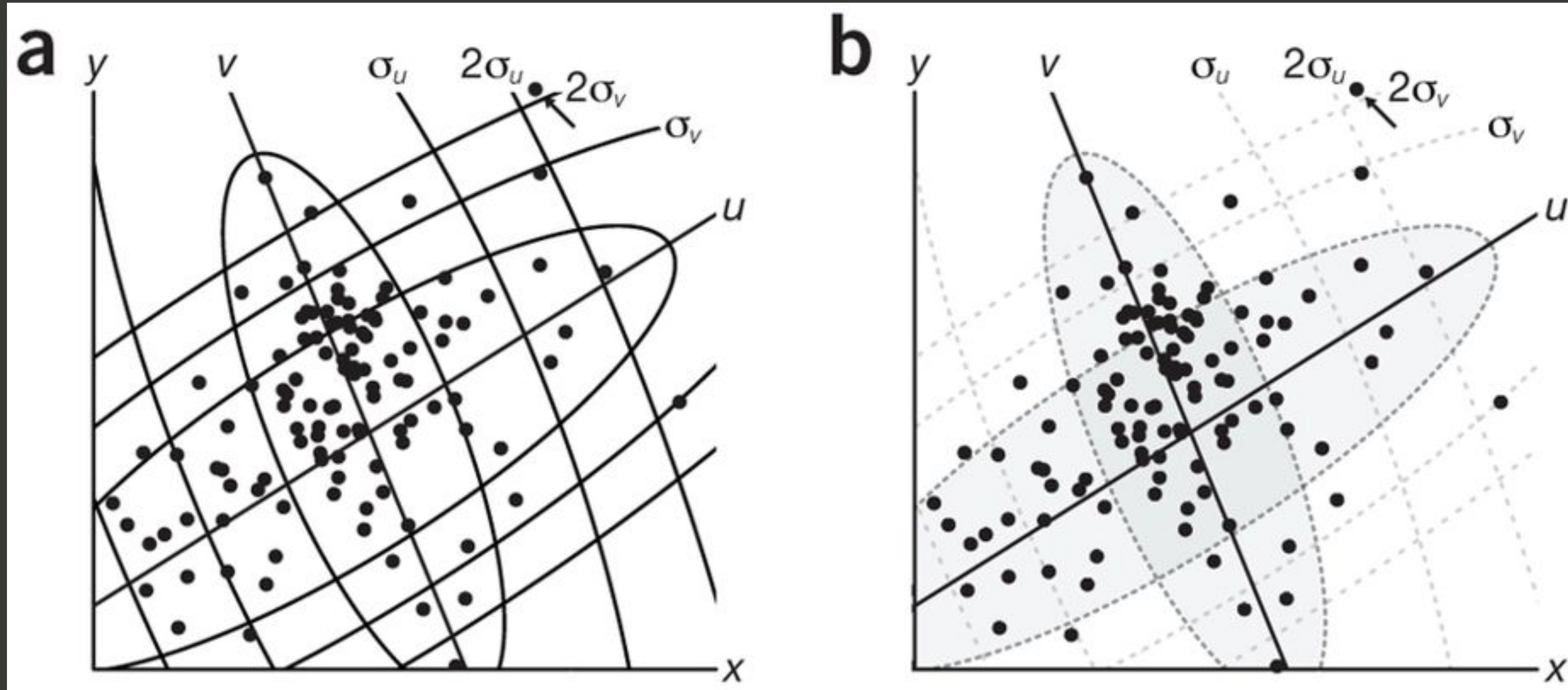


Upper limits obtained in the hours after explosion for SN 2011fe enable precise constraints on the radius of the progenitor star when compared to expectations from shock break-out models. Combined with pre-explosion limits on the temperature of the progenitor, it is possible to definitively conclude that a WD must have exploded for this type Ia SN.

Human brain is not a multiprocessor

Information transmission needs to be efficient
Impossible to simultaneously read *and* listen

