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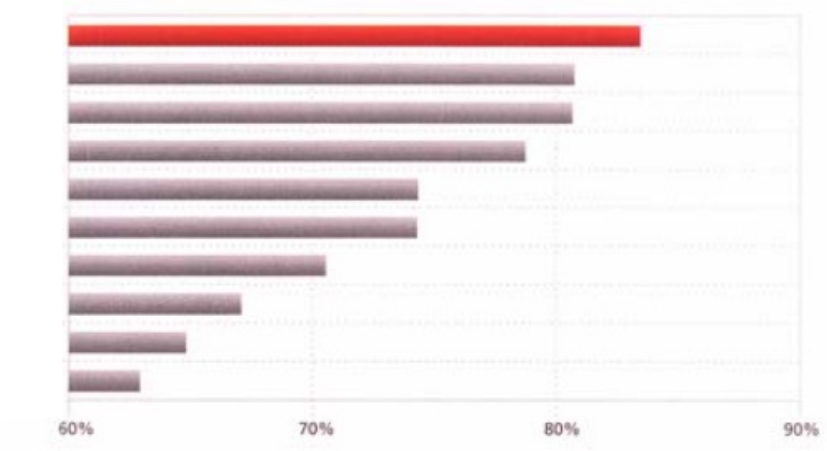
# *Designing* Figures and Tables for Publication and Presentation

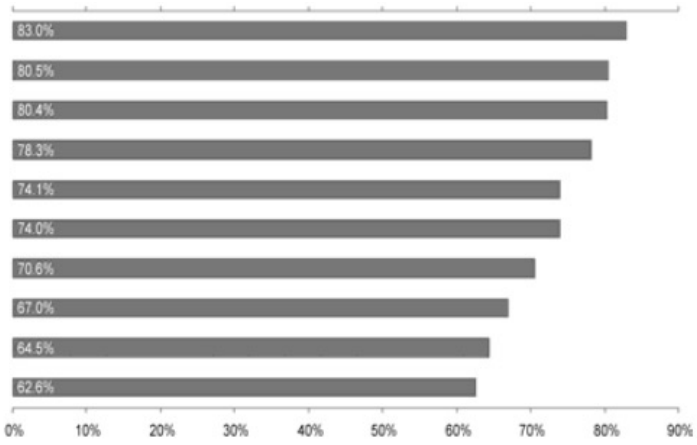
Tutor: Kali Tal, PhD (Research Support Services, University of Bern Medical Library)

# 1a. The Lie Factor

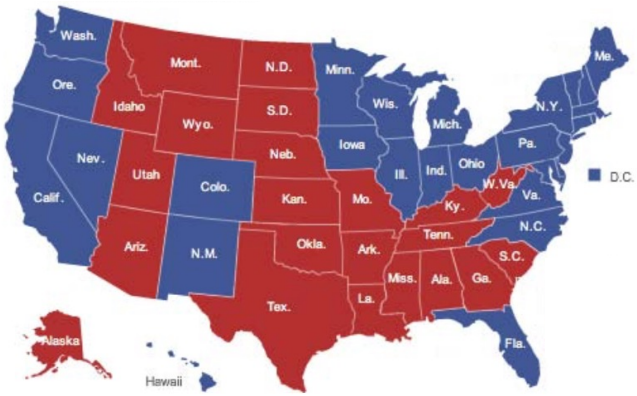
$$\text{Lie Factor} = \frac{\text{size of effect shown in graphic}}{\text{size of effect in data}}$$

