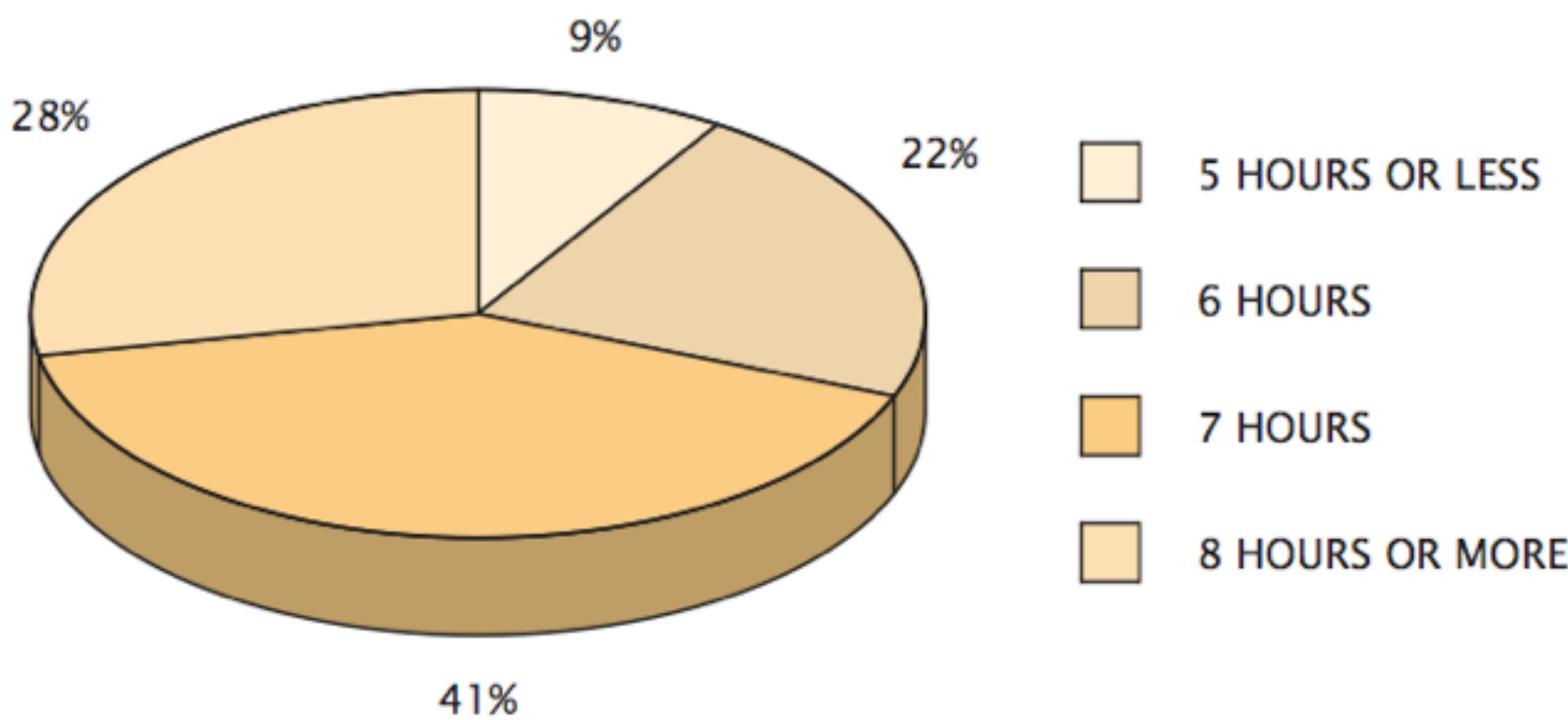
L'hebdo au féminin 106, p. 3, November 12, 1991

Only 28% of adults sleep
the recommended 8 hours

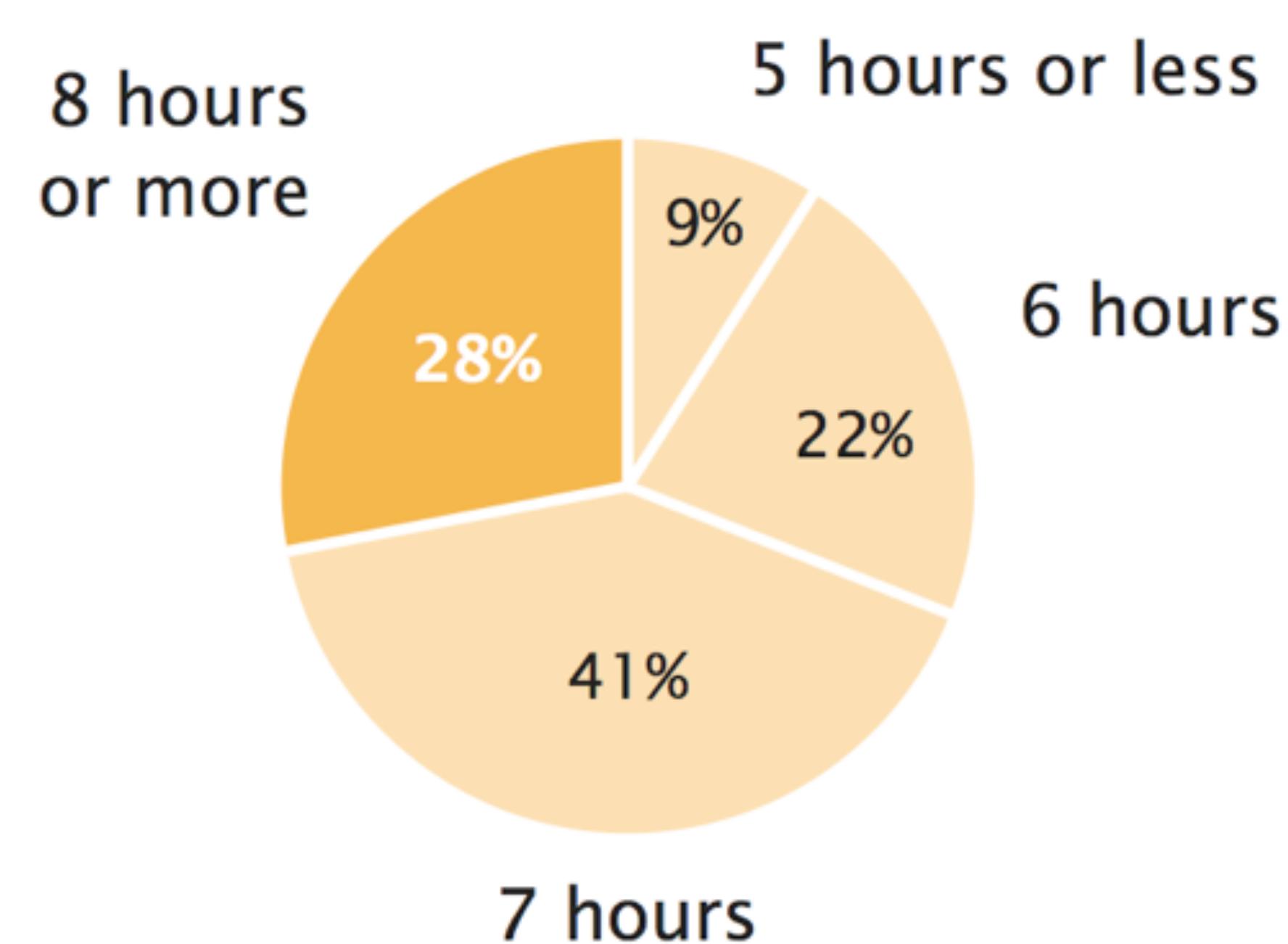


How is the key task supported or hindered?