Building Visualizations via Principles of Design



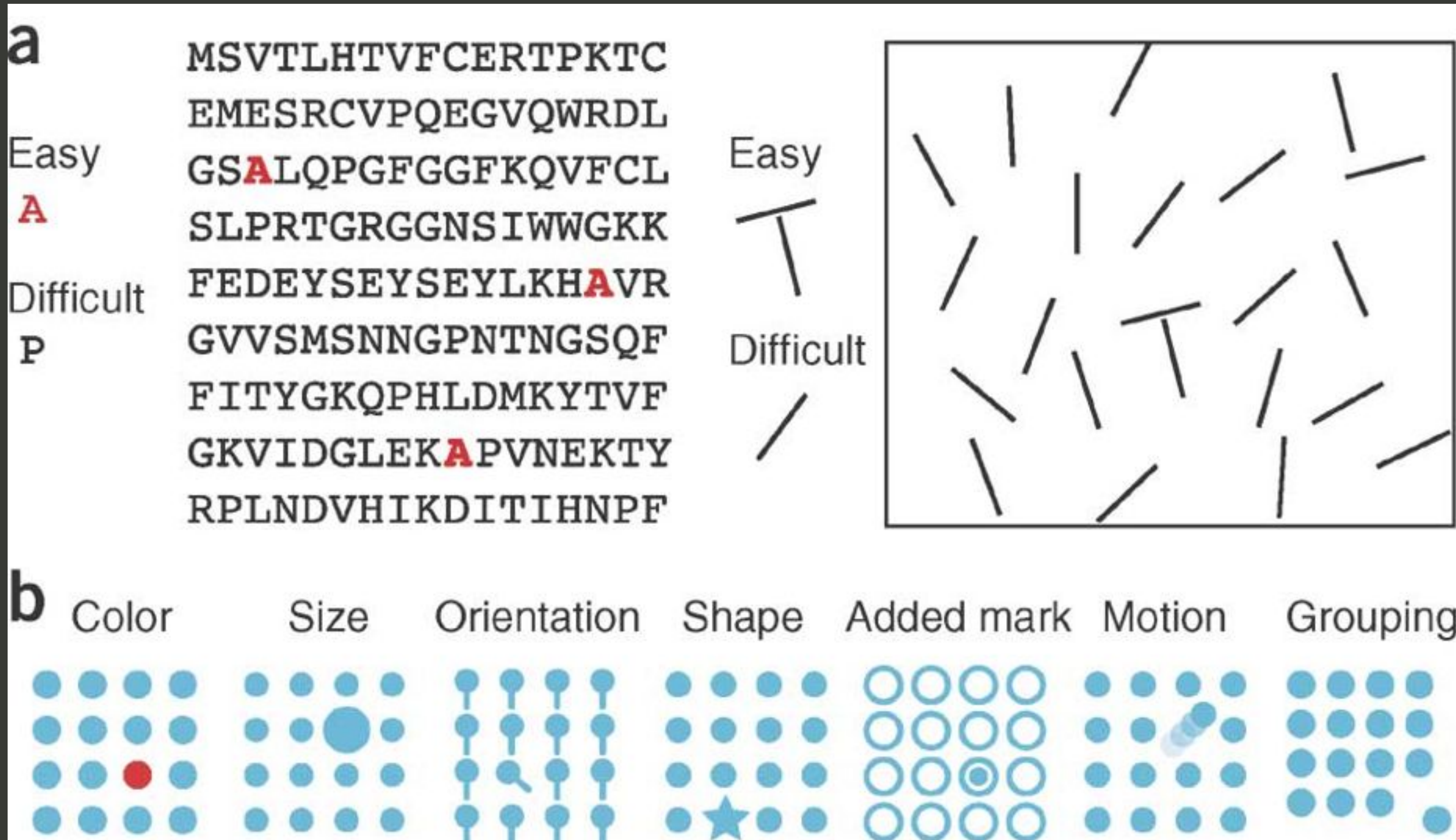
Adam A Miller
Northwestern/CIERA

LSST-DA DSFP Session 23
08 May 2025

Krzywinski, Nature Methods, 2013

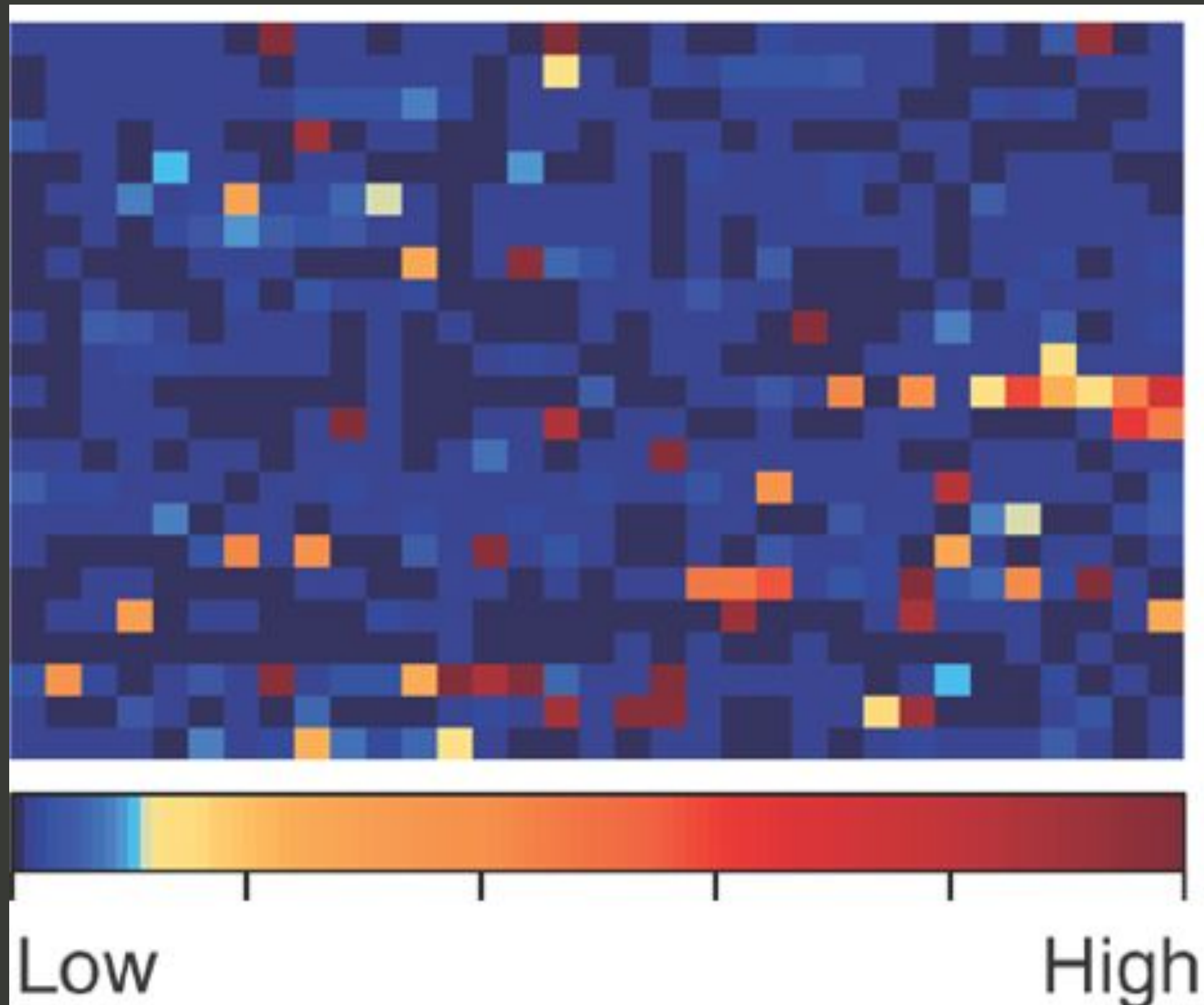
Salience

Things that stand out are easy to find



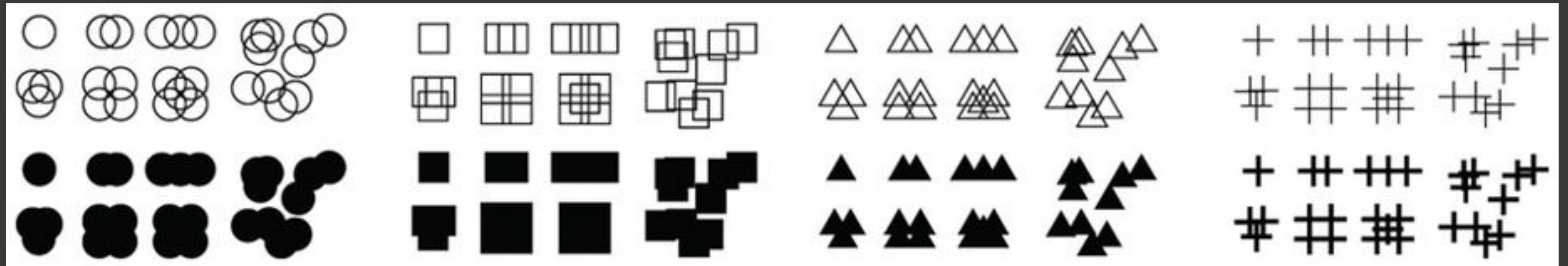
Salience

Salience must match relevance



Symbols

