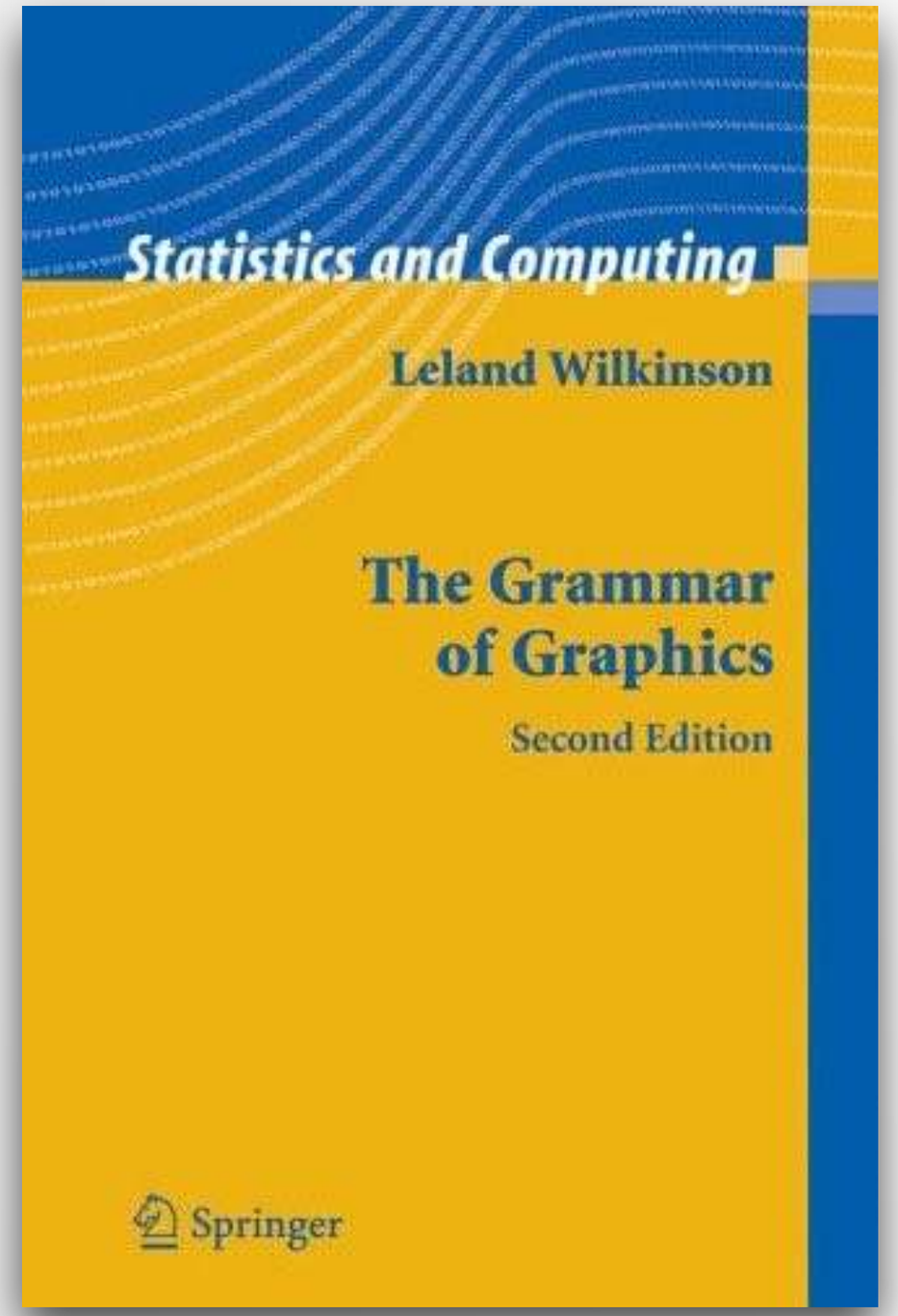
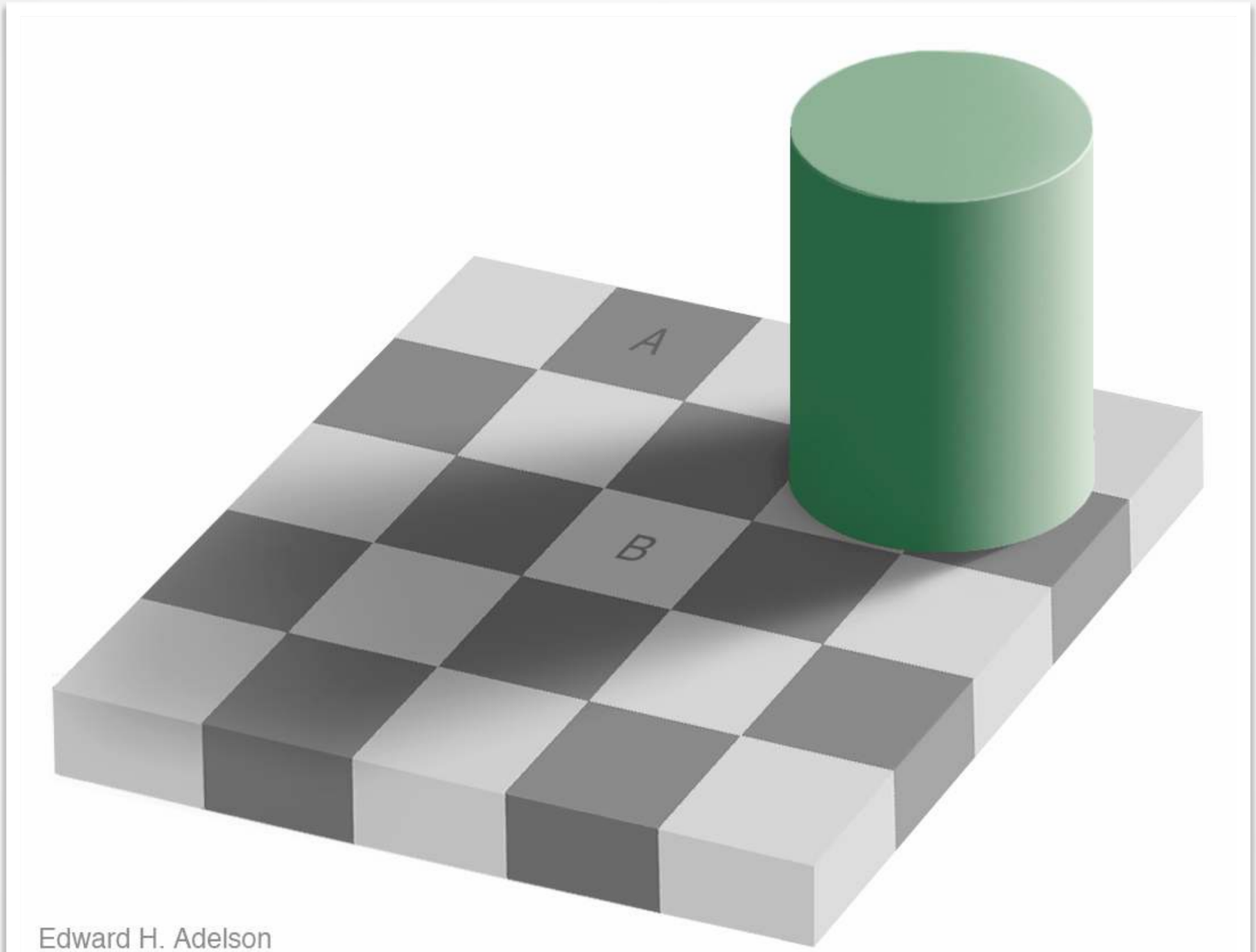
FIGURE 1 — SCIENTIFIC GRAPHICS WALK-THROUGH