DISTRIBUTION OF THE NUMBER OF SLEEP HOURS FOR ADULTS

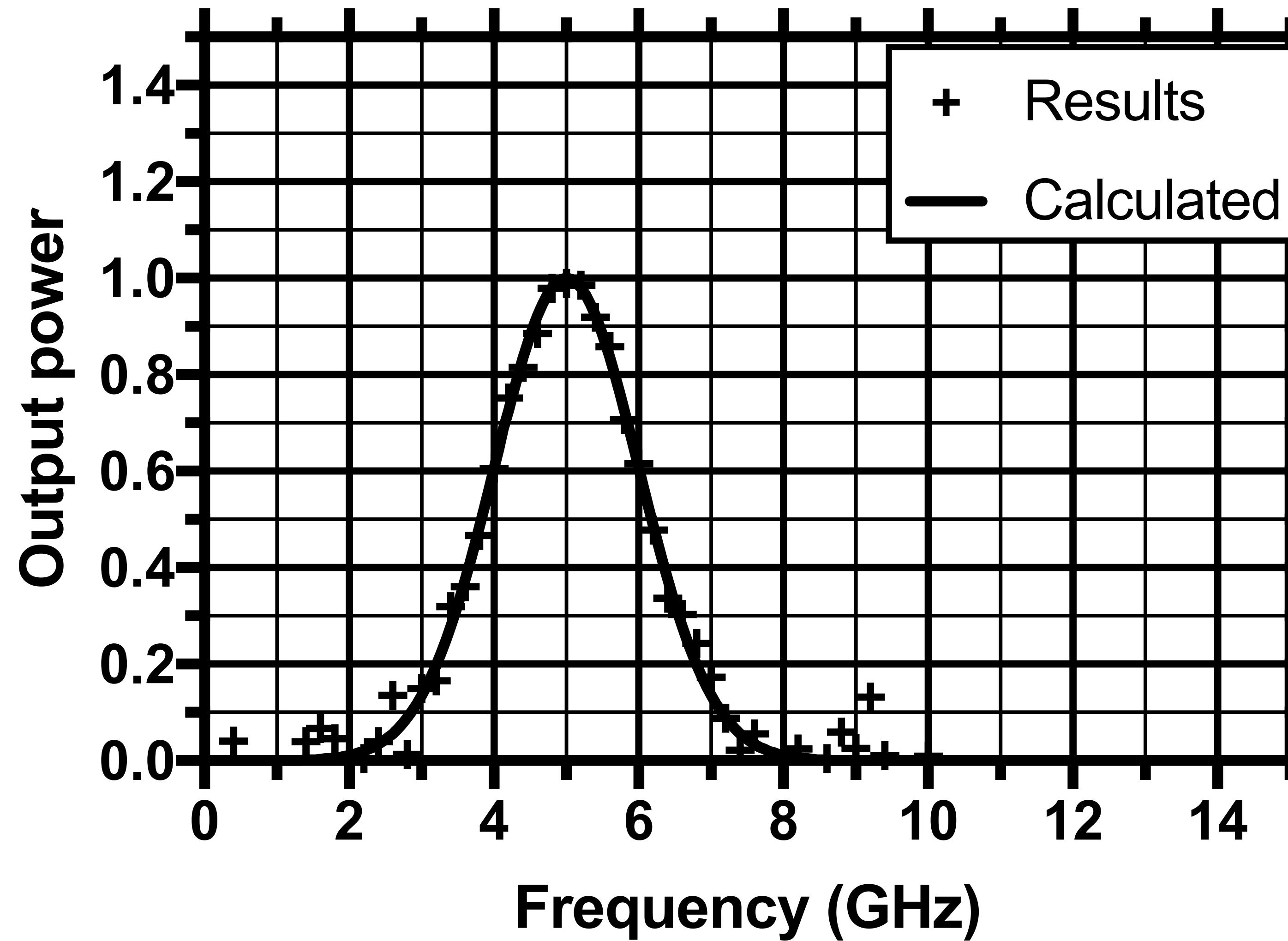


Only 28% of adults sleep the recommended 8 hours

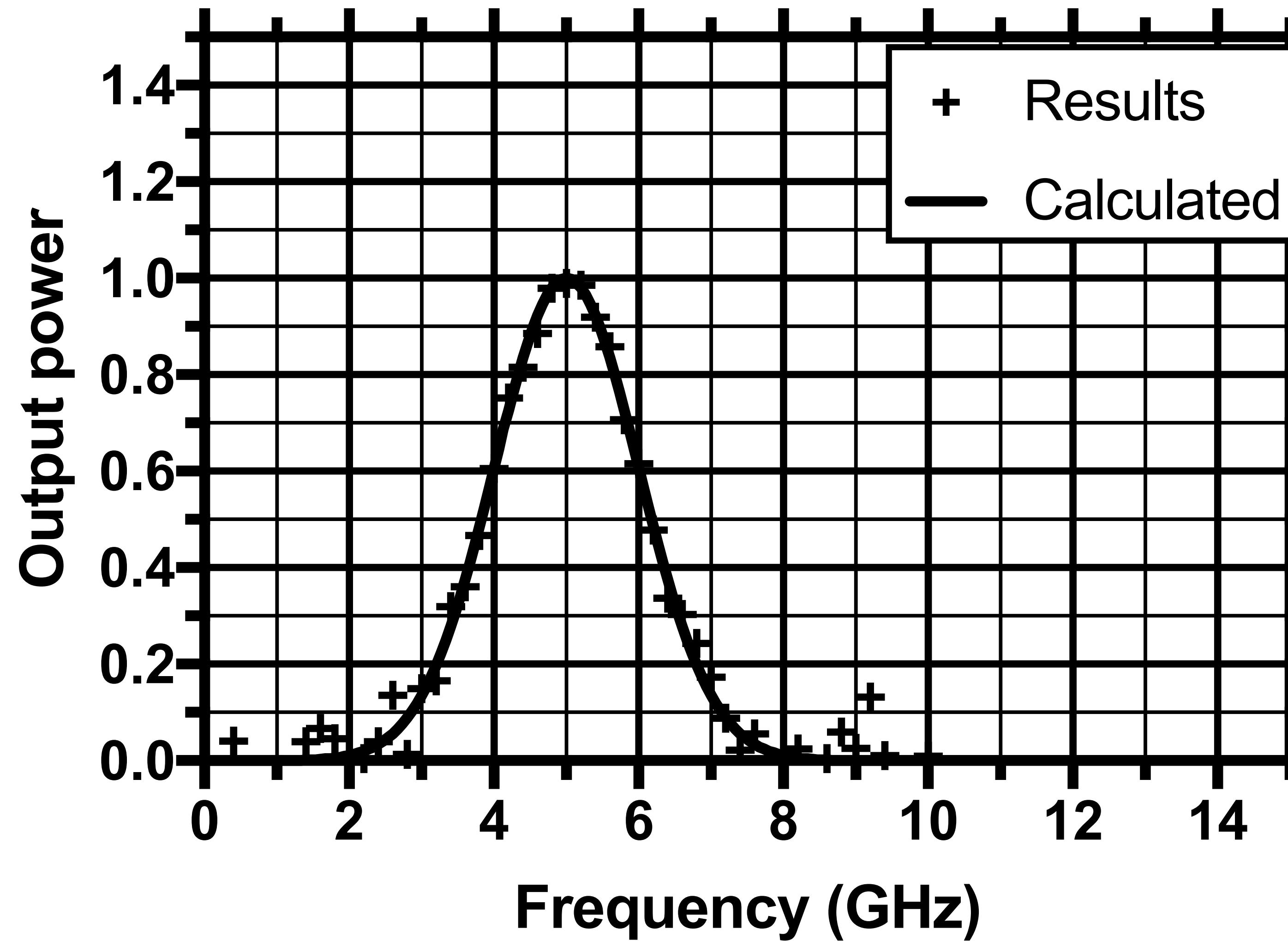


How might we title this graph?

What's the key user task? What goes in each layer?