Hollow circle is the most flexible and robust



Symbols

Form strong visual boundaries

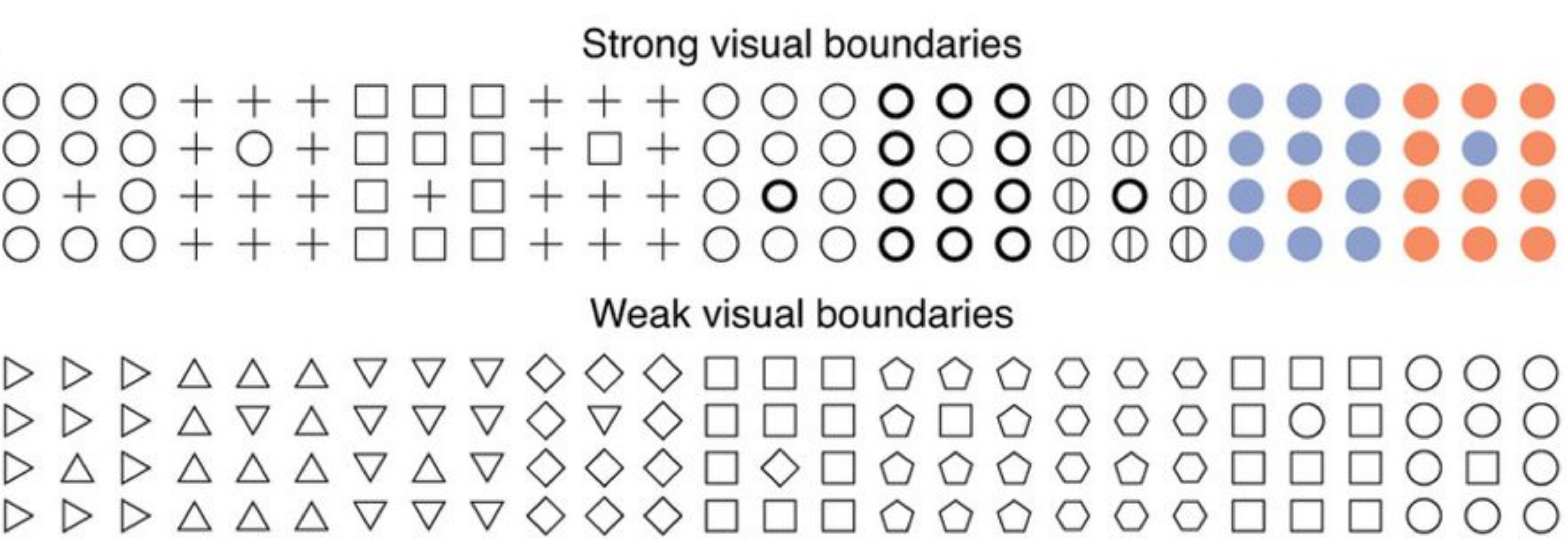


Figure Design

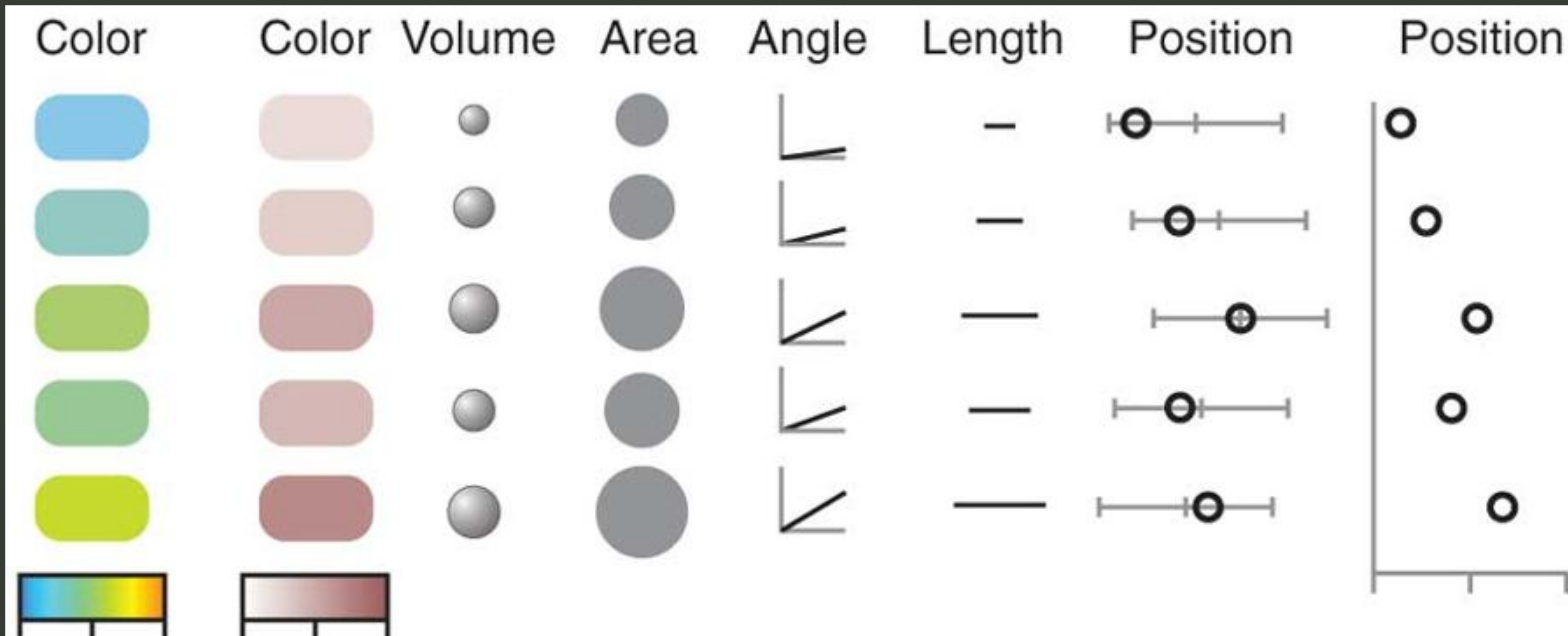
Use easy-to-estimate visual representations

Rank	Aspect to Compare
1	Positions on a common scale
2	Positions on the same but nonaligned scales
3	Lengths
4	Angles, slopes
5	Area
6	Volume, color saturation
7	Hue