BAPTISTE AUGUIÉ, CASS PASS (2025)



If charts are maps of abstract worlds the guiding principles of graphics usage could be derived from the psychology of perception.

“WHO CARES HOW PLOTS LOOK, ONLY THE DATA MATTERS”



Edward H. Adelson

SOMETIMES A TABLE IS BEST

h:	$x_{\max}$:	0.01	0.1	1	2	3	4	5	6	7	8	10	12	15	20	25	30	40	50	60	70	80
	N	5	5	7	9	11	11	13	15	17	17	21	23	27	35	41	47	63	77	95	127	111
1.1	N_θ	6	6	6	7	7	8	8	9	9	10	15	15	15	20	25	35	40	40	80	80	1200
	error	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	10^{-12}	10^{-11}	10^{-9}	10^{-7}	10^{-4}
	N	5	5	9	11	11	13	15	15	19	19	23	27	31	37	45	53	69	93	115		
1.3	N_θ	9	9	9	9	9	10	15	15	15	15	15	20	20	25	45	30	50	45	500		
	error	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	10^{-12}	10^{-9}	10^{-7}	10^{-3}		
	N	5	7	11	13	15	15	19	19	21	23	25	27	33	41	49	61	75	103			
2	N_θ	20	20	20	20	20	20	20	20	25	25	25	25	30	35	45	35	50	45			
	error	–	–	–	–	–	–	–	–	–	–	–	–	–	–	10^{-12}	10^{-11}	10^{-7}	10^{-4}			
	N	5	7	11	15	17	19	21	23	23	25	29	31	35	45	51	57	59				
4	N_θ	40	40	40	40	40	7	40	45	45	45	50	50	60	70	70	90	90				
	error	–	–	–	–	–	10^{-3}	–	–	–	–	–	–	–	10^{-13}	10^{-11}	10^{-9}	10^{-4}				
	N	5	7	11	15	19	19	19	23	25	27	31	35	37	41	47	47					
7	N_θ	70	70	70	70	70	70	80	80	80	80	90	90	100	200	130	130					
	error	–	–	–	–	–	–	–	–	–	–	–	–	–	10^{-11}	10^{-10}	10^{-6}					
	N	5	7	13	15	19	19	21	25	27	27	31	33	41	45	43	47					
10	N_θ	100	100	90	100	100	100	110	110	110	120	120	130	140	180	180	200					
	error	–	–	–	–	–	–	–	–	–	–	–	–	–	10^{-11}	10^{-8}	10^{-6}					
	N	5	7	13	15	19	21	23	23	27	29	33	37	43	43	49	41					
20	N_θ	200	200	200	200	200	200	200	220	220	240	260	260	280	300	550	400					
	error	–	–	–	–	–	–	–	–	–	–	–	–	–	10^{-12}	10^{-8}	10^{-4}					
	N	5	7	13	17	19	21	23	25	27	29	33	35	39	45	47	45					
50	N_θ	500	500	500	500	500	500	550	550	550	600	650	800	700	1100	900	1200					
	error	–	–	–	–	–	–	–	–	–	–	–	–	10^{-13}	10^{-12}	10^{-9}	10^{-6}					
	N	5	7	13	17	19	21	23	25	27	27	33	35	47	53	47						
100	N_θ	1000	1100	1000	1100	1000	1100	1100	1100	1100	1100	1300	1500	1400	1600	2000						
	error	–	–	–	–	–	–	–	–	–	–	–	–	–	–	10^{-9}						