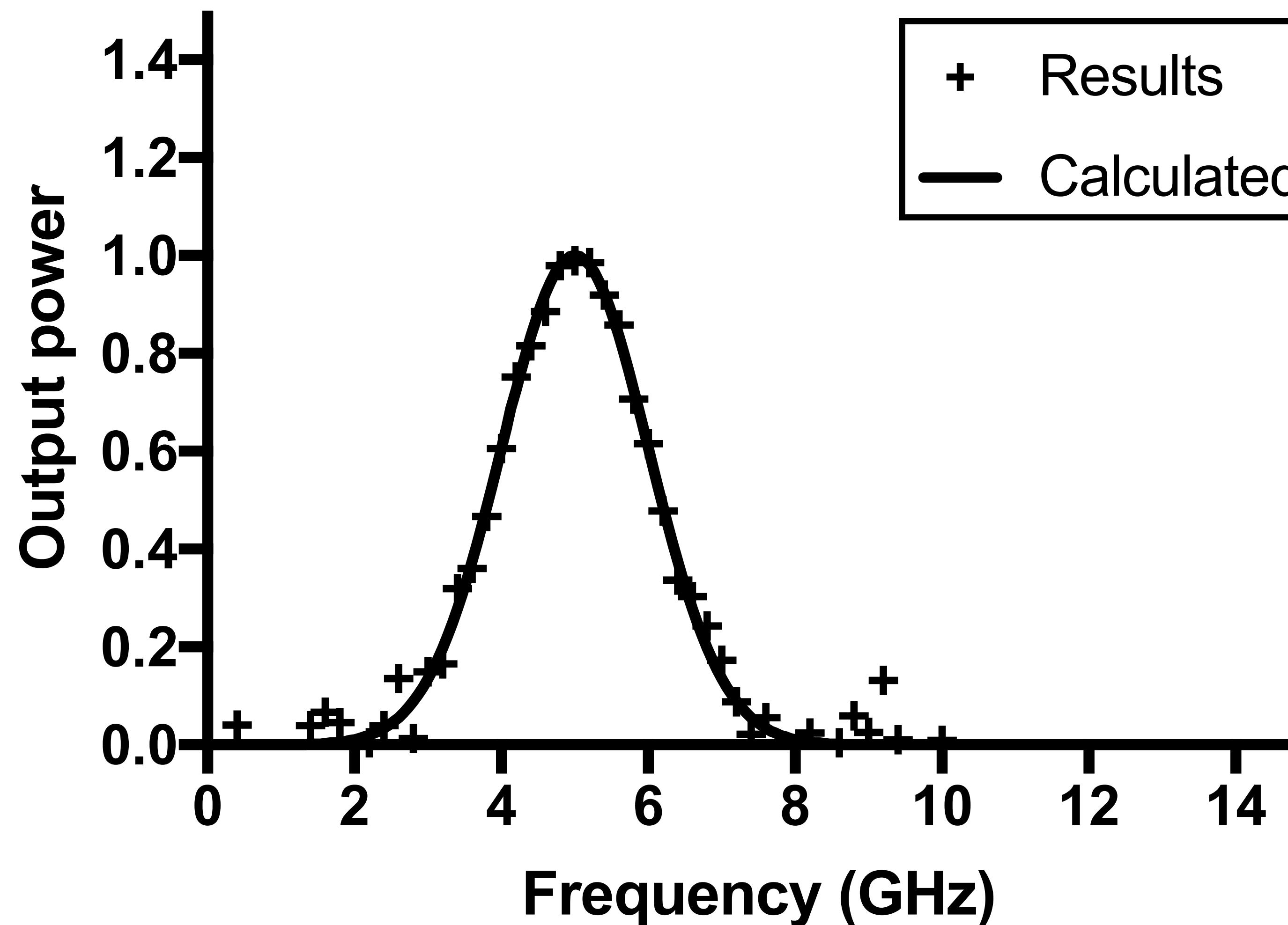


Experimental measurements match theoretical predictions

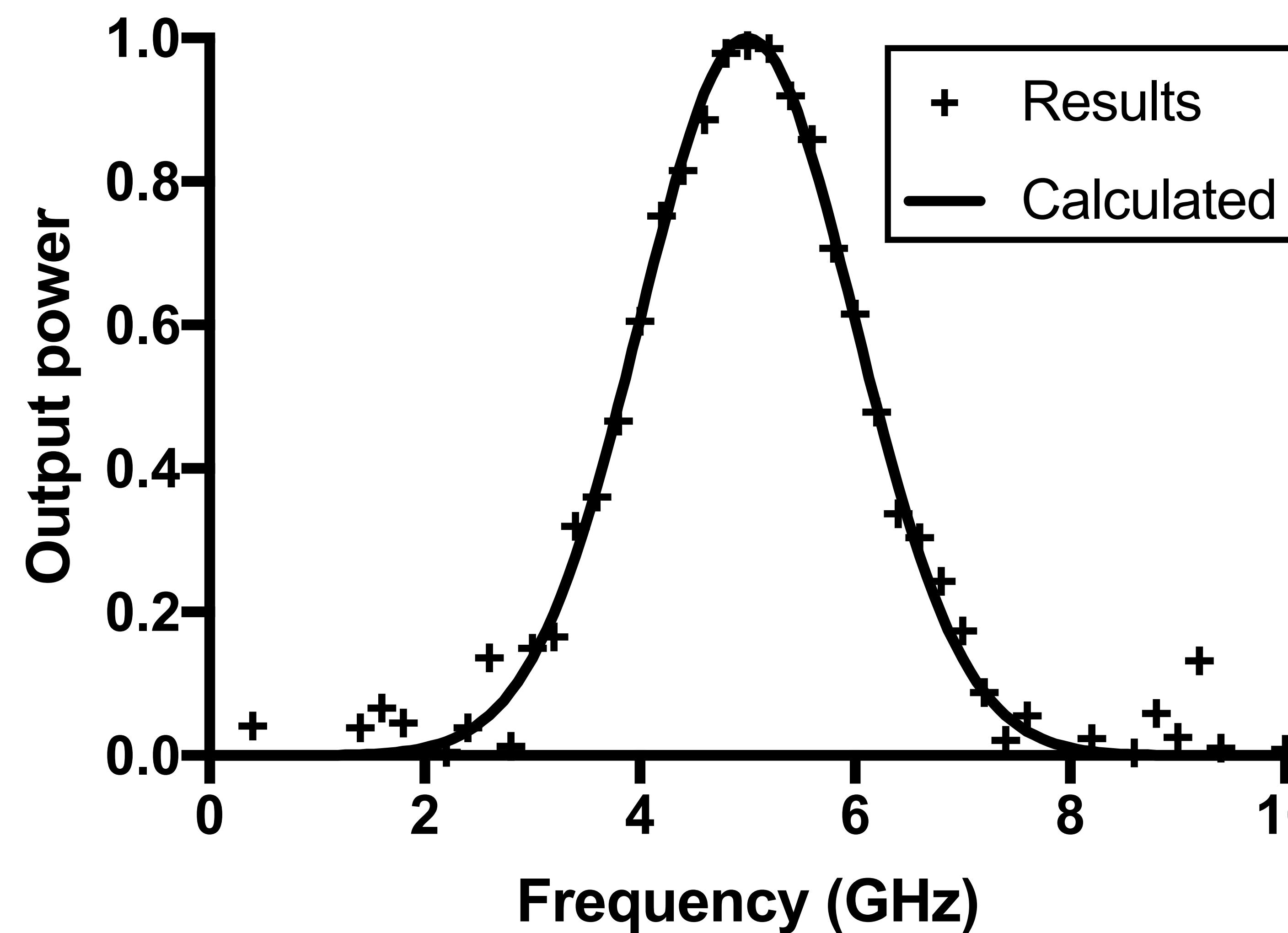


Experimental measurements match theoretical predictions

Removed gridlines

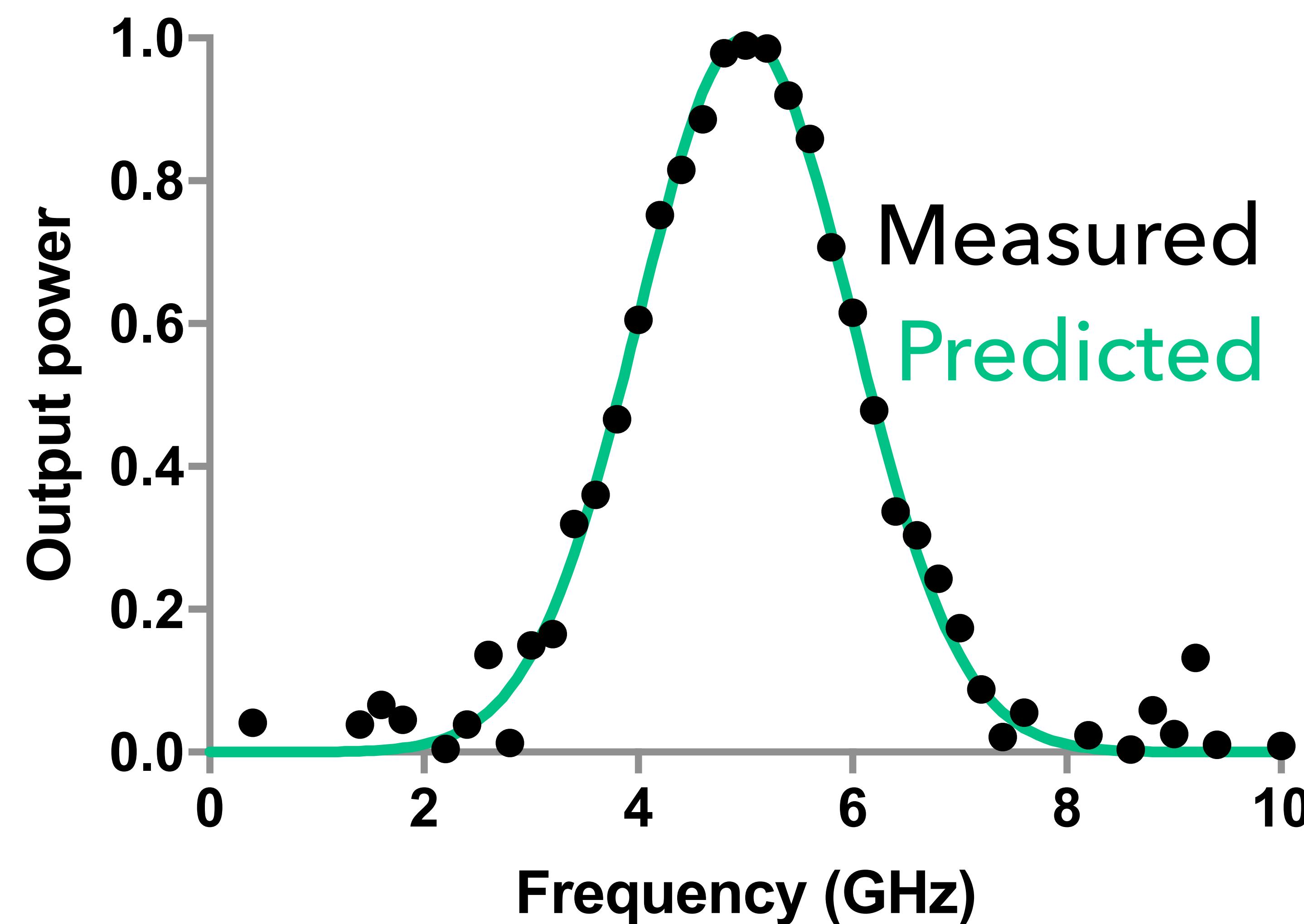


Experimental measurements match theoretical predictions

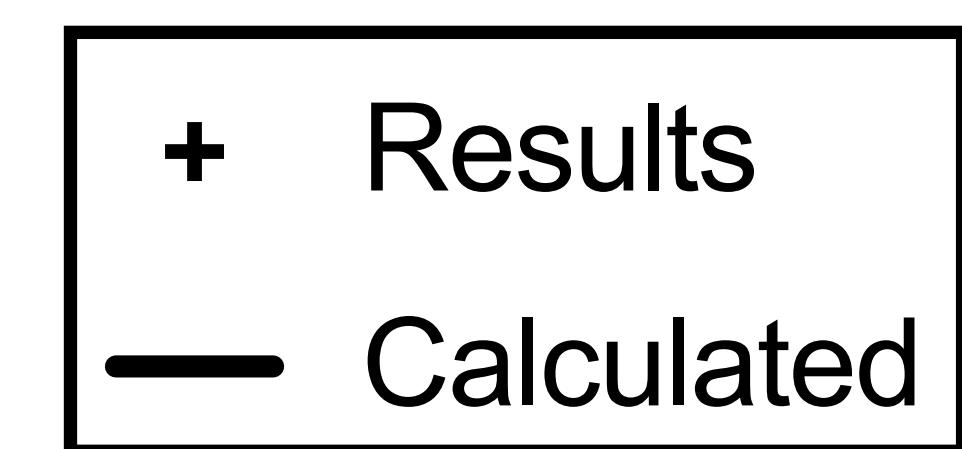


Removed gridlines
Scaled axiis

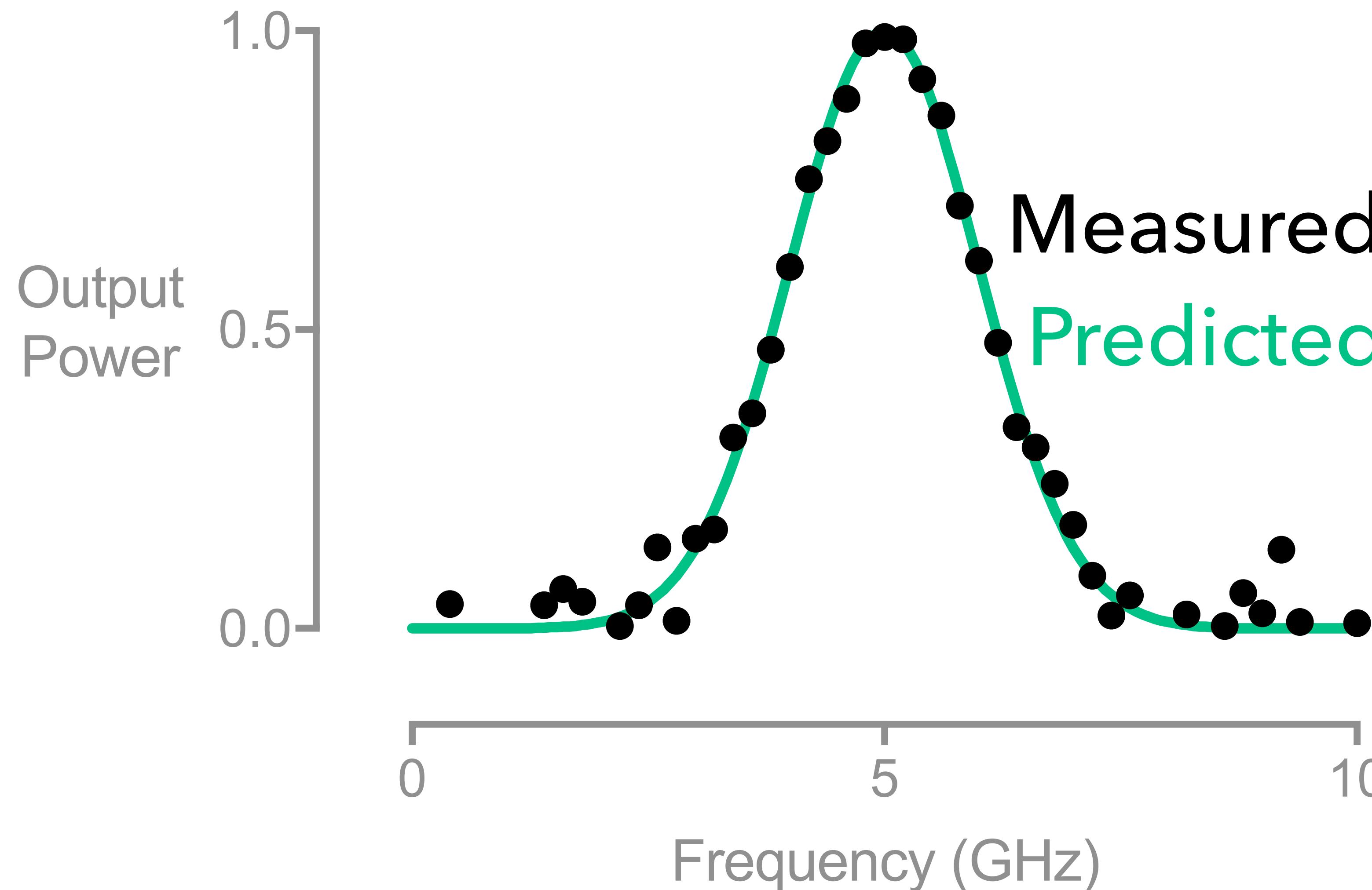
Experimental measurements match theoretical predictions



Removed gridlines
Scaled axiis
3 layers emphasis
Native legend
Matching words



Experimental measurements match theoretical predictions



Removed gridlines
Scaled axiis
3 layers emphasis
Native legend
Matching words
Ranged axis
Horizontal Y label
Logical linebreak

3. Make the key task easy

Identify the key task required to verify your assertion

Emphasize those pixels

De-emphasize competing pixels

Minimize the distance of eye travel required