Figure Design

Use easy-to-estimate visual representations

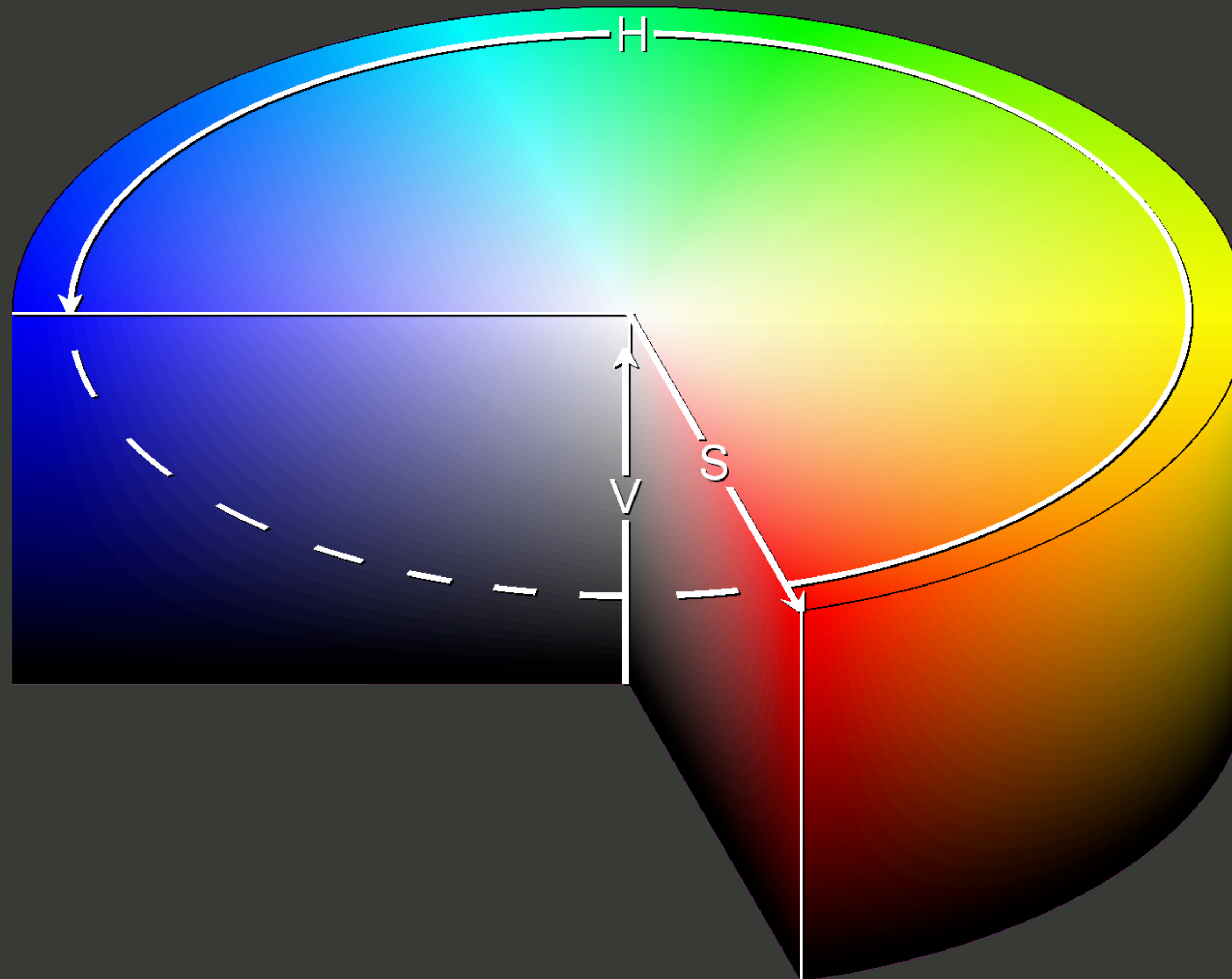
positions = easy
colors = hard



Color

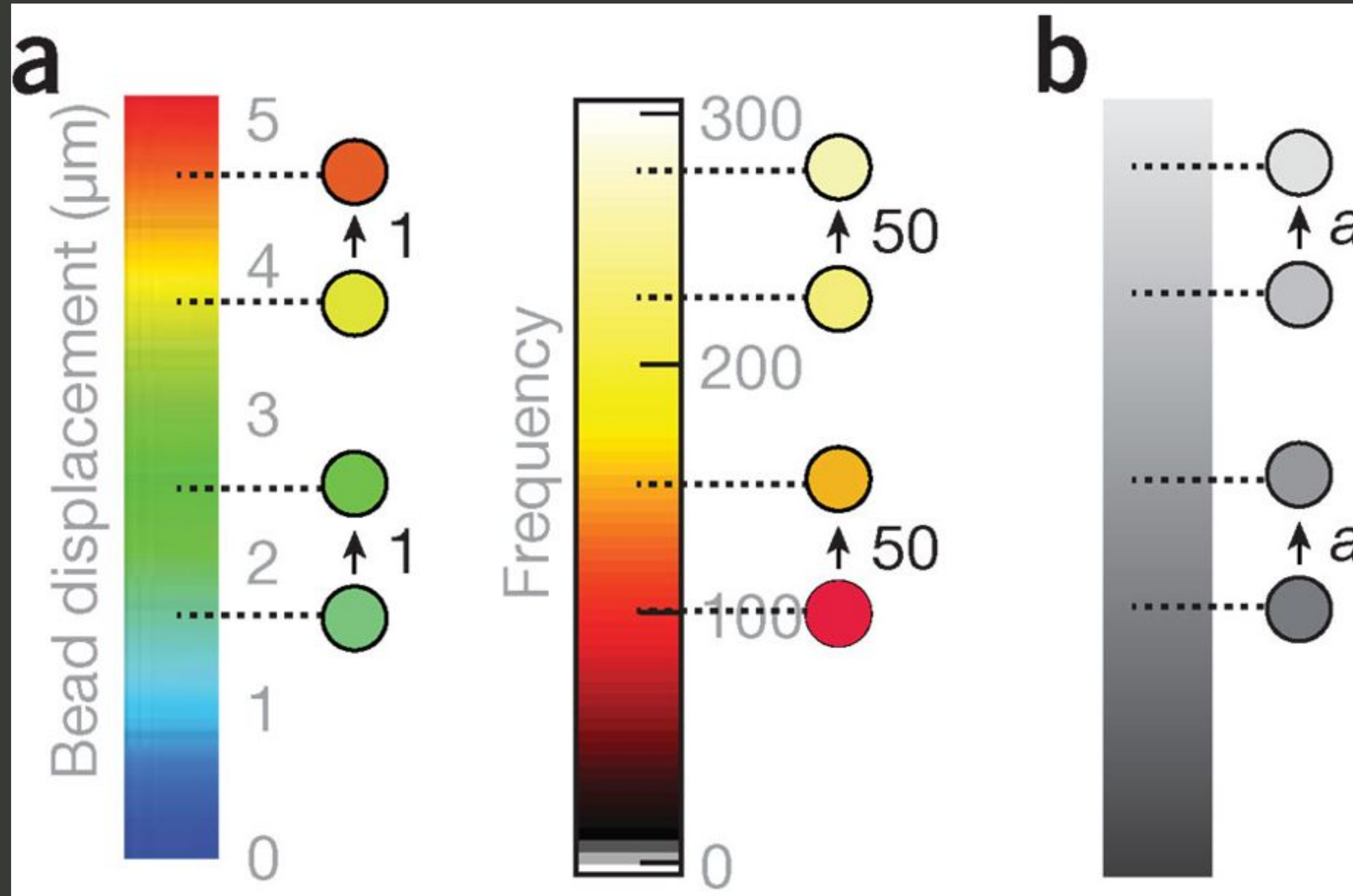
Color defined by hue, saturation, value