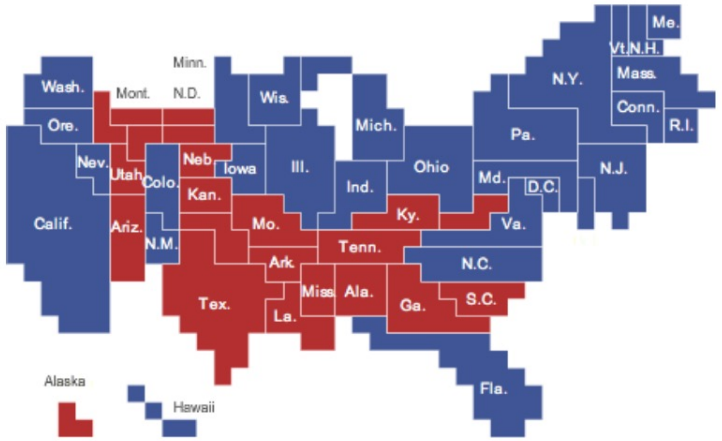
*"In practice almost all distortions involve overstating and Lie Factors of 2-5 are not uncommon."* (Edward Tufte)

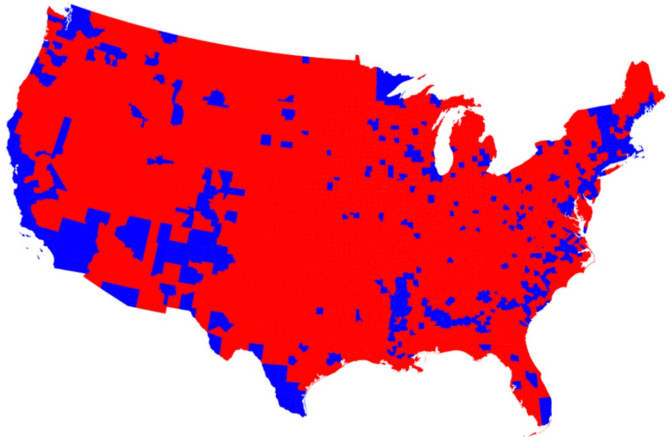


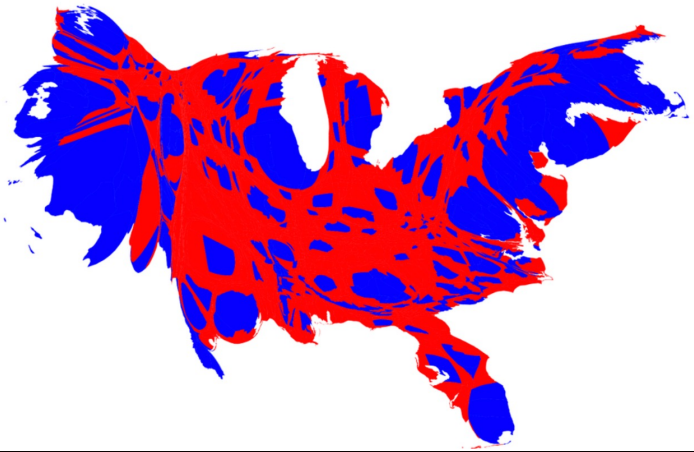



# 1b. The Lie Factor: Distorting with accurate maps





Electoral votes for President, divided by party.

But “states” don’t vote. People do!