Minimize color memorization

Strong visualizations should pass the “squint test”

3 tools to align visual emphasis

1. Show hierarchy
2. Align structure to argument
3. Make the key task easy

A workflow for scientific visual design

Exploratory visualization

Develop insights

Distill your message

Align visual emphasis

Identify data relationship & align color

Identify argument & align structure

Identify key task & minimize

Practice

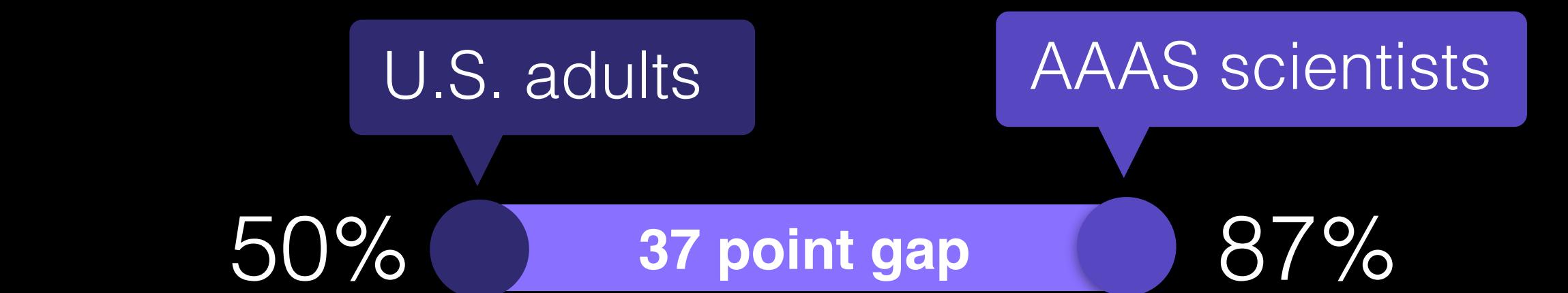
Sketch a visualization
that's aligned with your message

Test

Swap visualizations with a neighbor
Take your best guess at the title

There's a large gap between the public and scientists

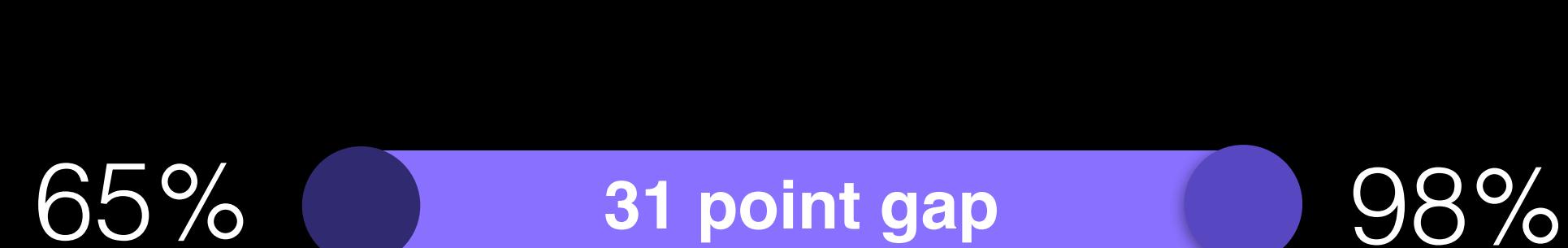
Climate change is mostly due to human activity



Safe to eat genetically modified foods



Human beings evolved over time



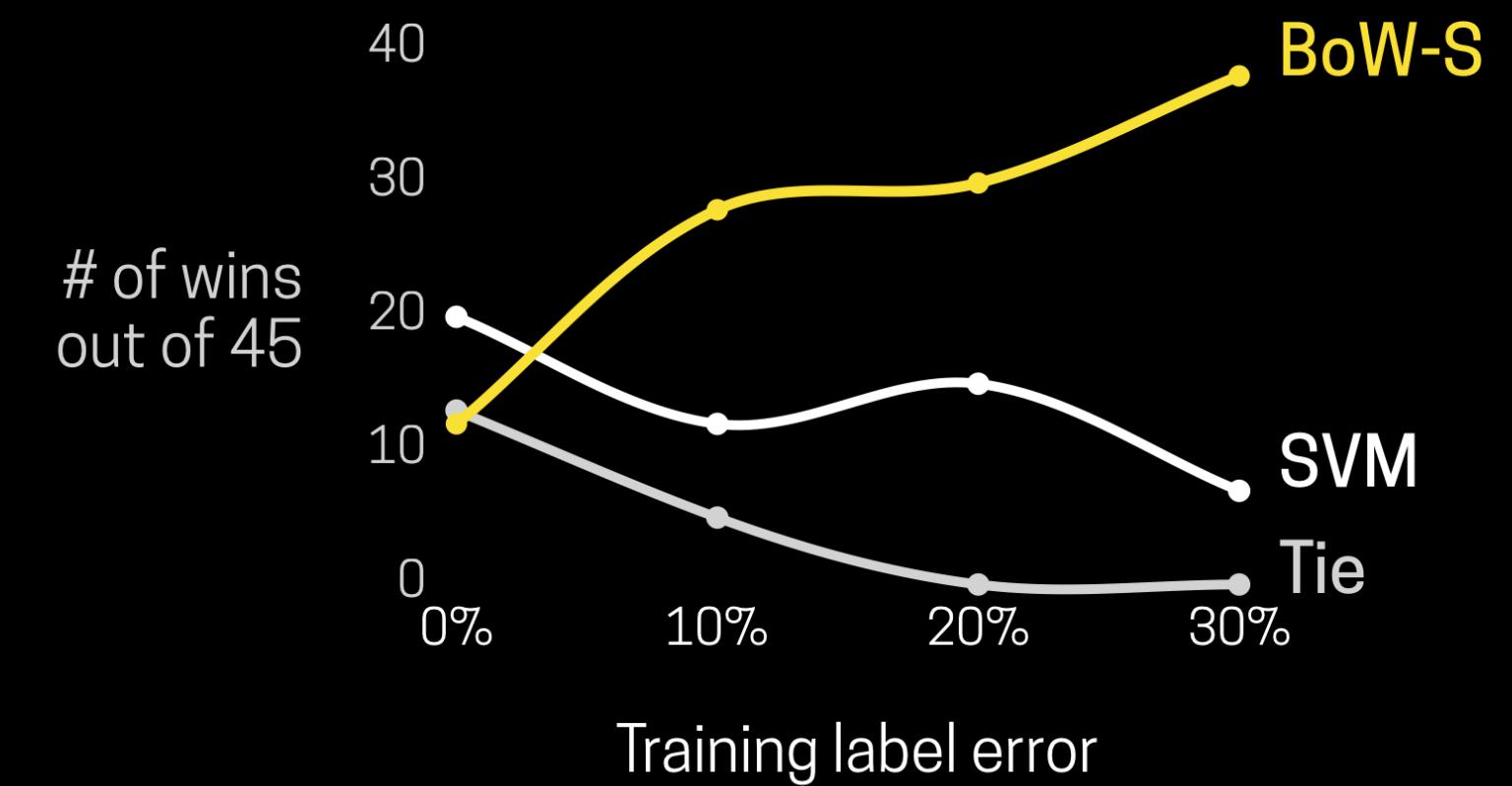
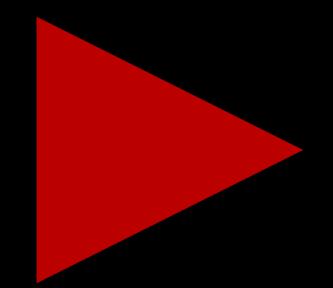
You now know a 2-step process:

1. Distill your message
2. Align visual emphasis

Number of wins of BoW vs SVM

BoW-S outperforms SVM on noisy data

BoW-S outperforms SVM on noisy data



Resources

Choose color based on your data

Base Options

Nature of your data
Qualitative

Base color scheme
Even Darker

Example
Pie

Control Options

Reverse
 Correct colors
 Desaturated

Vision
 Normal
 Deutan
 Protan
 Tritan

Color Settings

HUE 1: 0 (SET)
HUE 2: 300 (SET)
CHROMA: 80 (SET)
LUMIN. 1: 60 (SET)
NUMBER: 7 (SET)



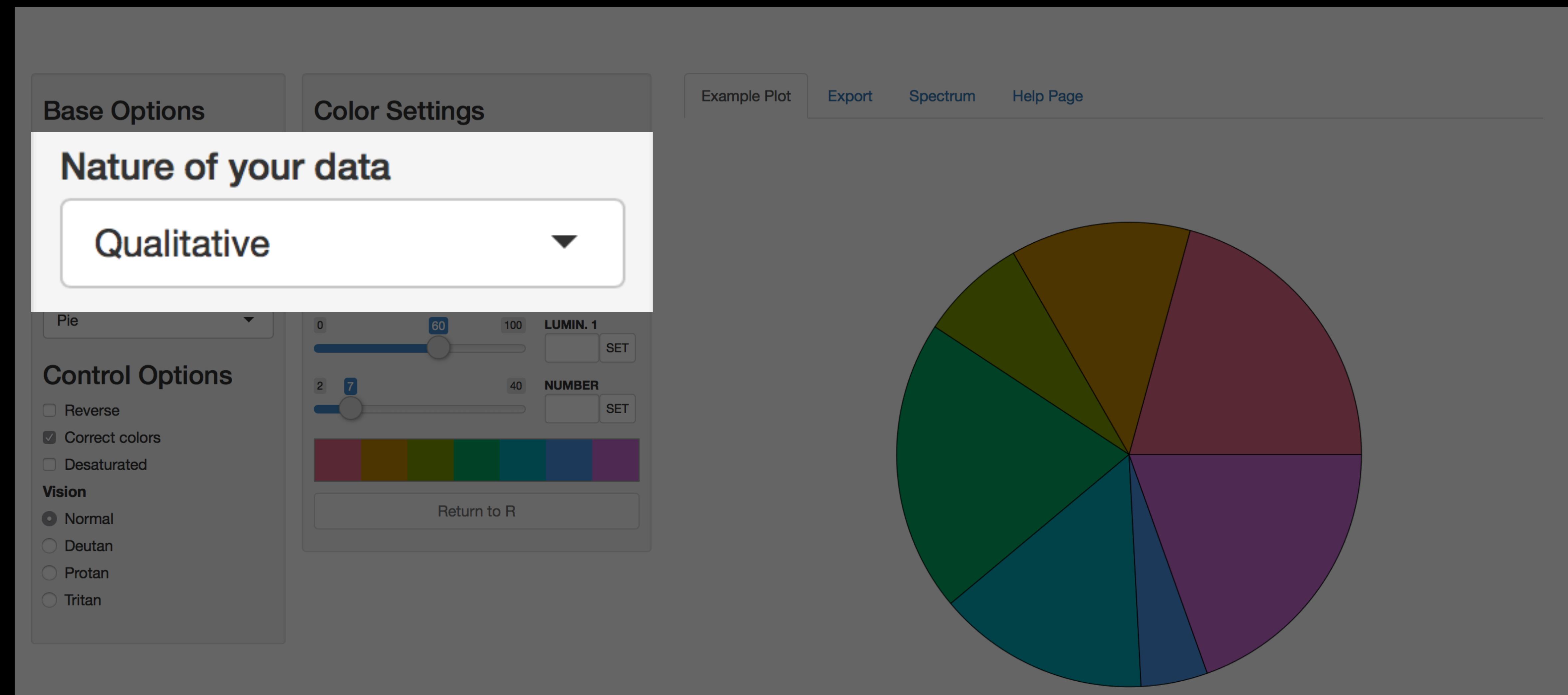
Return to R

[Example Plot](#) [Export](#) [Spectrum](#) [Help Page](#)



hclwizard.org/hclwizard

Choose color based on your data



hclwizard.org/hclwizard

Choose color based on your data

Base Options Color Settings

Example Plot Export Spectrum Help Page

Nature of your data

Diverging

Map

Control Options

- Reverse
- Correct colors
- Desaturated

Vision

- Normal
- Deutan
- Protan
- Tritan

0 70 100 LUMIN. 1 SET

0 90 LUMIN. 2 SET

0 1 3 POWER 1 SET

2 7 40 NUMBER SET

Return to R

A choropleth map of the United States showing county-level data. The map uses a diverging color scheme where states are colored based on their data values. Darker shades of green represent higher values in the western and northern parts of the country, while darker shades of orange and red represent higher values in the southern and eastern parts. Lighter shades of gray and beige represent lower values across most of the central and western US.

Choose color based on your data

Base Options Color Settings

Example Plot Export Spectrum Help Page

Nature of your data

Sequential (multiple hues) ▾

Heatmap ▾

Control Options

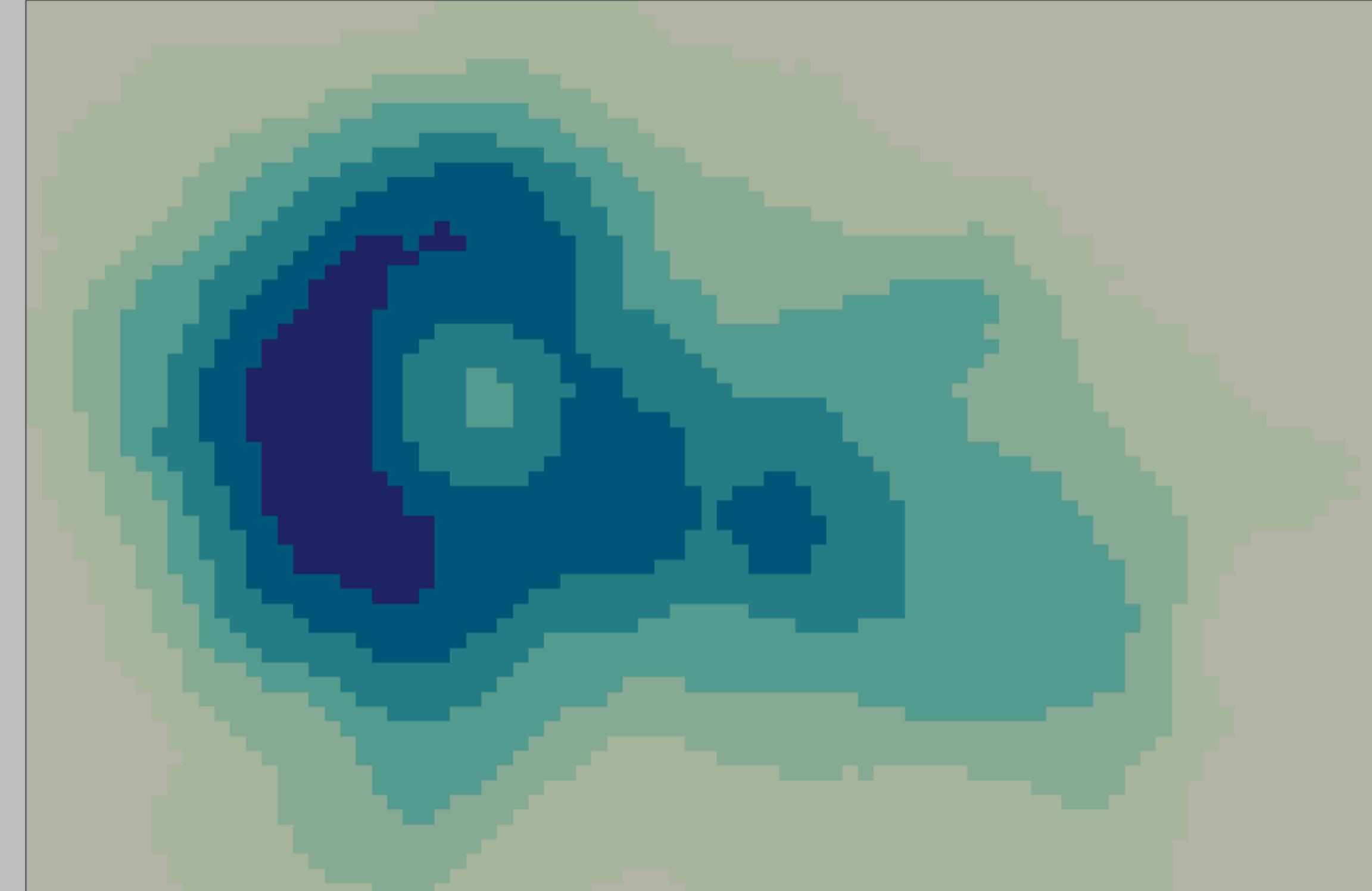
Reverse
 Correct colors
 Desaturated

Vision

Normal
 Deutan
 Protan
 Tritan

CHROMA: 10 (0-100) SET
LUMIN. 1: 25 (0-100) SET
LUMIN. 2: 95 (0-100) SET
POWER 1: 0.7 (0-3) SET
POWER 2: 2 (0-3) SET
NUMBER: 7 (2-40) SET

Return to R



hclwizard.org/hclwizard

Export color codes

Base Options

Nature of your data
Sequential (multiple hues) ▾

Base color scheme
Yellow-Blue ▾

Example
Heatmap ▾

Control Options

Reverse
 Correct colors
 Desaturated

Vision
 Normal
 Deutan
 Protan
 Tritan

Color Settings

HUE 1: 265 (Slider from -360 to 360)
HUE 2: 80 (Slider from -360 to 360)
CHROMA: 60 (Slider from 0 to 100)
CHROMA: 10 (Slider from 0 to 100)
LUMIN. 1: 25 (Slider from 0 to 100)
LUMIN. 2: 95 (Slider from 0 to 100)
POWER 1: 0.7 (Slider from 0 to 3)
POWER 2: 2 (Slider from 0 to 3)
NUMBER: 7 (Slider from 2 to 40)

Return to R

Example Plot Export Spectrum Help Page

RAW GrADS Python matlab

RGB values [0-1]	RGB values [0-255]	HEX colors, no alpha	Color Map
0.176 0.192 0.518	45 49 132	#2D3184	
0.000 0.463 0.631	0 118 161	#0076A1	
0.196 0.667 0.710	50 170 181	#32AAB5	
0.467 0.812 0.745	119 207 190	#77CFBE	
0.702 0.906 0.773	179 231 197	#B3E7C5	
0.875 0.945 0.816	223 241 208	#DFF1D0	
0.953 0.945 0.894	243 241 228	#F3F1E4	

[Download](#) [Download](#) [Download](#)

hclwizard.org/hclwizard

chroma.js

chroma.js is a tiny JavaScript library (14kB) for dealing with colors!

build passing

Quick-start

Here are a couple of things chroma.js can do for you:

- read colors from a wide range of formats
- analyze and manipulate colors
- convert colors into wide range of formats
- linear and bezier interpolation in different color spaces

Here's an example for a simple read / manipulate / output chain:

```
chroma('pink').darken().saturate(2).hex()
```

"#ff6d93"