best for categorical data
> 6 = hard to interpret



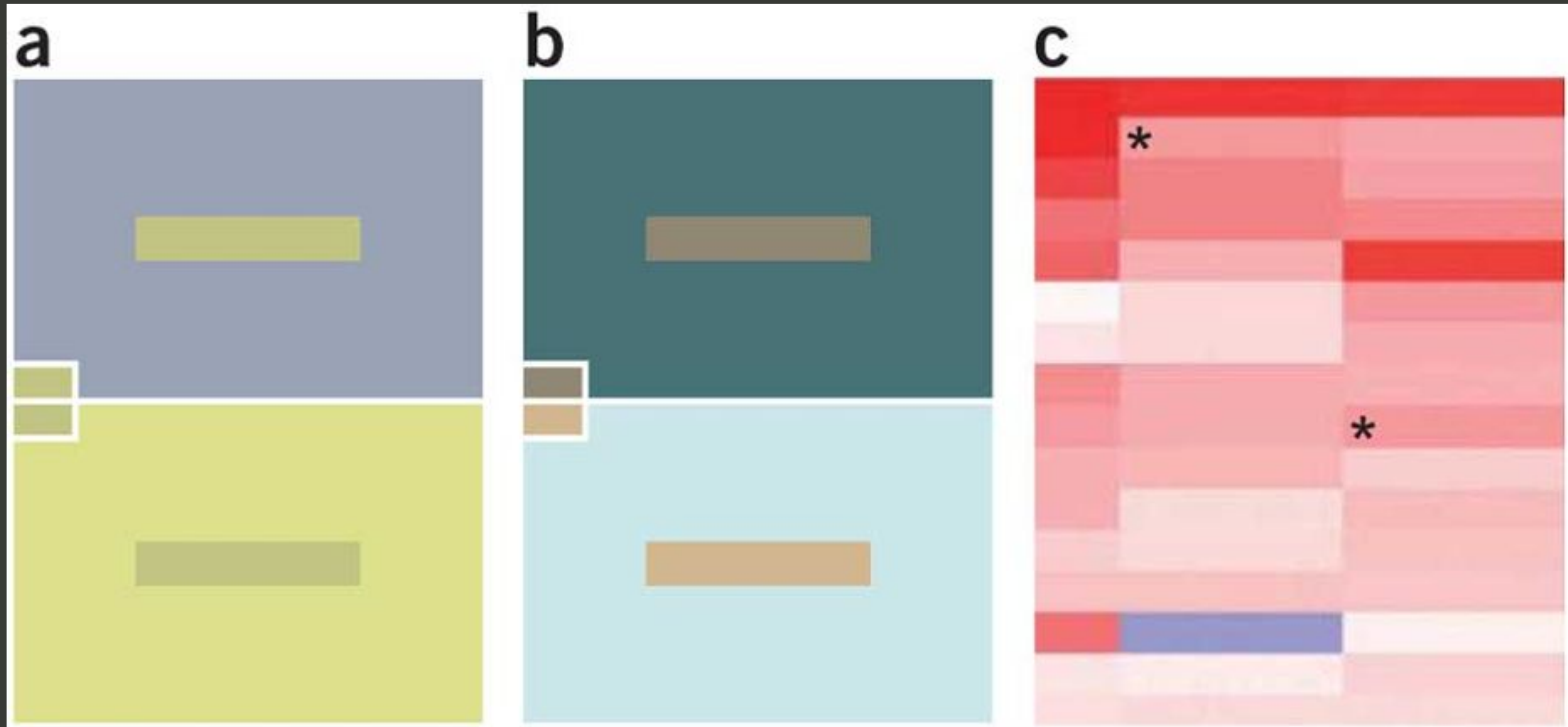
Color

Hue does a poor job encoding relative numerical values



Color

Color perception depends on context



Color

Select semantically resonant colors