Popular votes for President, county by county

Areas that look small on a map can be densely populated

# 2a. The point is not to show your data. It is to show what your data means!

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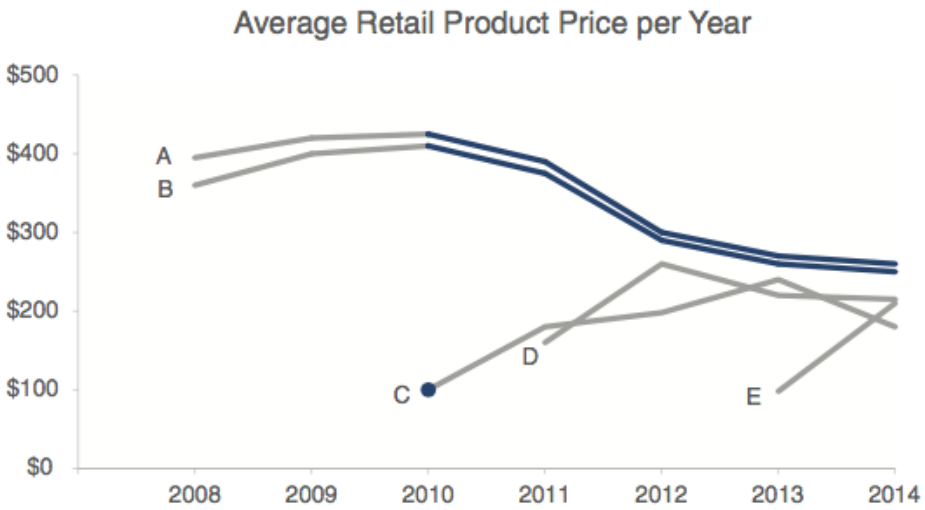
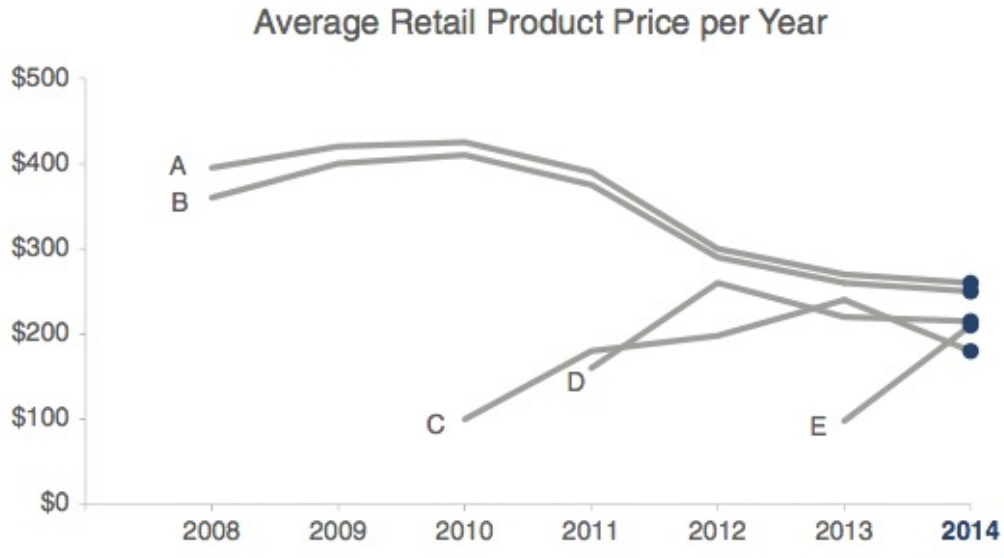
## Price decline (A&B)




## Price convergence




from Slide-ology, by Nancy Duarte

# 2b. Graphs show *relationships* between values

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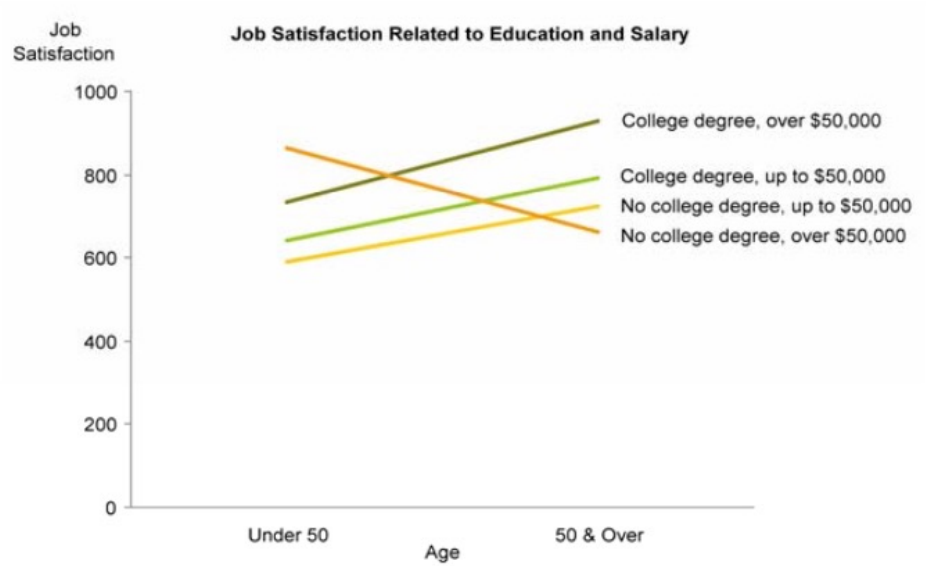
Job Satisfaction By Income, Education & Age