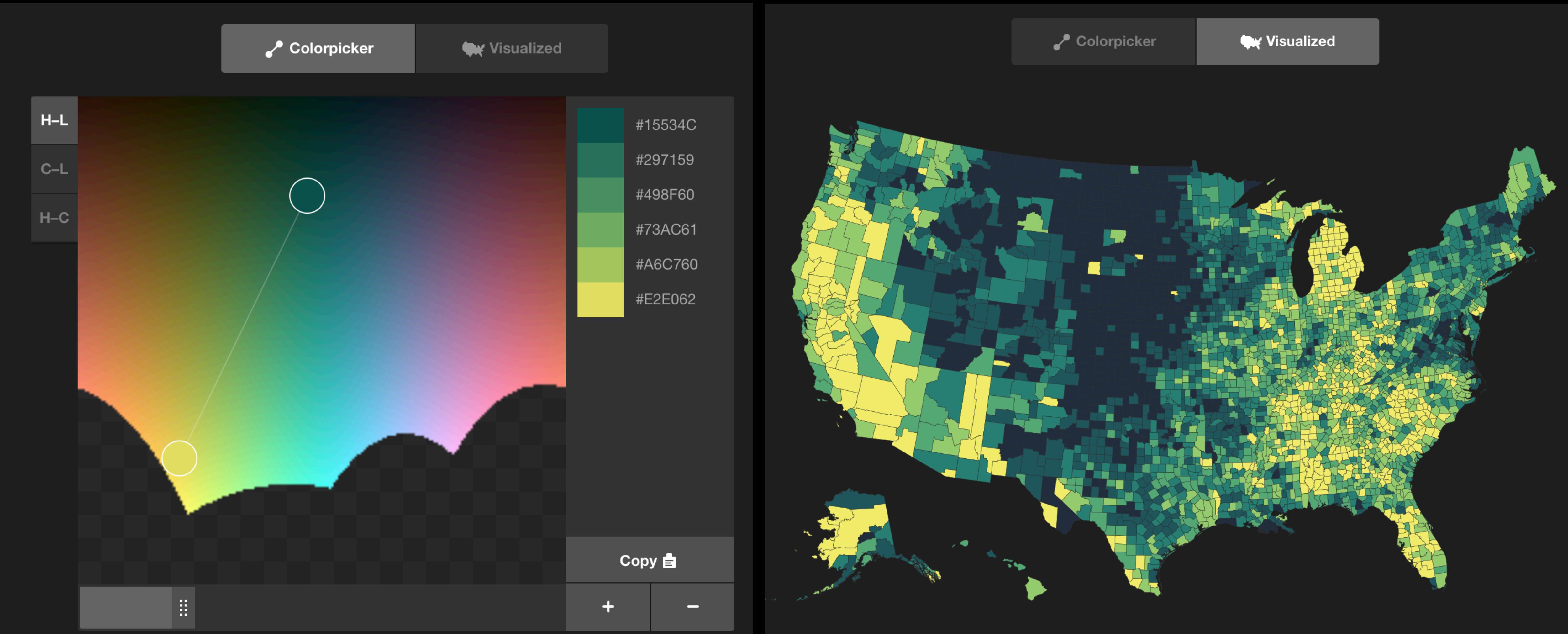
Aside from that, chroma.js can also help you **generate nice colors** using various methods, for instance to be used in color palette for maps or data visualization.

```
chroma.scale(['#fafa6e', '#2A4858'])  
  .mode('lch').colors(6)
```

[ ,  ,  ,  , ]

chroma.js has a lot more to offer, but that's the gist of it.

Explore multihue sequential gradients



<http://tristen.ca/hcl-picker/>

Check for color name conflicts

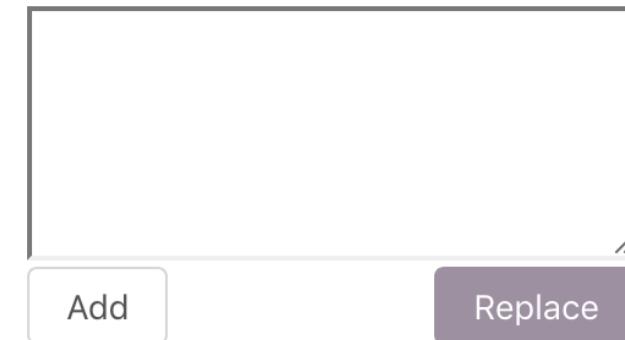
VIZ

PALETTE

By: Elijah Meeks
& Susie Lu

PICK

Use Chroma.js



Use Colorgorical

Use ColorBrewer

EDIT

- ≡ 1 ● #ffd700
- ≡ 2 ● #ffb14e
- ≡ 3 ● #fa8775
- ≡ 4 ● #ea5f94
- ≡ 5 ● #cd34b5
- ≡ 6 ● #9d02d7
- ≡ 7 ● #0000ff

Add

#hex

rgb

hsl

GET

- String quotes
- Object with metadata

```
[ "#ffd700",
  "#ffb14e",
  "#fa8775",
  "#ea5f94",
  "#cd34b5",
  "#9d02d7",
  "#0000ff" ]
```

hsl

COLORS IN ACTION

Color Population:

No Color Deficiency - 96%

Deuteranomaly - 2.7%

Protanomaly - 0.66%

Protanopia - 0.59%

Deuteranopia - 0.56%

COLOR REPORT

Arcs link colors difficult
to tell apart as:

- Lines or small points
- Medium areas
- Large areas

#ea5f94	pink
#fa8775	light orange
#ffb14e	orange
#ffd700	gold
#0000ff	indigo
#cd34b5	magenta •
#9d02d7	magenta •

- Minimize name
conflicts for
categorical palettes

projects.susielu.com/viz-palette

Preview colors on sample data

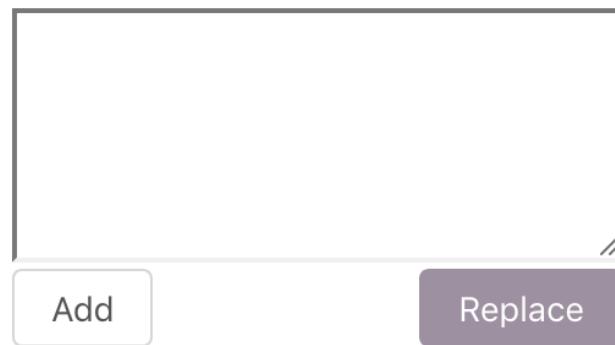
VIZ

PALETTE

By: Elijah Meeks
& Susie Lu

PICK

Use Chroma.js



Add

Replace

Use Colorgorical

Use ColorBrewer

EDIT

- ≡ 1 ● #ffd700 ✎
- ≡ 2 ● #ffb14e ✎
- ≡ 3 ● #fa8775 ✎
- ≡ 4 ● #ea5f94 ✎
- ≡ 5 ● #cd34b5 ✎
- ≡ 6 ● #9d02d7 ✎
- ≡ 7 ● #0000ff ✎

7 Colors

Add

● hex ○ rgb

○ hsl

GET

- String quotes
 Object with metadata

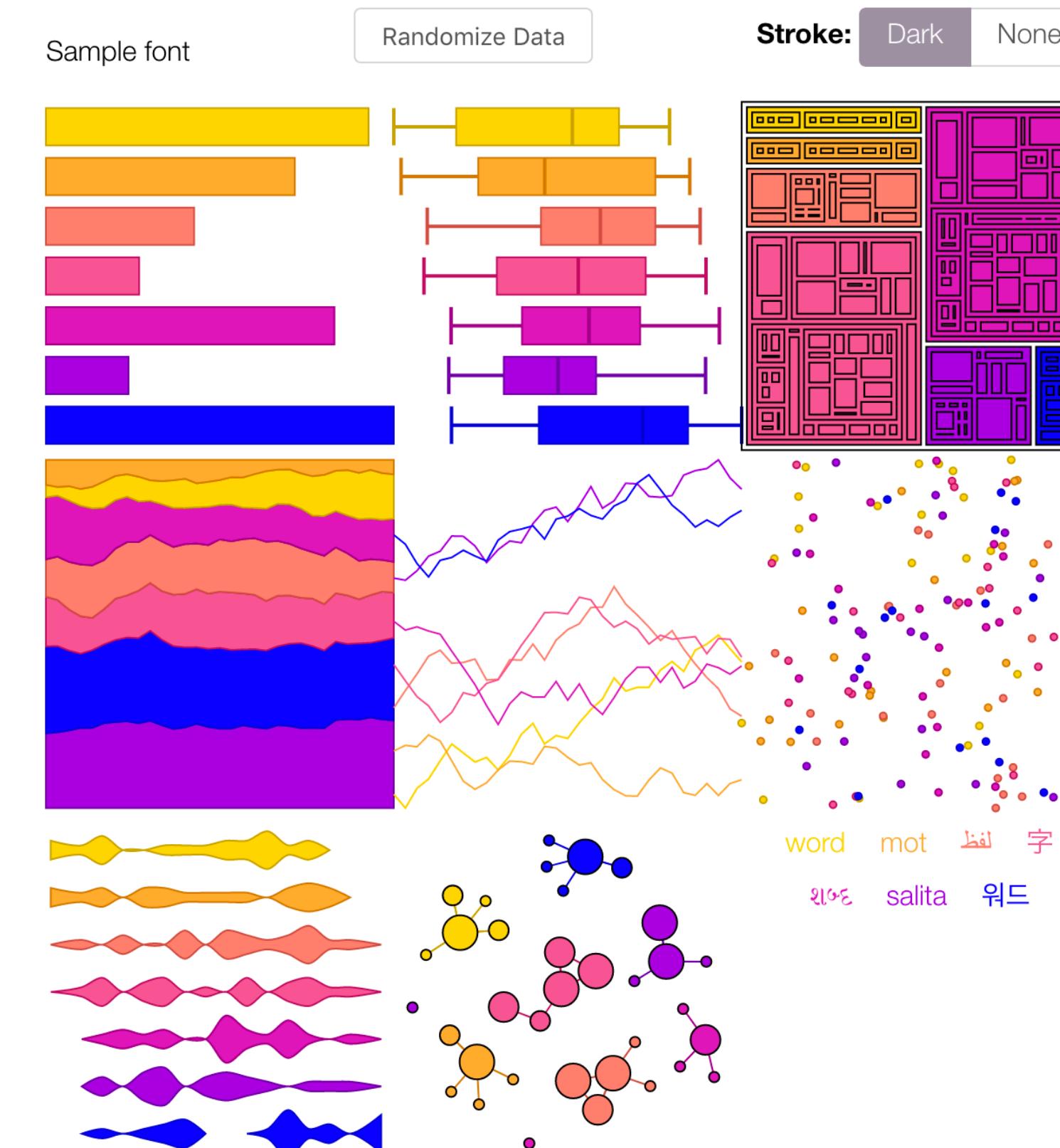
```
[ "#ffd700",
  "#ffb14e",
  "#fa8775",
  "#ea5f94",
  "#cd34b5",
  "#9d02d7",
  "#0000ff" ]
```

● hex ○ rgb

○ hsl

COLORS IN ACTION

Color Population: No Color Deficiency - 96% Deuteranomaly - 2.7% Protanomaly - 0.66% Protanopia - 0.59% Deuteranopia - 0.56%



projects.susielu.com/viz-palette

Test colorblind compatibility

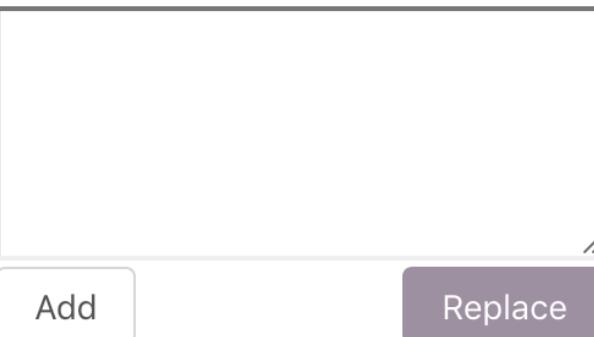
VIZ

PALETTE

By: Elijah Meeks
& Susie Lu

PICK

Use Chroma.js



Add

Replace

Use Colorgorical

Use ColorBrewer

EDIT

- ≡ 1 ● #ffd700 ✎
- ≡ 2 ● #ffb14e ✎
- ≡ 3 ● #fa8775 ✎
- ≡ 4 ● #ea5f94 ✎
- ≡ 5 ● #cd34b5 ✎
- ≡ 6 ● #9d02d7 ✎
- ≡ 7 ● #0000ff ✎

Add

● hex ○ rgb

○ hsl

GET

String quotes

Object with metadata

```
[ "#ffd700",
  "#ffb14e",
  "#fa8775",
  "#ea5f94",
  "#cd34b5",
  "#9d02d7",
  "#0000ff" ]
```

● hex ○ rgb

○ hsl

COLORS IN ACTION

Color Population:

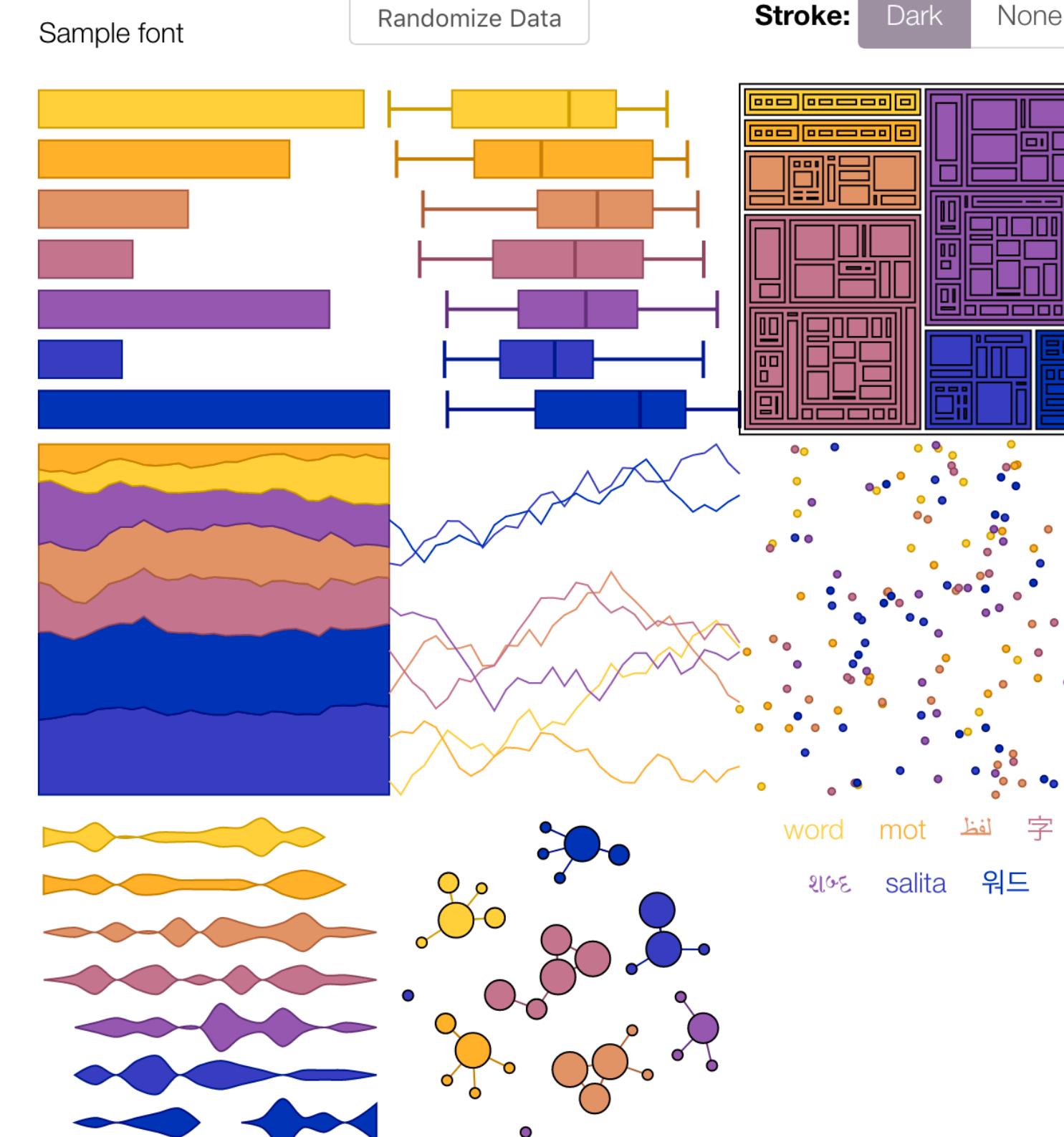
No Color Deficiency - 96%

Deuteranomaly - 2.7%

Protanomaly - 0.66%

Protanopia - 0.59%

Deuteranopia - 0.56%



projects.susielu.com/viz-palette

Browse color schemes

Adobe Color CC Create Explore My Themes Sign In

Most Popular ▾

 81FF1FAD-FCBB... 237 279 0 FAVE colours 100 112 0 Copy of Copy of ... 80 102 0

 コピー SAP01 58 90 0 Copy of Ventan... 76 59 0 Shades of Blue 52 56 0

 color1 38 54 0 Meu tema do C... 54 51 0 eLCP 3 60 49 3

color.adobe.com

Browse visualizations



A project in beta by **ferd.io**

ALL FAMILY ▾ INPUT ▾ FUNCTION ▾ SHAPE ▾ Q i

Comparison

Concept visualisation

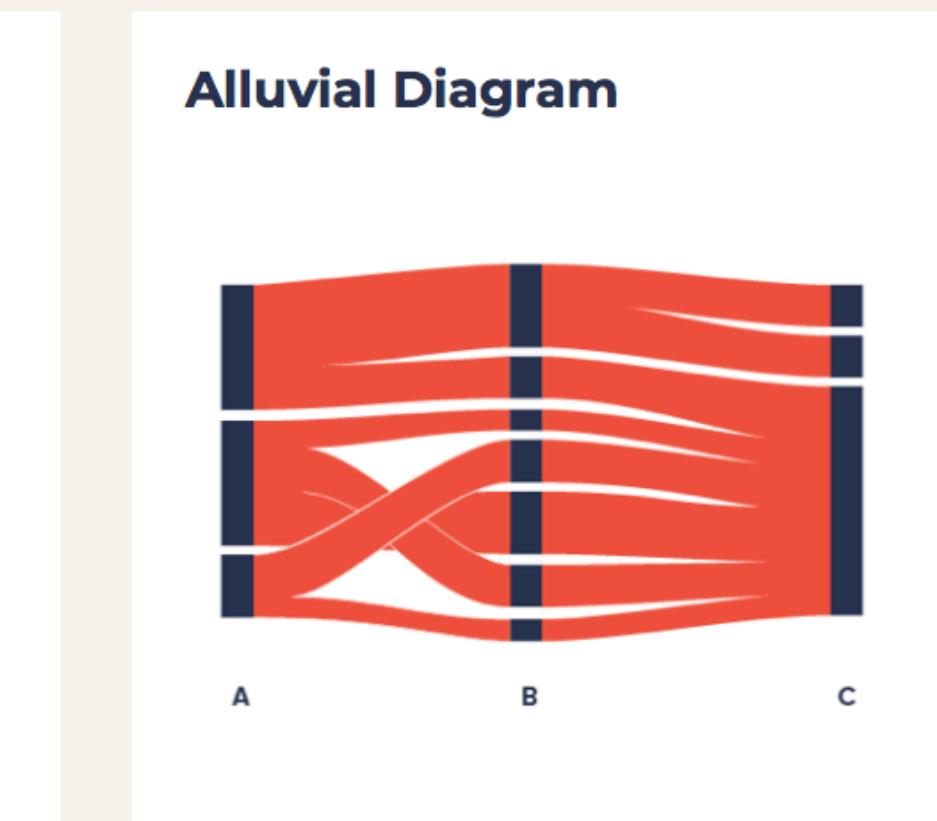
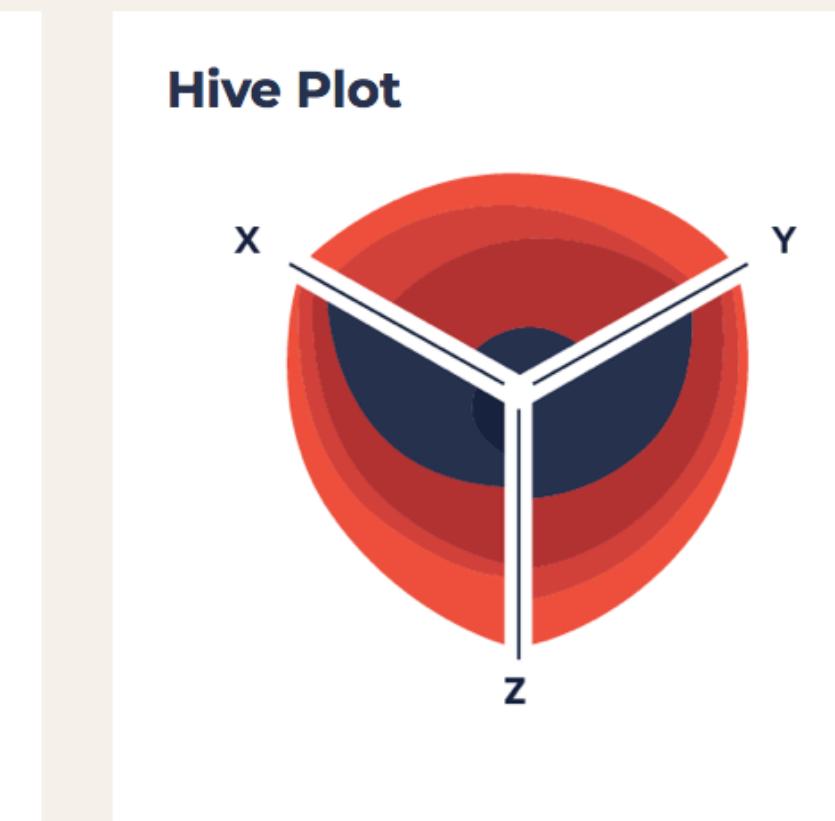
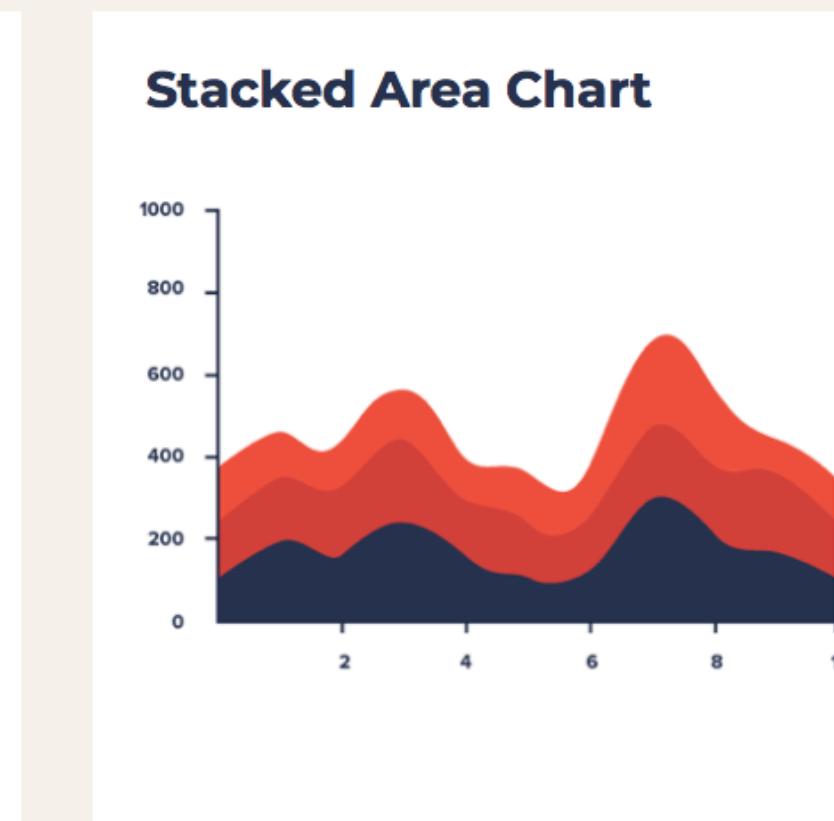
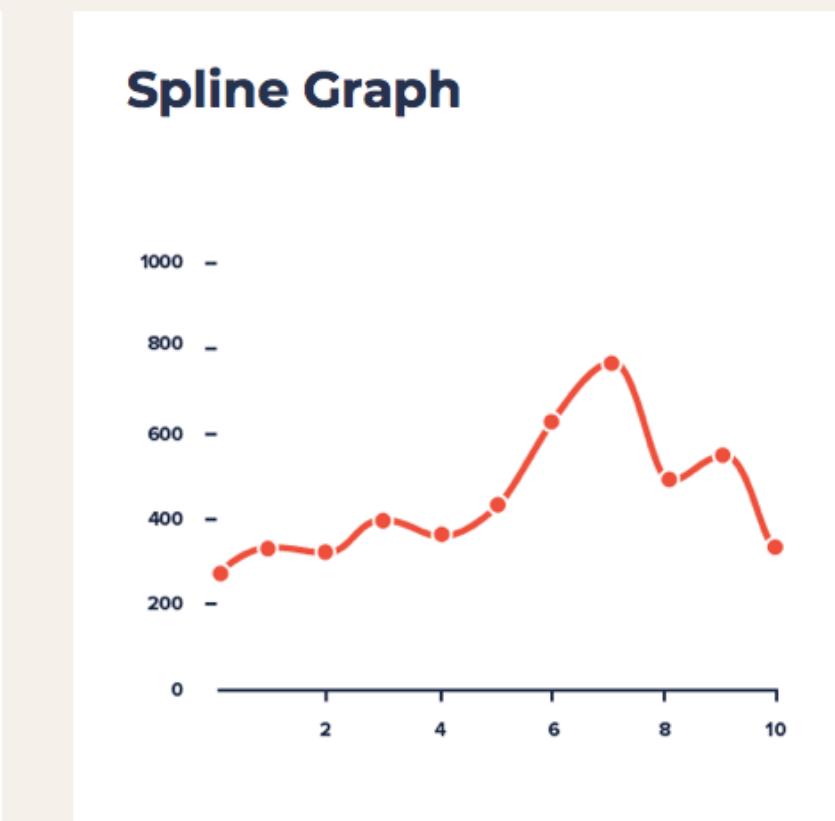
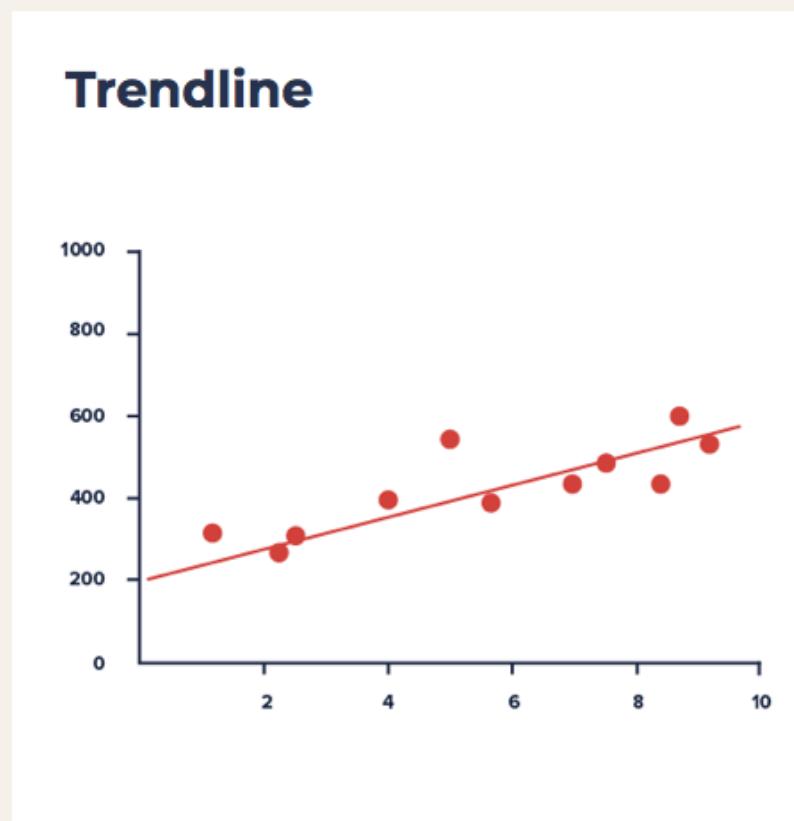
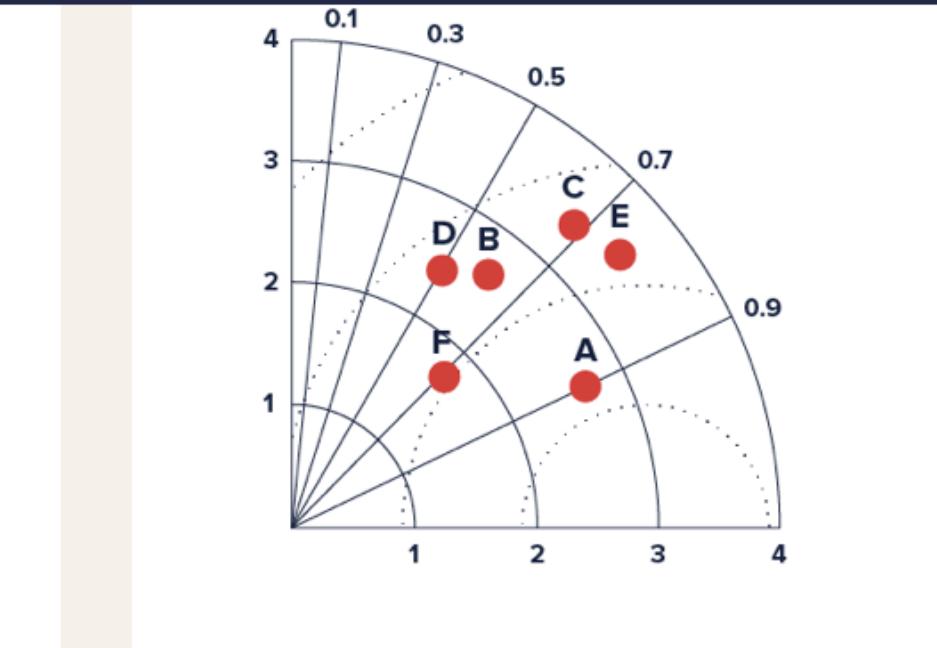
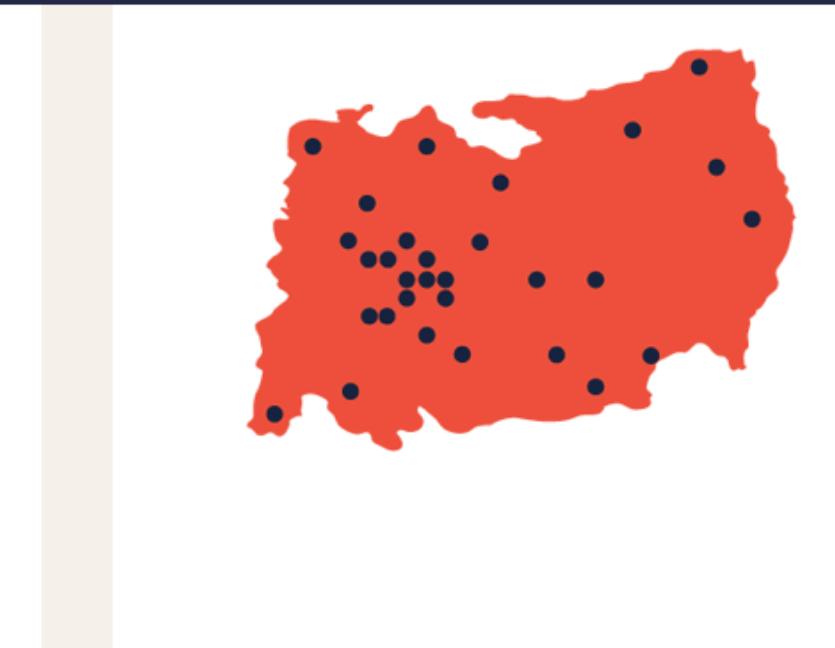
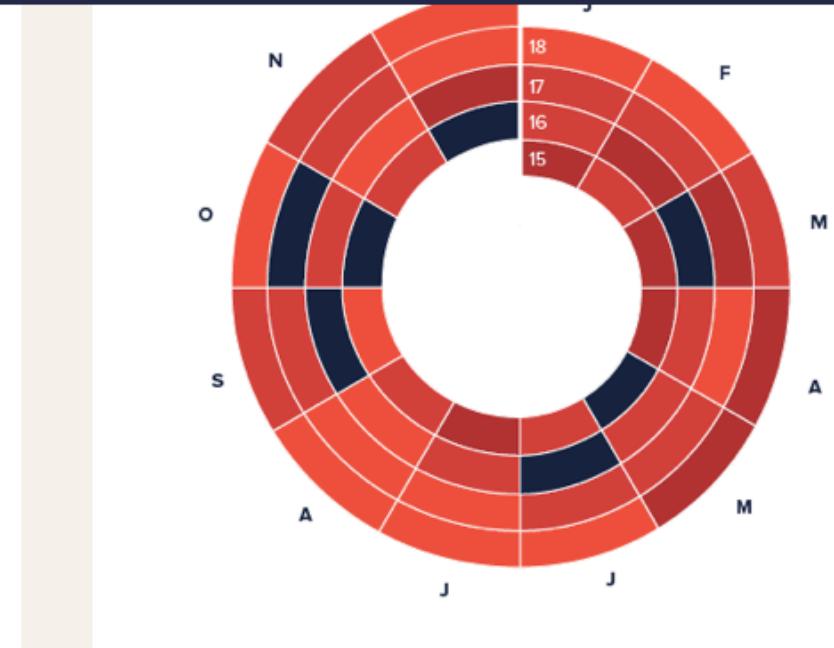
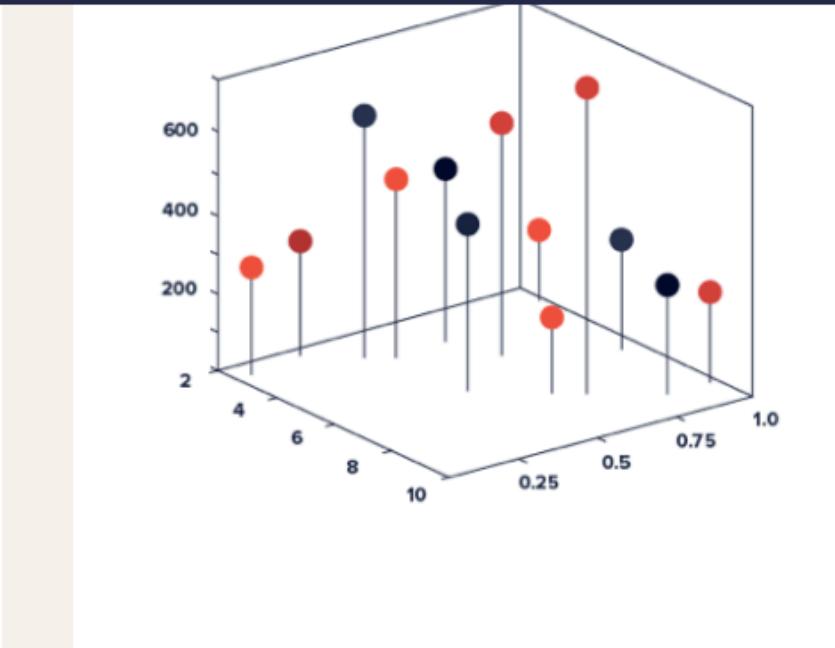
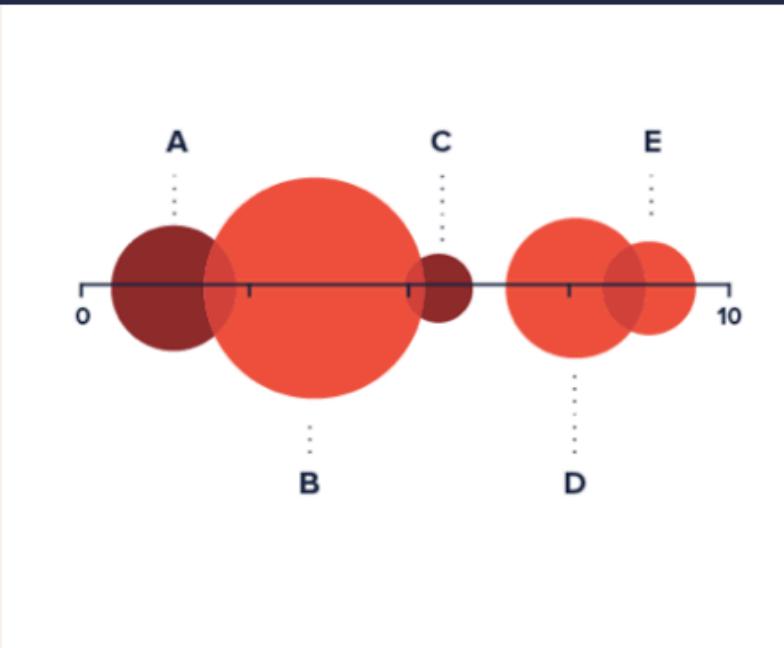
Correlation