banana

anger

money

sky

Color

Select semantically resonant colors

banana

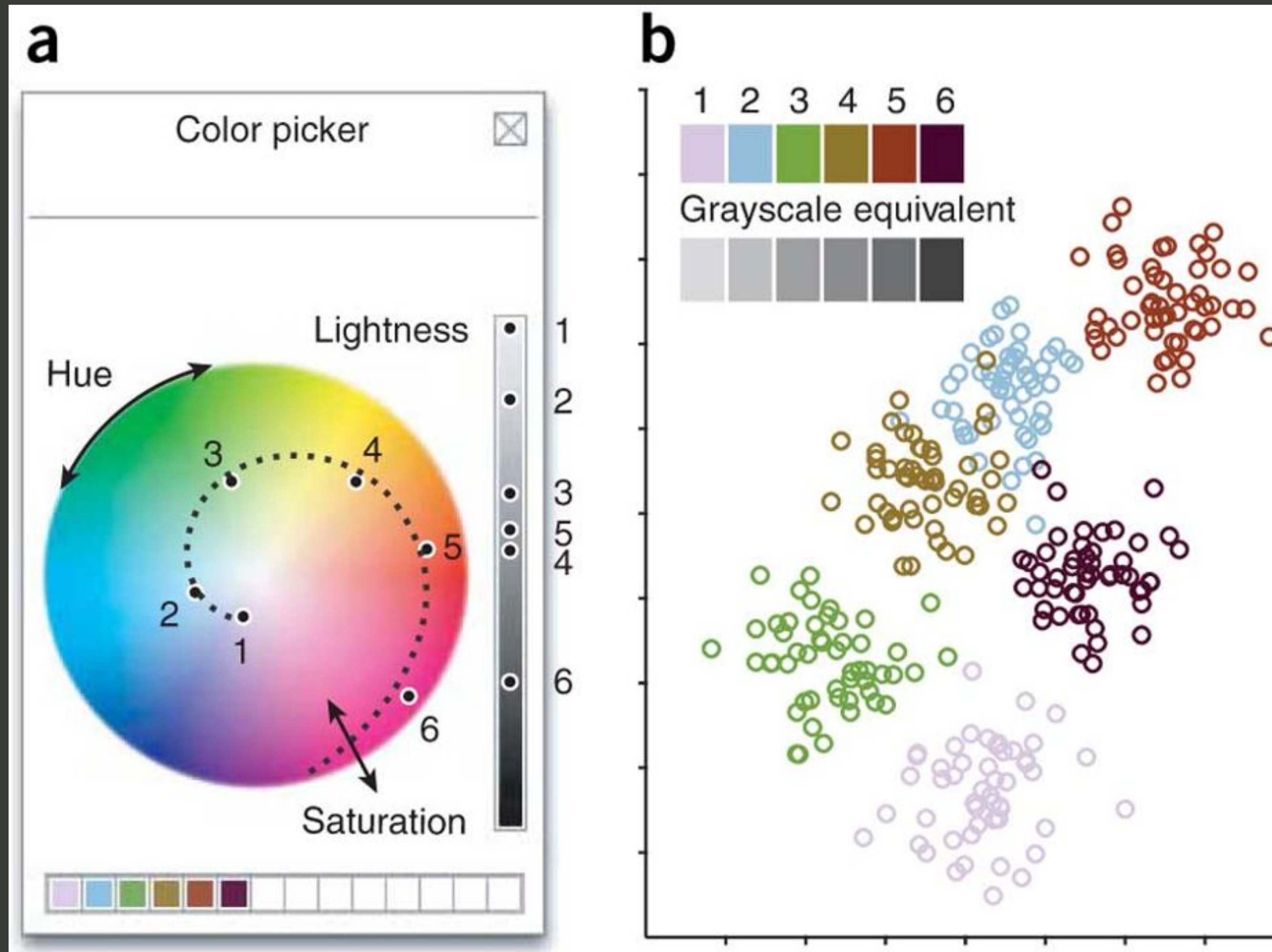
anger

money

sky

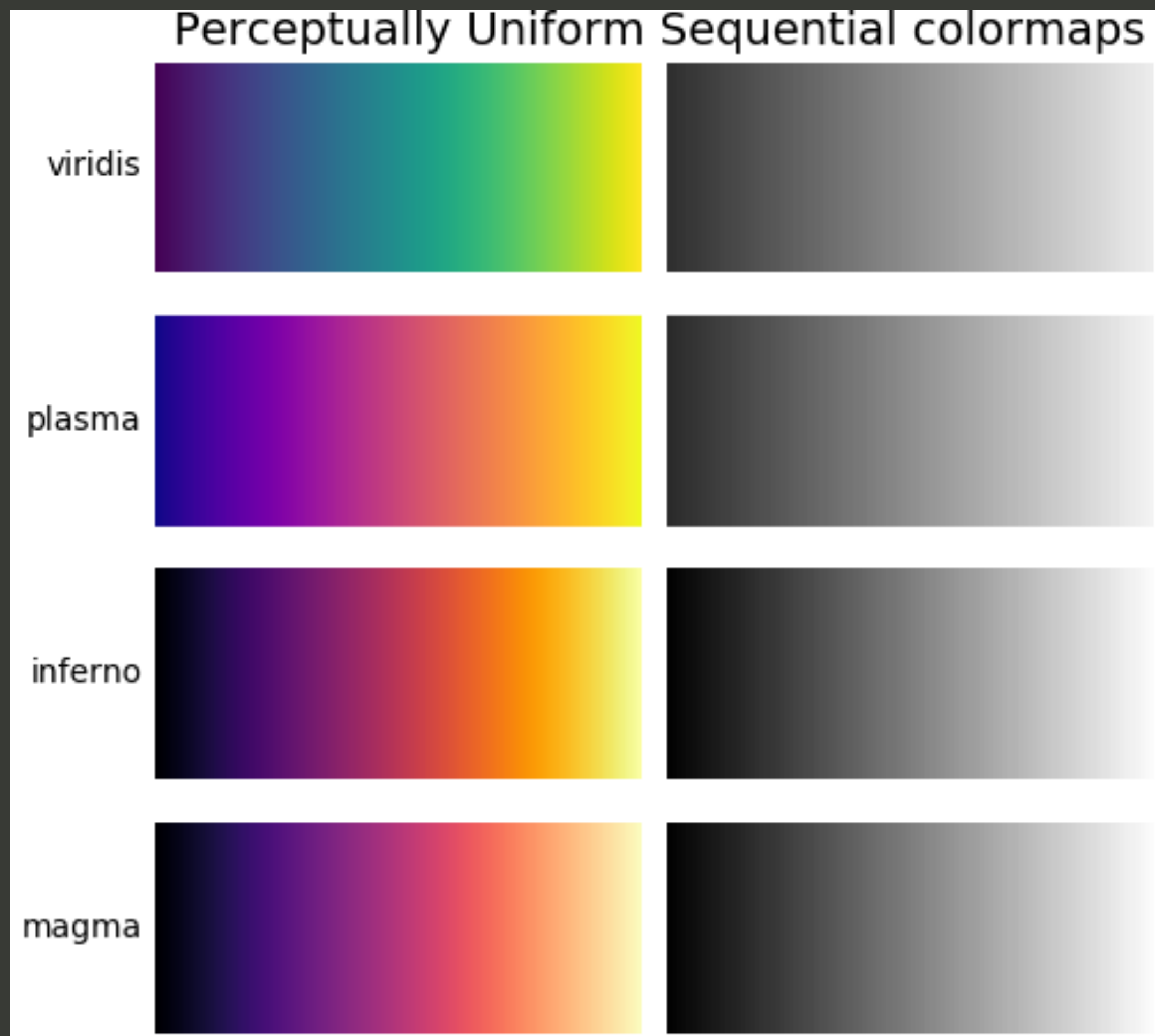
Color

Rotate through color wheel for categorical selection