40%
30%
0%
40%
40%
THE GOOD THE BAD AND THE UGLY
DVD video

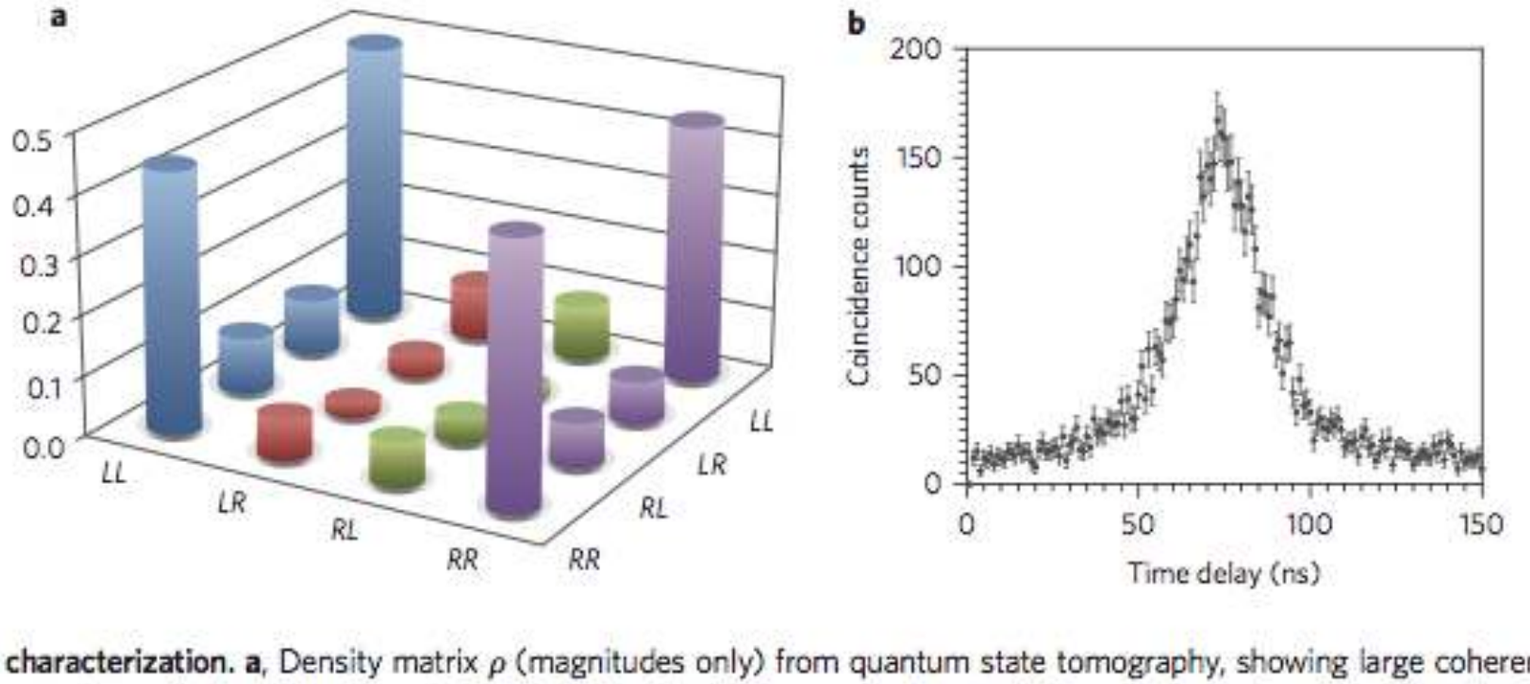
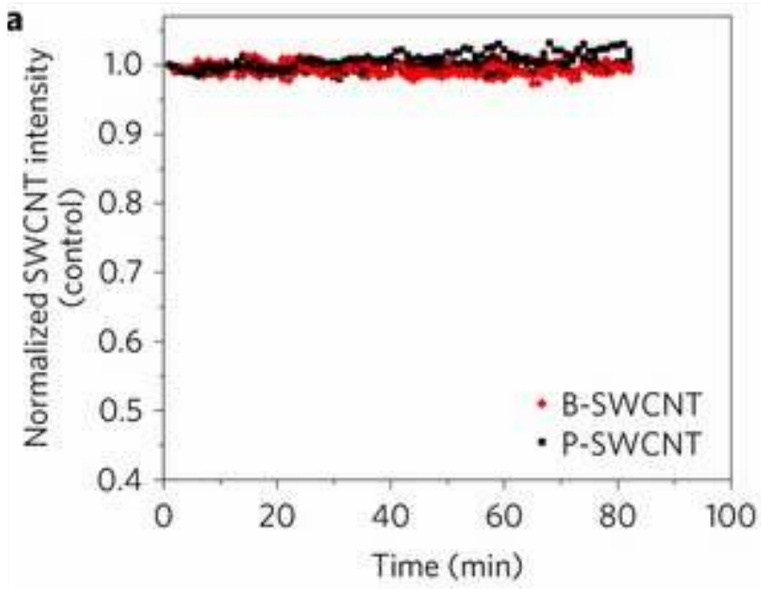
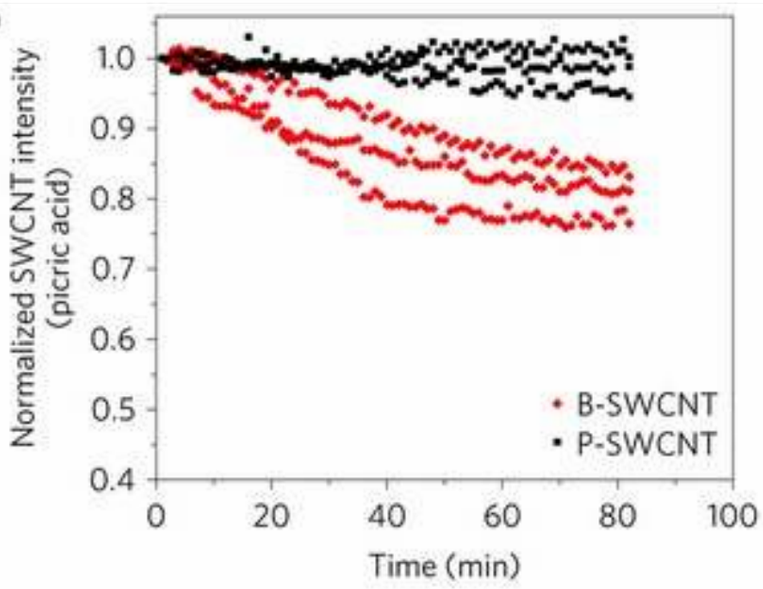
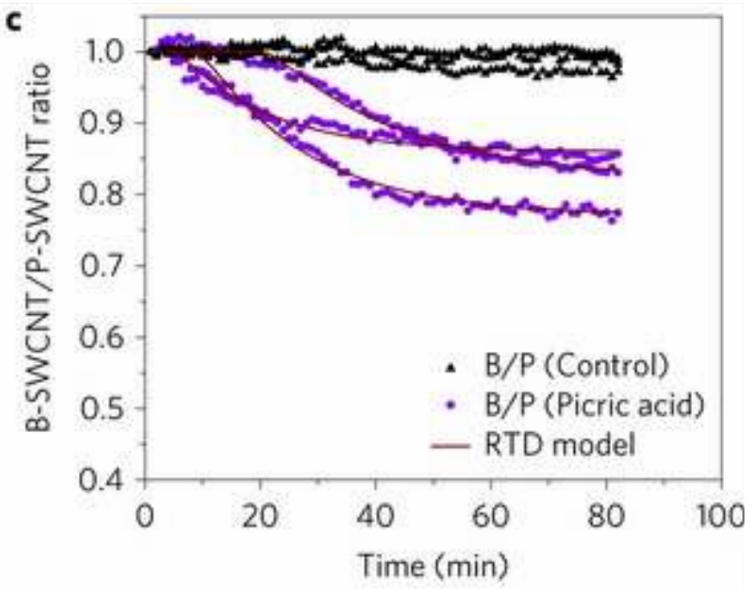
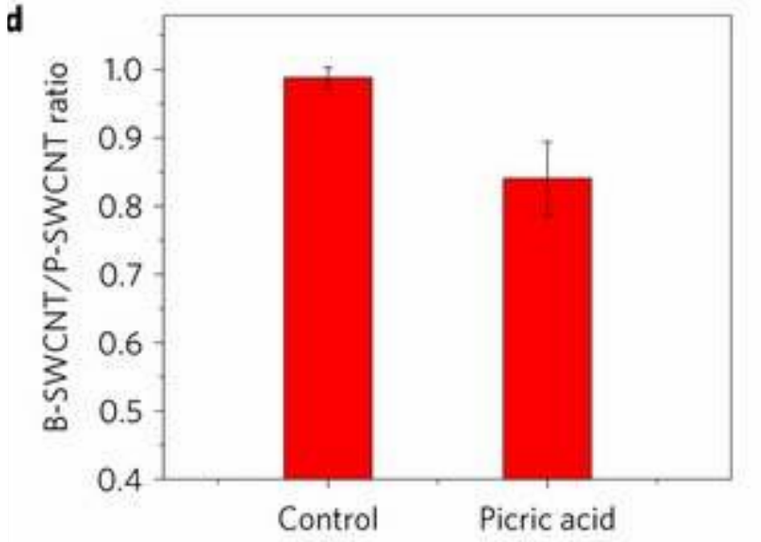