| | College Degrees | | No College Degrees | |
|---|---|---|---|---|
| Income | Under 50 | 50 & over | Under 50 | 50 & over |
| Up to $50,000 | 643 | 793 | 590 | 724 |
| Over $50,000 | 735 | 928 | 863 | 662 |




Relationships that are invisible in tables…

are suddenly revealed when you choose the right graph!

Example from Stefan Fry

# 3a. Keep your data-to-ink ratio high!

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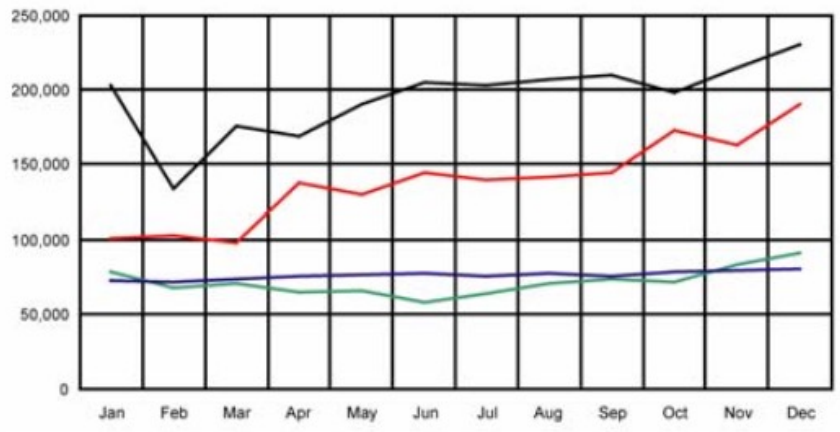
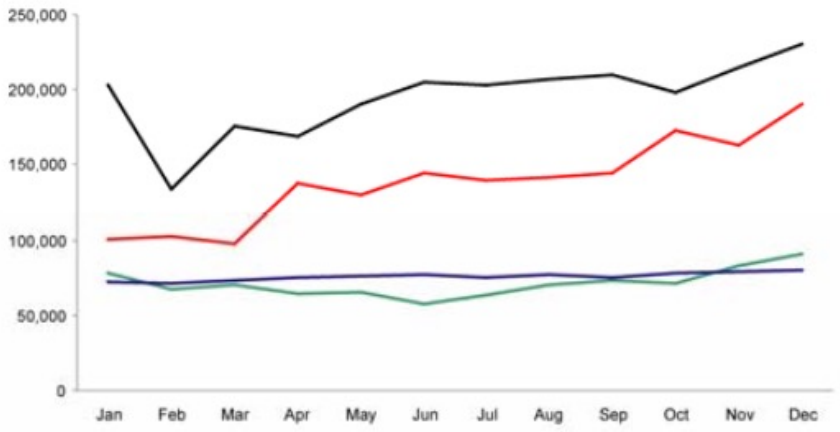
Graphs show the relationship between values by giving them shape.




Don’t obscure the shapes by cluttering your graphs with non-data ink.