Distribution

Geographical data

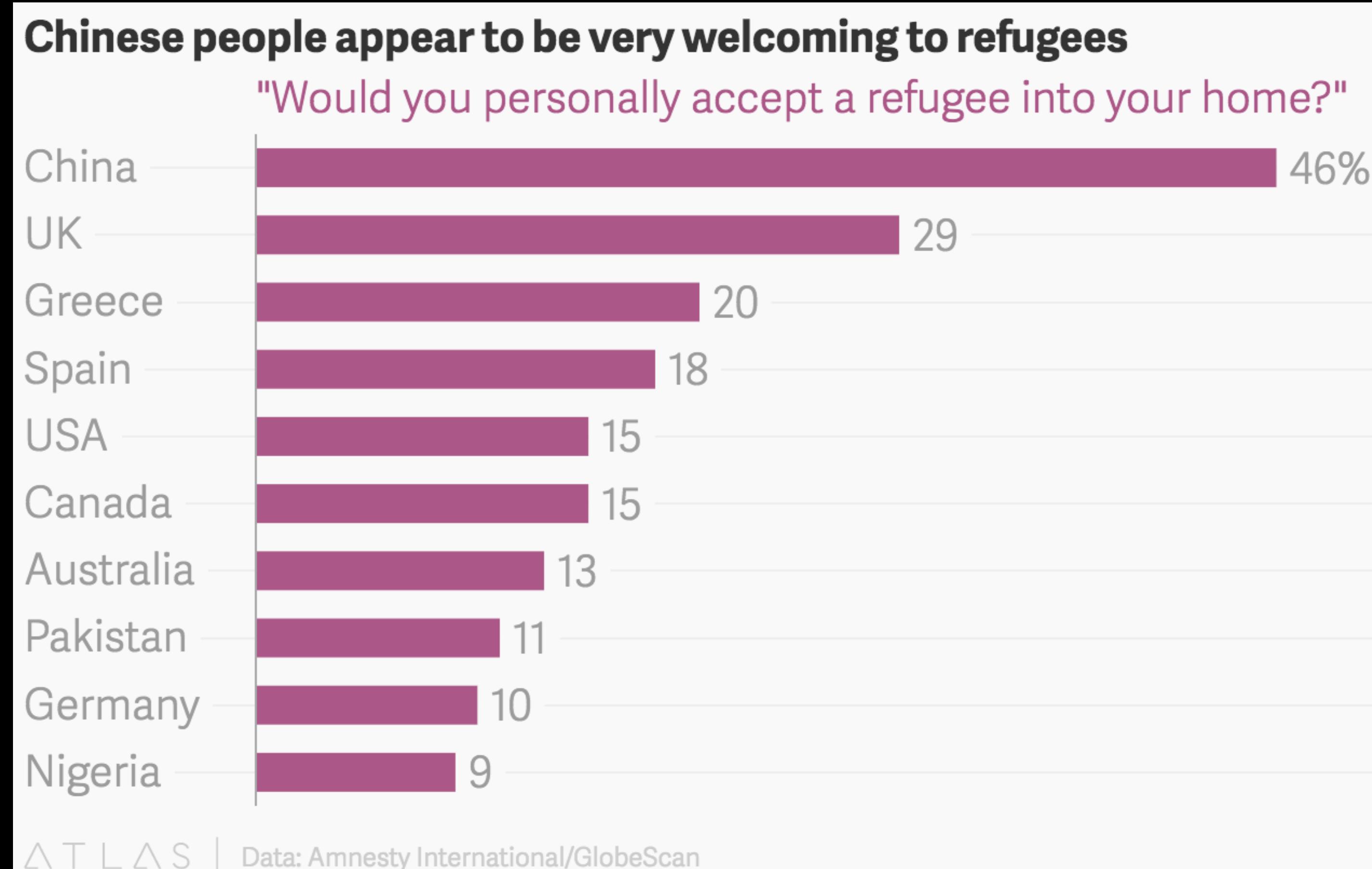
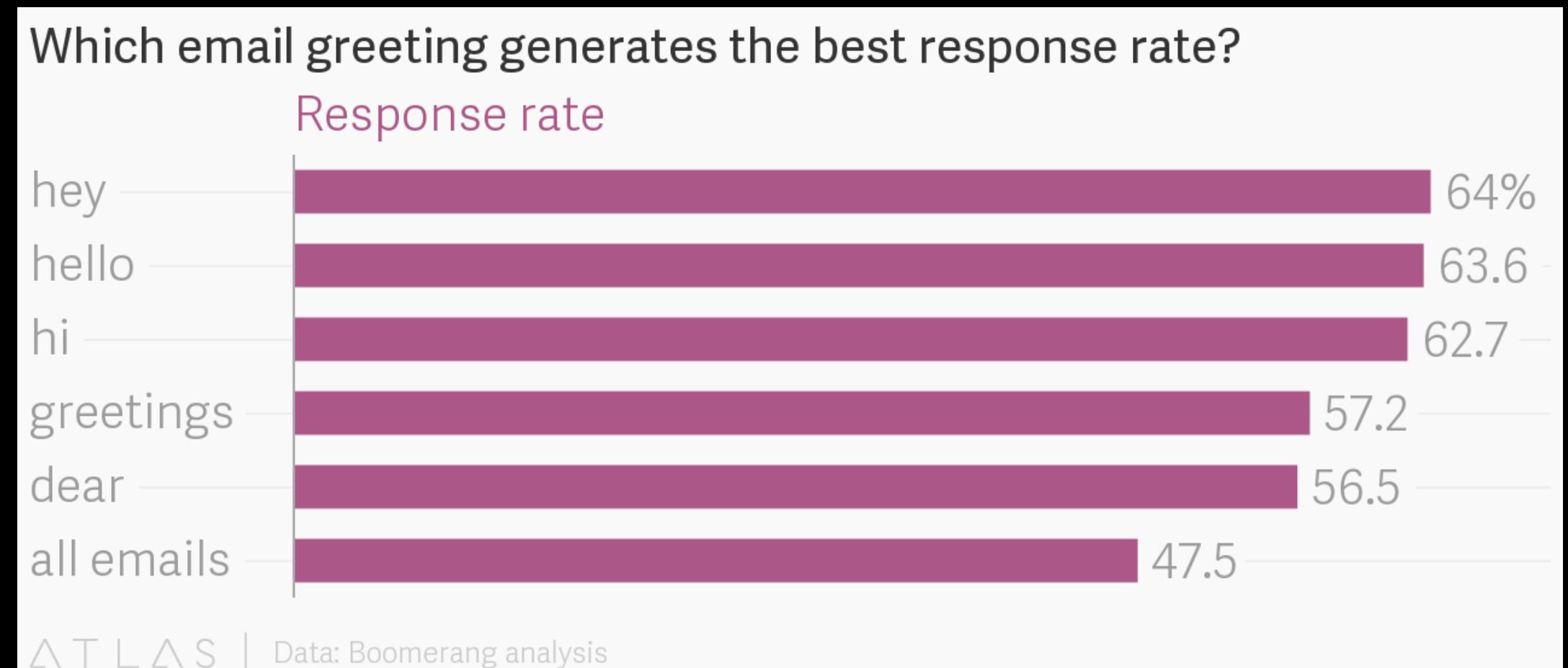
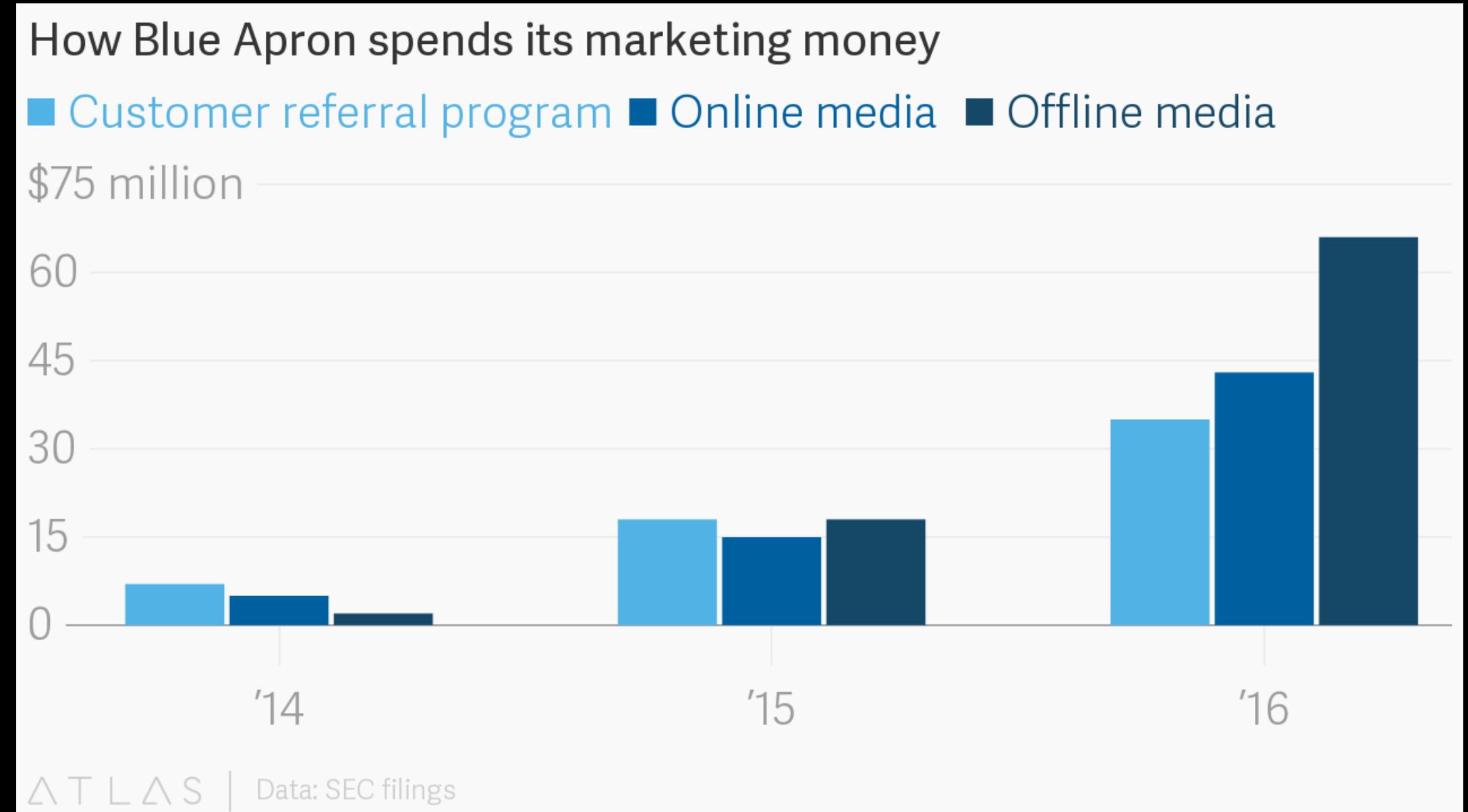
Part to whole

Trend over time



Browse example graphs

Do you agree with their choices?



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Books available in Mellon 409G

Alley, Michael (2013) The Craft of Scientific Presentations **Evidence-assertion paradigm:**
http://writing.engr.psu.edu/assertion_evidence.html

Doumont, Jean-luc (2005) **Trees, Maps, and Theorems**

Duarte, Nancy (2008) **slide:ology**: The Art and Science of Creating Great Presentations

Duarte, Nancy (2010) **Resonate**

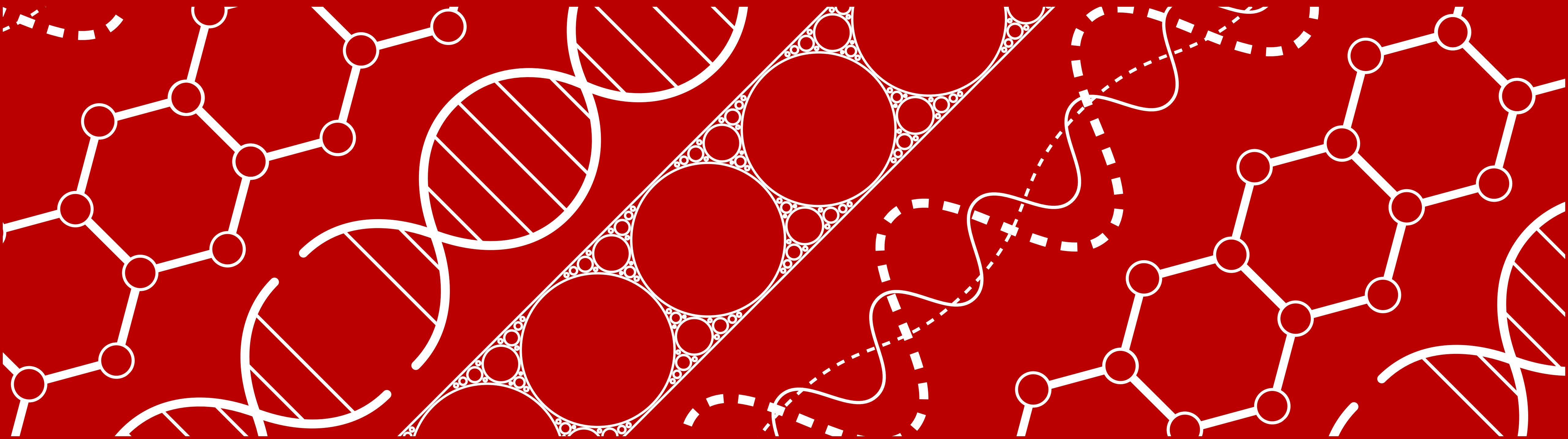
Stauffer Reto, et al. (2015) **Somewhere Over the Rainbow**
doi:10.1175/BAMS-D-13-00155.1

Tufte, Edward (1982) The Visual Display of Quantitative Information

Tufte, Edward (1990) Envisioning information

Zeileis Achim, et al. (2009) **Escaping RGBland**: Selecting colors for statistical graphics.
doi:10.1016/j.csda.2008.11.033

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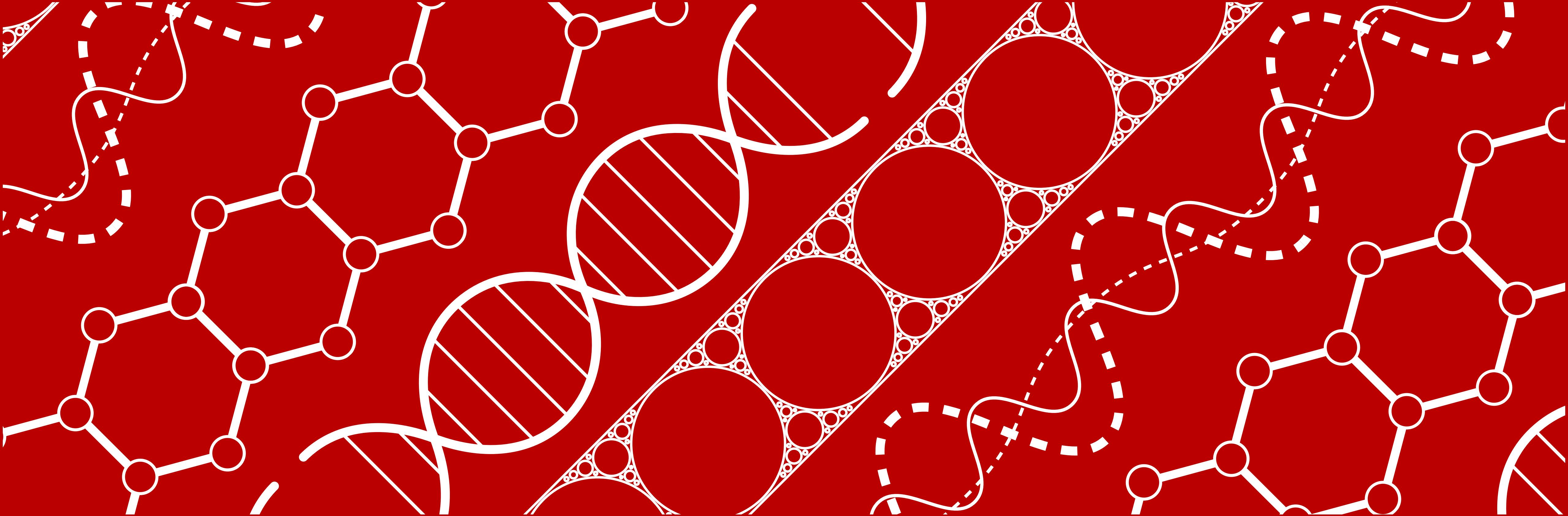
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Nov 27, 30 Crafting Explanation

Dec 4, 7 Vocal Delivery

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