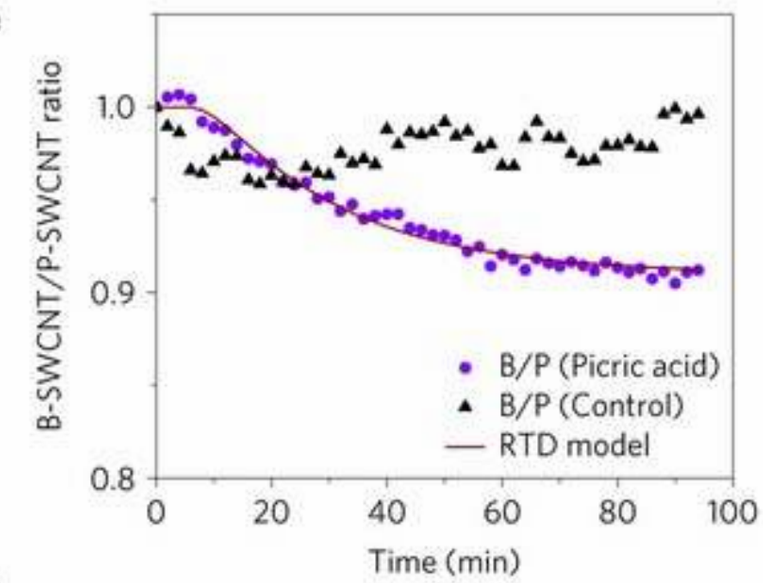
Figure 3 | NOON state characterization. a, Density matrix ρ (magnitudes only) from quantum state tomography, showing large coherence between $|LL\rangle$ and $|RR\rangle$ components. **b**, Measured correlation of the filtered CESPDC pairs (no background subtracted). The absence of modulation at the 2 ns cavity roundtrip time indicates the presence of a single cavity mode.