Example from Stefan Fry

# 3b. Even tables can be improved by keeping your data-ink ratio high

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Heavy borders

| Group | Metric A | Metric B | Metric C |
|---|---|---|---|
| Group 1 | $X.X | Y% | Z,ZZZ |
| Group 2 | $X.X | Y% | Z,ZZZ |
| Group 3 | $X.X | Y% | Z,ZZZ |
| Group 4 | $X.X | Y% | Z,ZZZ |
| Group 5 | $X.X | Y% | Z,ZZZ |

Light borders

| Group | Metric A | Metric B | Metric C |
|---|---|---|---|
| Group 1 | $X.X | Y% | Z,ZZZ |
| Group 2 | $X.X | Y% | Z,ZZZ |
| Group 3 | $X.X | Y% | Z,ZZZ |
| Group 4 | $X.X | Y% | Z,ZZZ |
| Group 5 | $X.X | Y% | Z,ZZZ |

Minimal borders

| Group | Metric A | Metric B | Metric C |
|---|---|---|---|
| Group 1 | $X.X | Y% | Z,ZZZ |
| Group 2 | $X.X | Y% | Z,ZZZ |
| Group 3 | $X.X | Y% | Z,ZZZ |
| Group 4 | $X.X | Y% | Z,ZZZ |
| Group 5 | $X.X | Y% | Z,ZZZ |

Push your key data to the front and let less important data recede

| | A | B | C |
|---|---|---|---|
| Category 1 | 15% | 22% | 42% |
| Category 2 | 40% | 36% | 20% |
| Category 3 | 35% | 17% | 34% |
| Category 4 | 30% | 29% | 26% |
| Category 5 | 55% | 30% | 58% |
| Category 6 | 11% | 25% | 49% |

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|---|---|---|---|
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Example from Stefan Fry

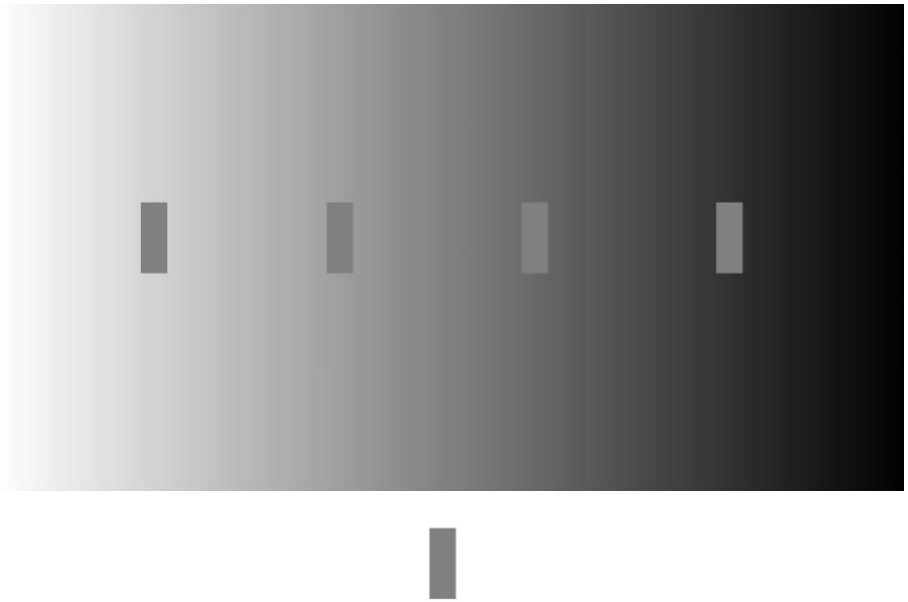
# 4a: Perspective: where we stand determines what we see