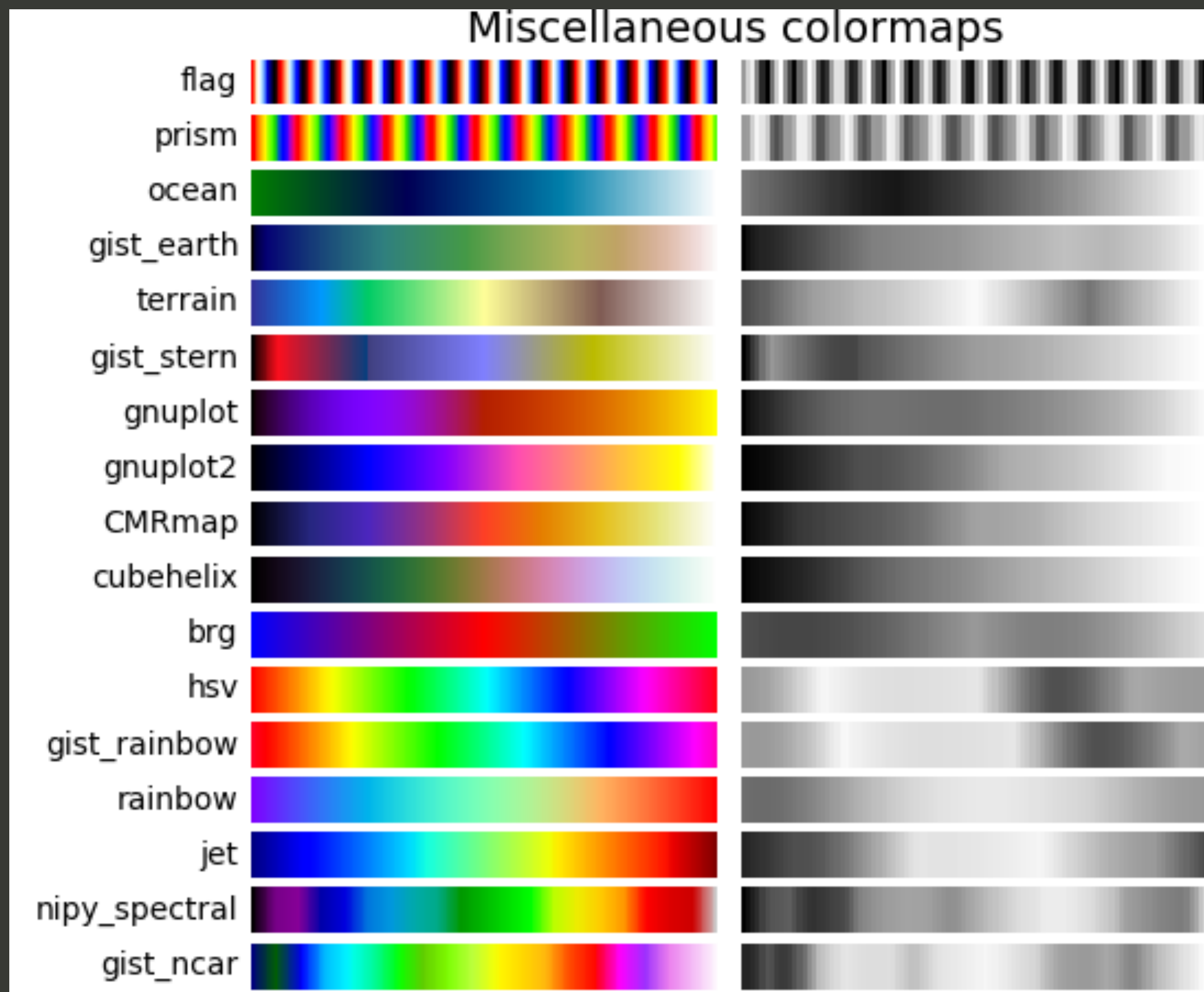
Color

What does it look like in greyscale?



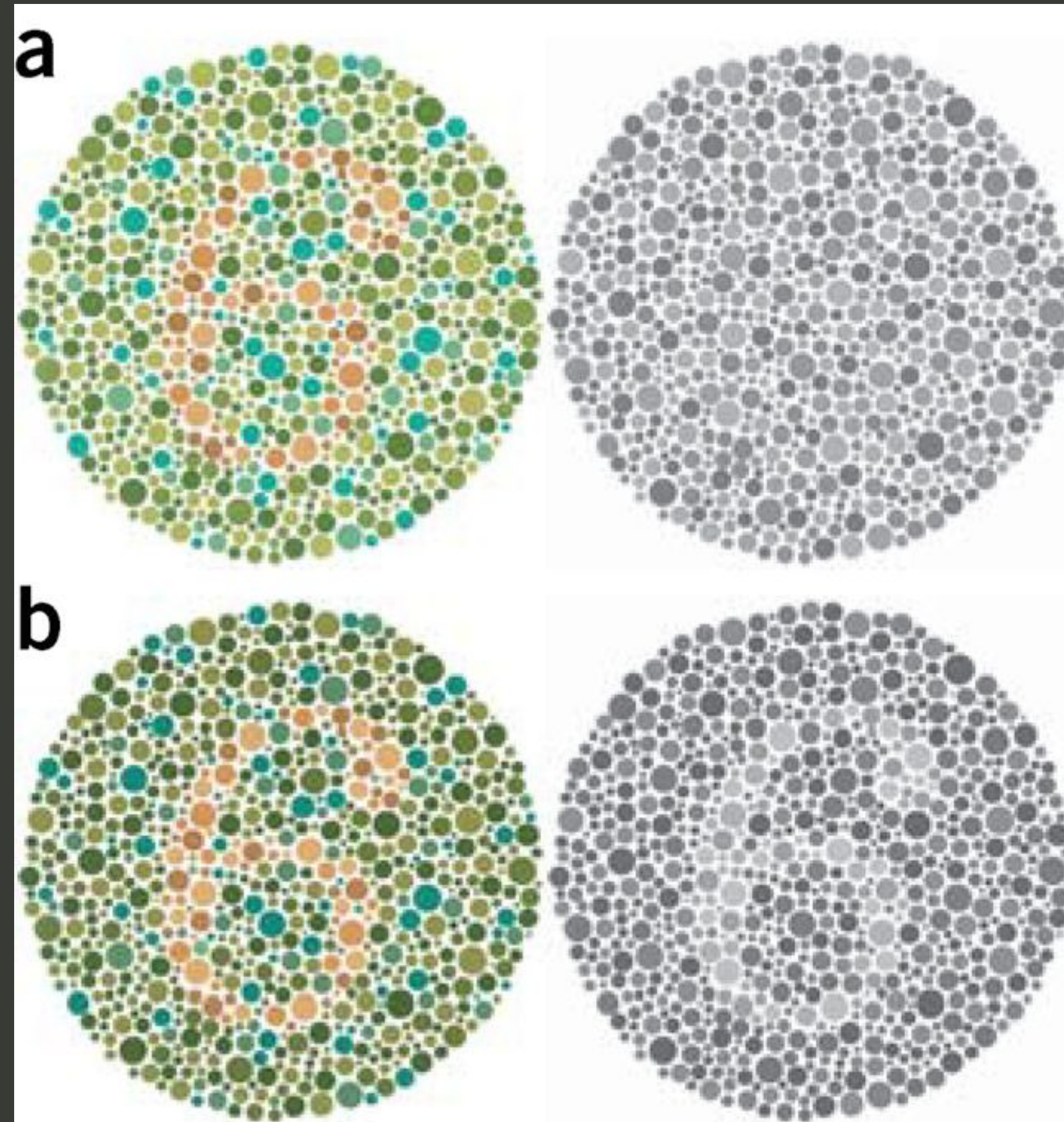
Color

What does it look like in greyscale?



Color

How does it look with color vision deficiency?



Color

If you must...

use colorbrewer2.org to select colorblind friendly palettes

use shapes to better highlight salience

select semantically resonant colors

consider background colors and how this affects final appearance