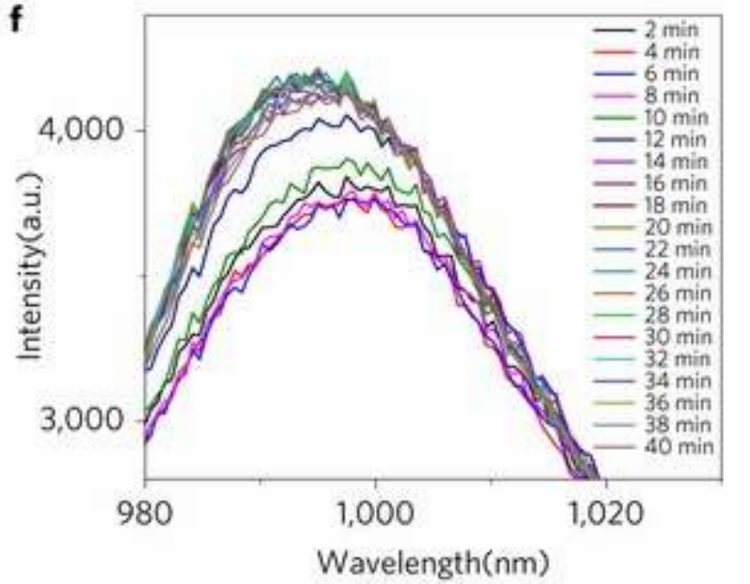

a
Normalized SWCNT intensity (control)
1.0
0.9
0.8
0.7
0.6
0.5
0.4
0
20
40
60
80
100
Time (min)
B-SWCNT
P-SWCNT

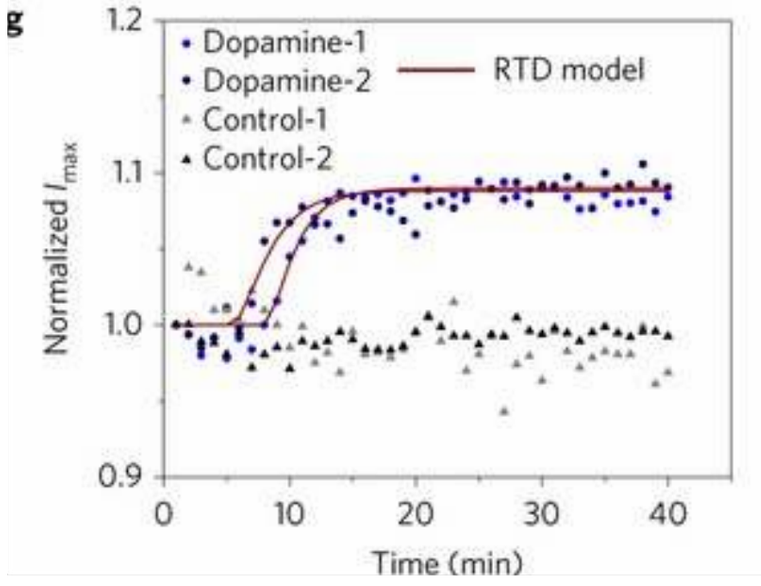

b
Normalized SWCNT intensity (picric acid)
1.0
0.9
0.8
0.7
0.6
0.5
0.4
0
20
40
60
80
100
Time (min)
B-SWCNT
P-SWCNT

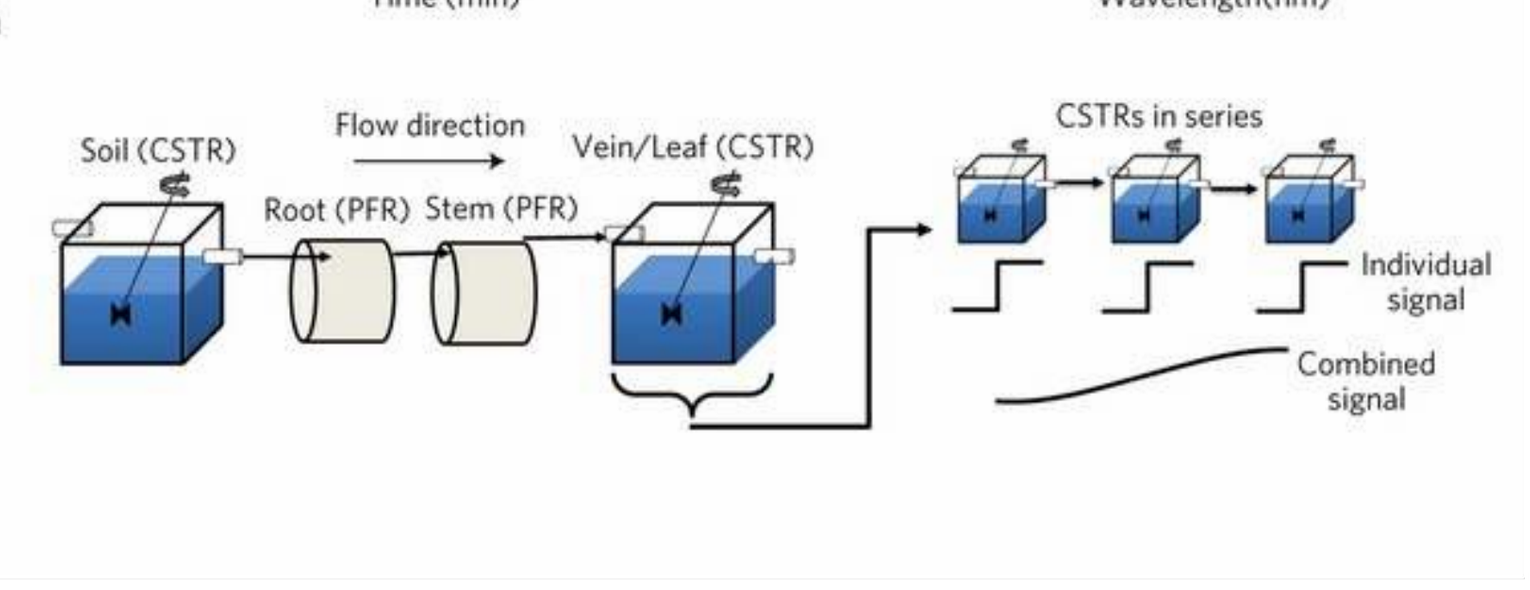

c
B-SWCNT/P-SWCNT ratio
1.0
0.9
0.8
0.7
0.6
0.5
0.4
0
20
40
60
80
100
Time (min)
B/P (Control)
B/P (Picric acid)
RTD model