A clear hierarchy…




becomes a collaboration if we shift perspective



Example from Nancy Duarte

# 4b. It's hard to think around circles. Avoid pie charts like the plague

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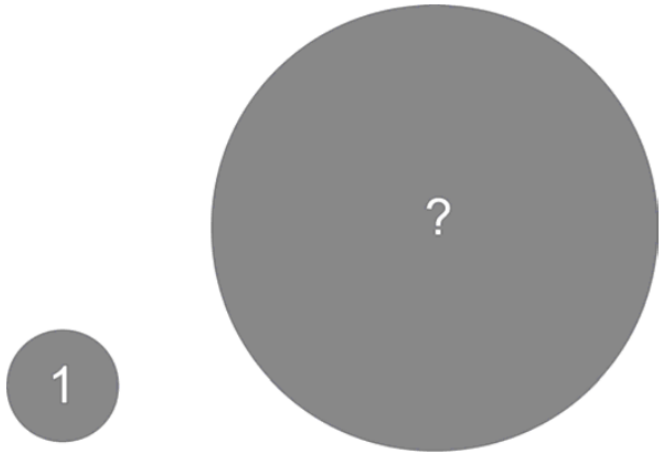
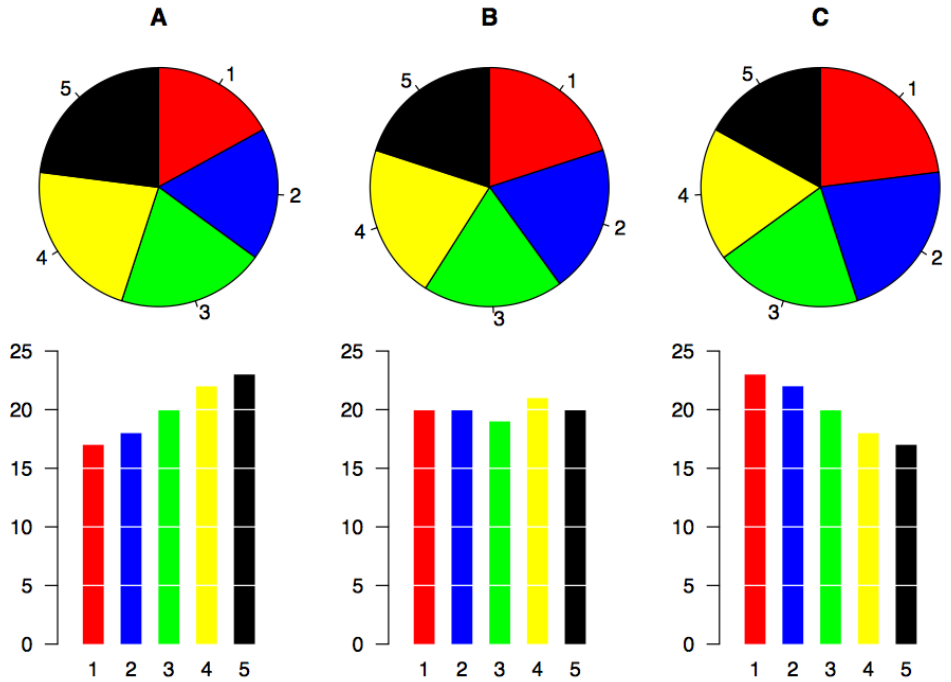



16x




Example from Stefan Fry

# 5a. Color is data ink. Use it sparingly and with intent. More is not better.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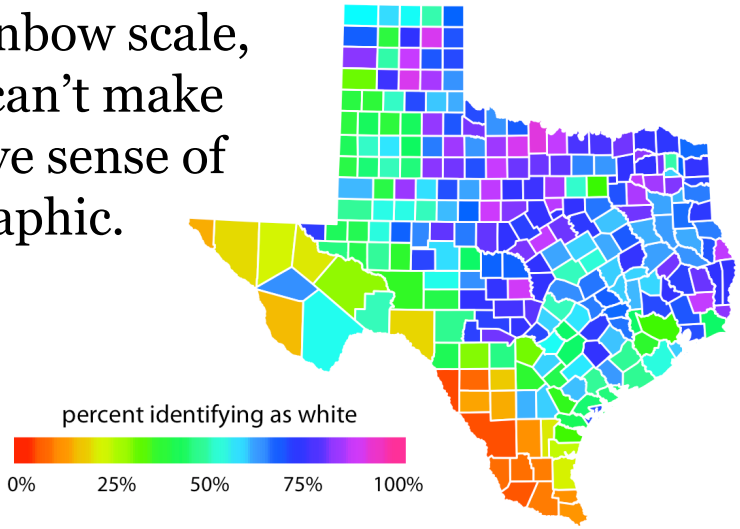
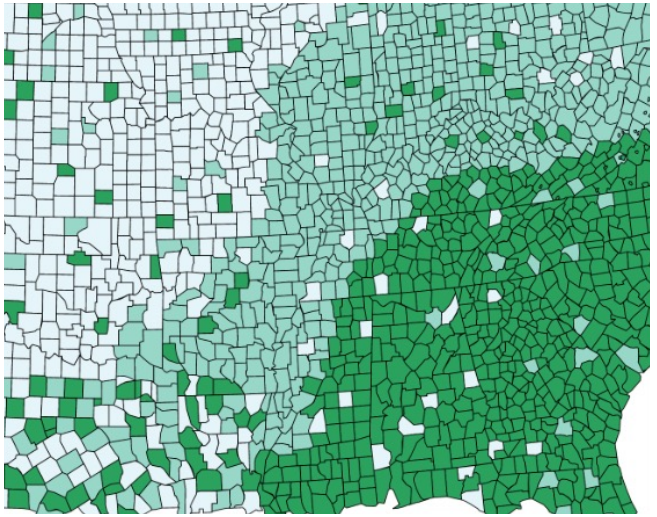
There is no logic to the rainbow scale, so we can't make intuitive sense of this graphic.