d
B-SWCNT/P-SWCNT ratio
1.0
0.9
0.8
0.7
0.6
0.5
0.4
Control
Picric acid

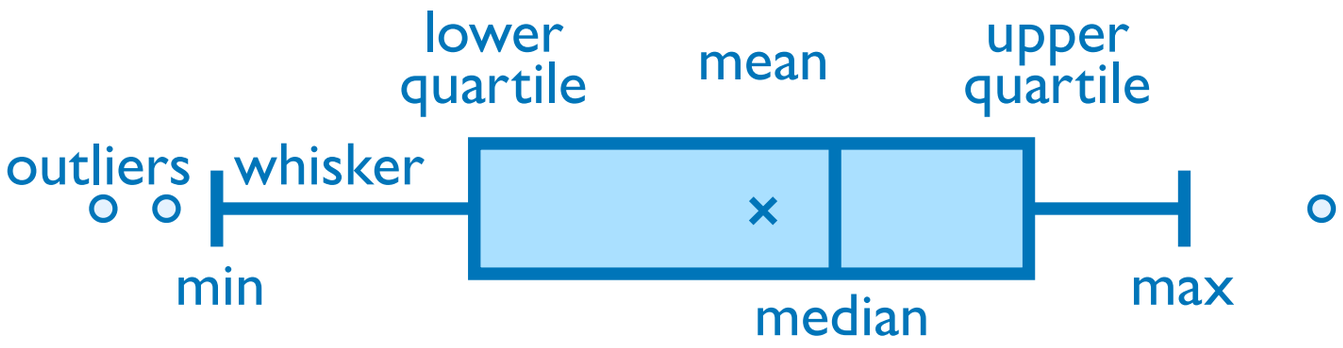

e
B-SWCNT/P-SWCNT ratio
1.0
0.9
0.8
0
20
40
60
80
100
Time (min)
B/P (Picric acid)
B/P (Control)
RTD model

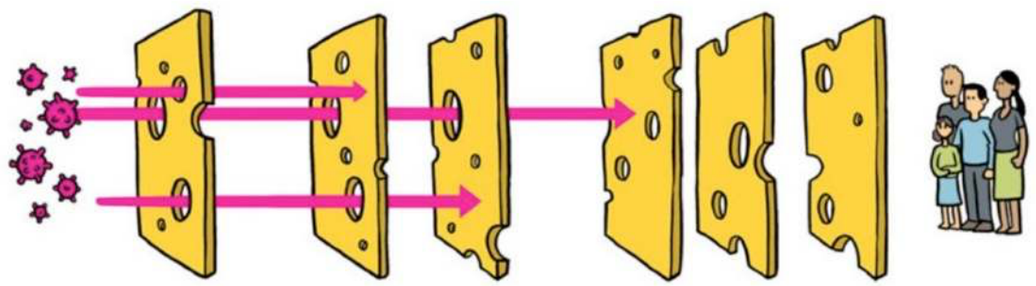

f
Intensity(a.u.)
4,000
3,000
980
1,000
1,020
Wavelength(nm)
2 min
4 min
6 min
8 min
10 min
12 min
14 min
16 min
18 min
20 min
22 min
24 min
26 min
28 min
30 min
32 min
34 min
36 min
38 min
40 min


g
Normalized I_{max}
1.2
1.1
1.0
0.9
0
10
20
30
40
Time (min)
Dopamine-1
Dopamine-2
Control-1
Control-2
RTD model

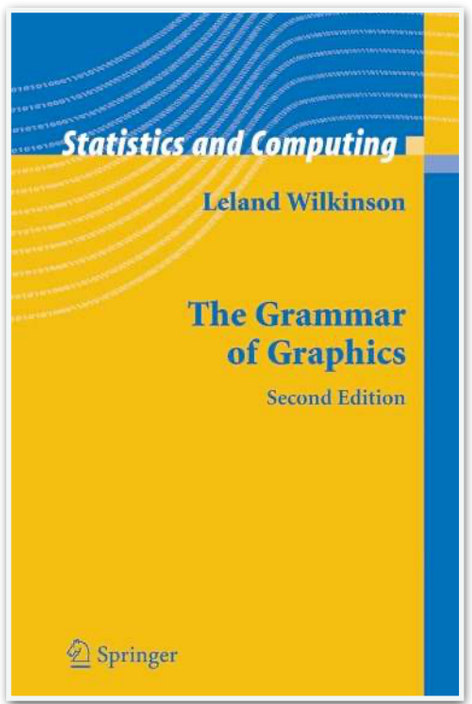

h
Soil (CSTR)
Flow direction
Root (PFR)
Stem (PFR)
Vein/Leaf (CSTR)
CSTRs in series
Individual signal
Combined signal

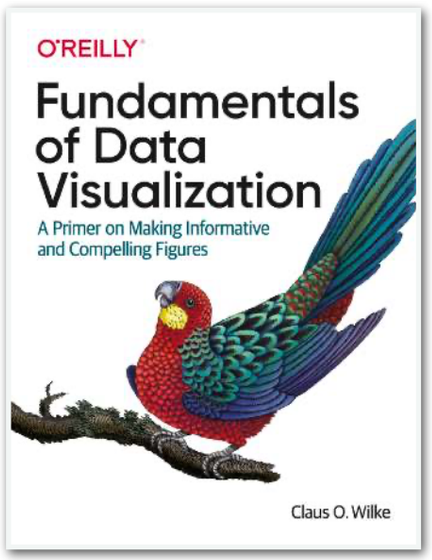
SCIENTIFIC GRAPHICS LAY ON A SPECTRUM

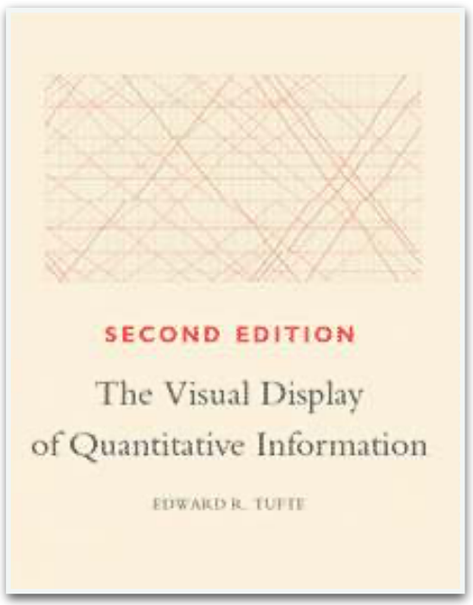


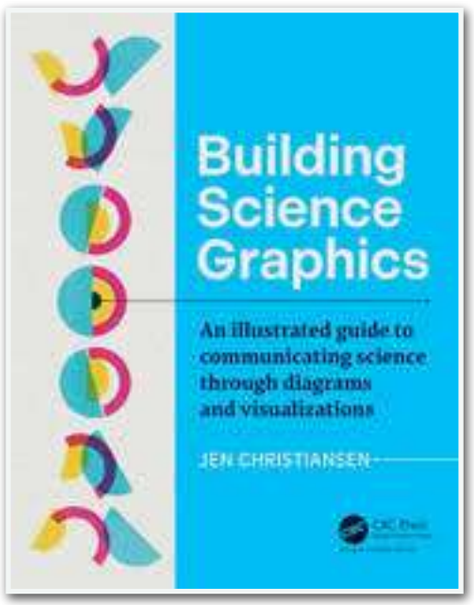