Varying saturation makes differences more visible than varying hue.

# 5b. Design for people with color-blindness (8% of men; .5% of women)

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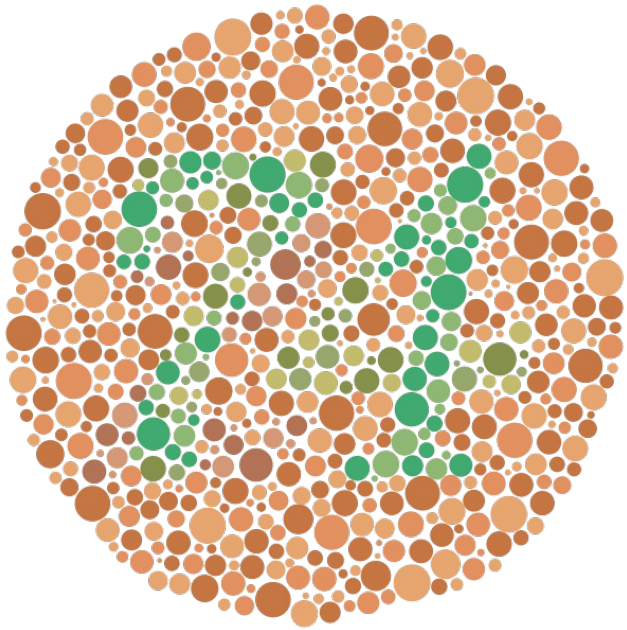
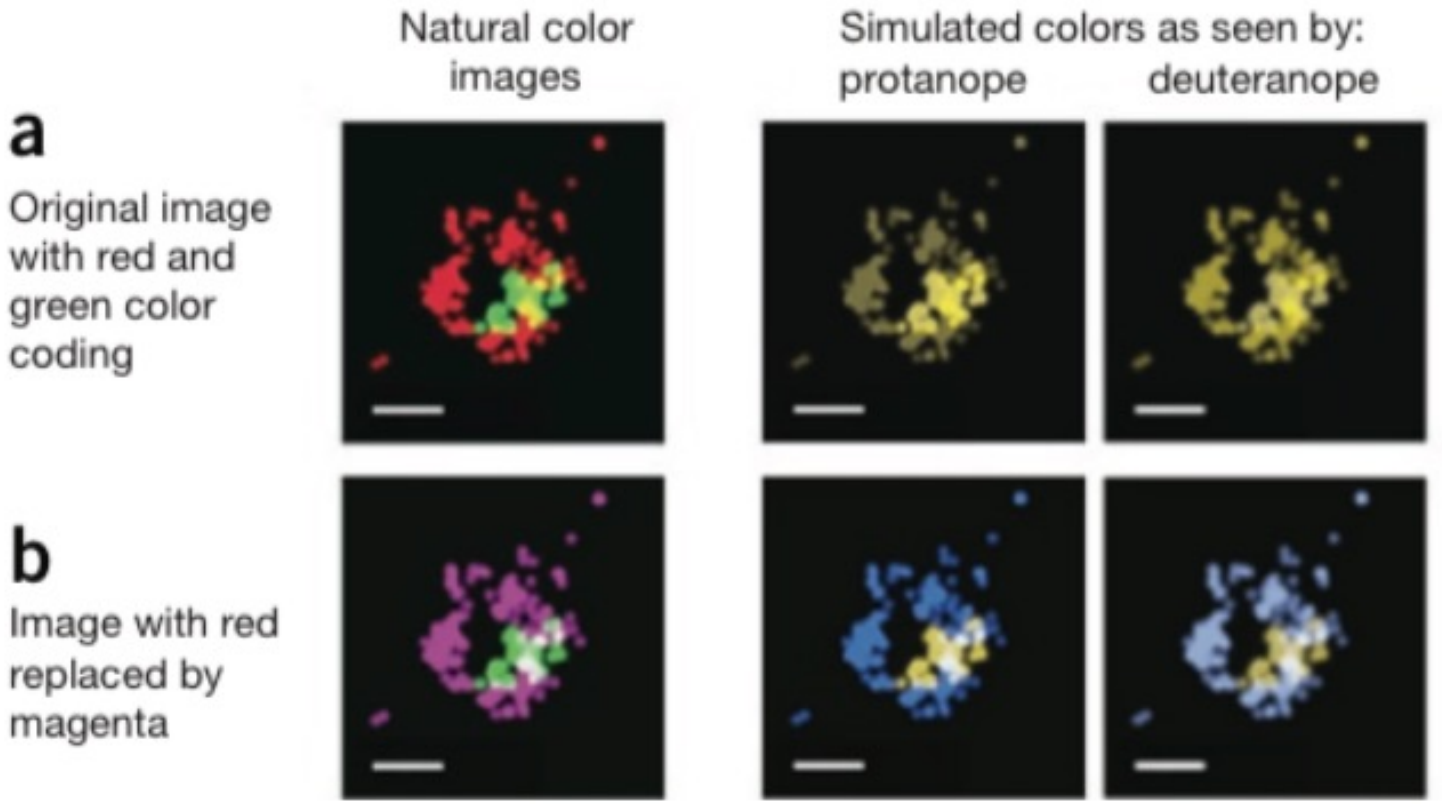


Choose a color palette that will work for people with and without color-blindness

| | Original | Simulation | | | | for Photoshop, Illustrator, Freehand, etc. | | for Word, Power Point, Canvas, etc. |
|---|---|---|---|---|---|---|---|---|
| | | Protan | Deutan | Tritan | Hue | C,M,Y,K (%) | R,G,B (0-255) | R,G,B (%) |
| 1 | | | | | – ° | (0,0,0,100) | (0,0,0) | (0,0,0) |
| 2 | | | | | 41° | (0,50,100,0) | (230,159,0) | (90,60,0) |
| 3 | | | | | 202° | (80,0,0,0) | (86,180,233) | (35,70,90) |
| 4 | | | | | 164° | (97,0,75,0) | (0,158,115) | (0,60,50) |
| 5 | | | | | 56° | (10,5,90,0) | (240,228,66) | (95,90,25) |
| 6 | | | | | 202° | (100,50,0,0) | (0,114,178) | (0,45,70) |
| 7 | | | | | 27° | (0,80,100,0) | (213,94,0) | (80,40,0) |
| 8 | | | | | 326° | (10,70,0,0) | (204,121,167) | (80,60,70) |

# 5c. Don’t forget to recolor your photographic images!




Red-green color coding in an immunofluorescent image. (a) Conventional color coding is difficult for individuals with red-green color blindness (protanopia or deuteranopia) to discriminate. (b) Replacing red with magenta (top) or green with turquoise (bottom) improves visibility for such individuals. Nat Methods. 2011 Jun;8(6):441.

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