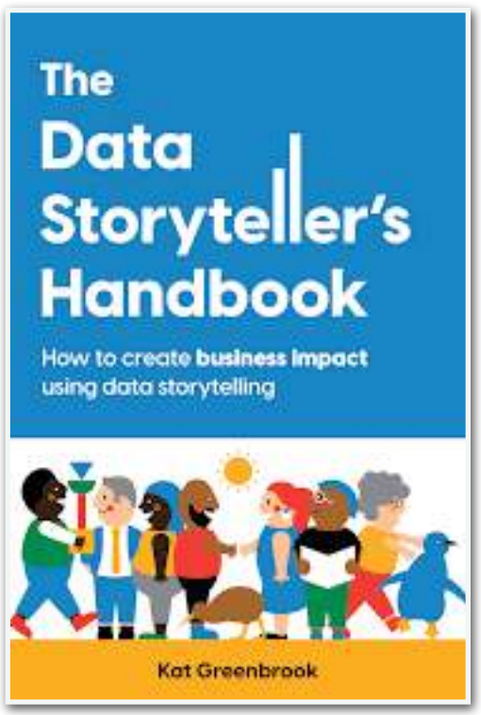
ABSTRACT — TODAY WE ARE HERE — GENERAL AUDIENCE

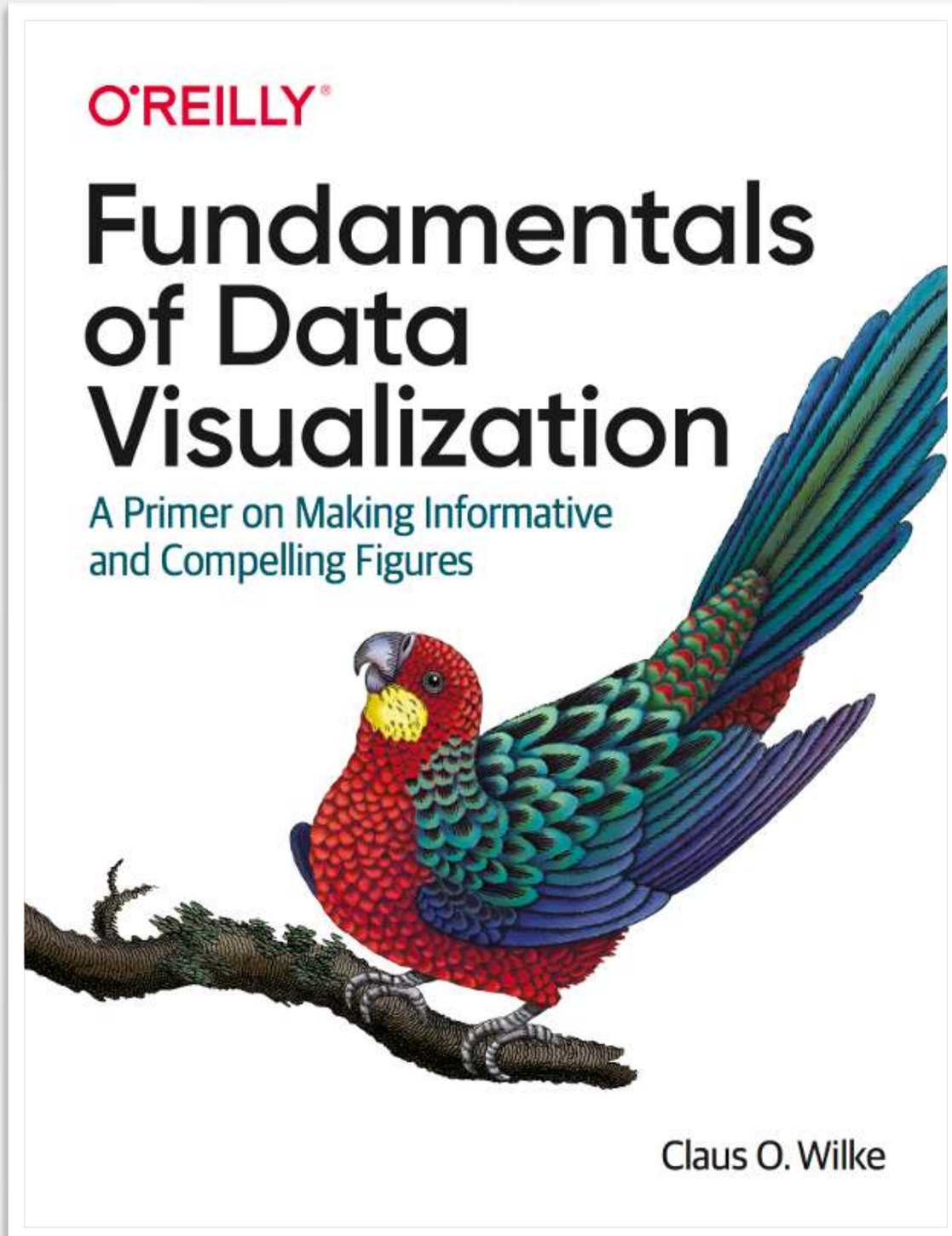




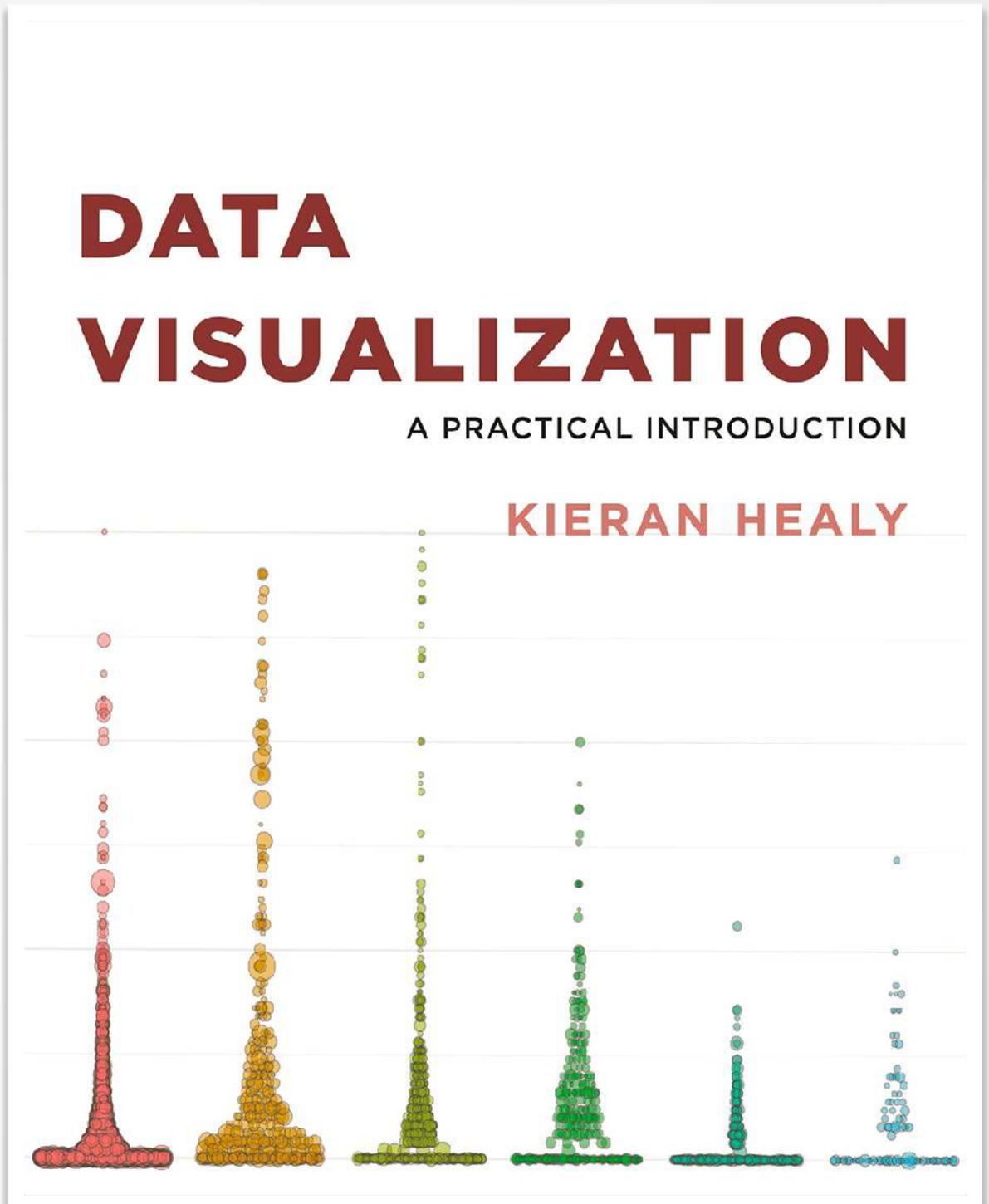






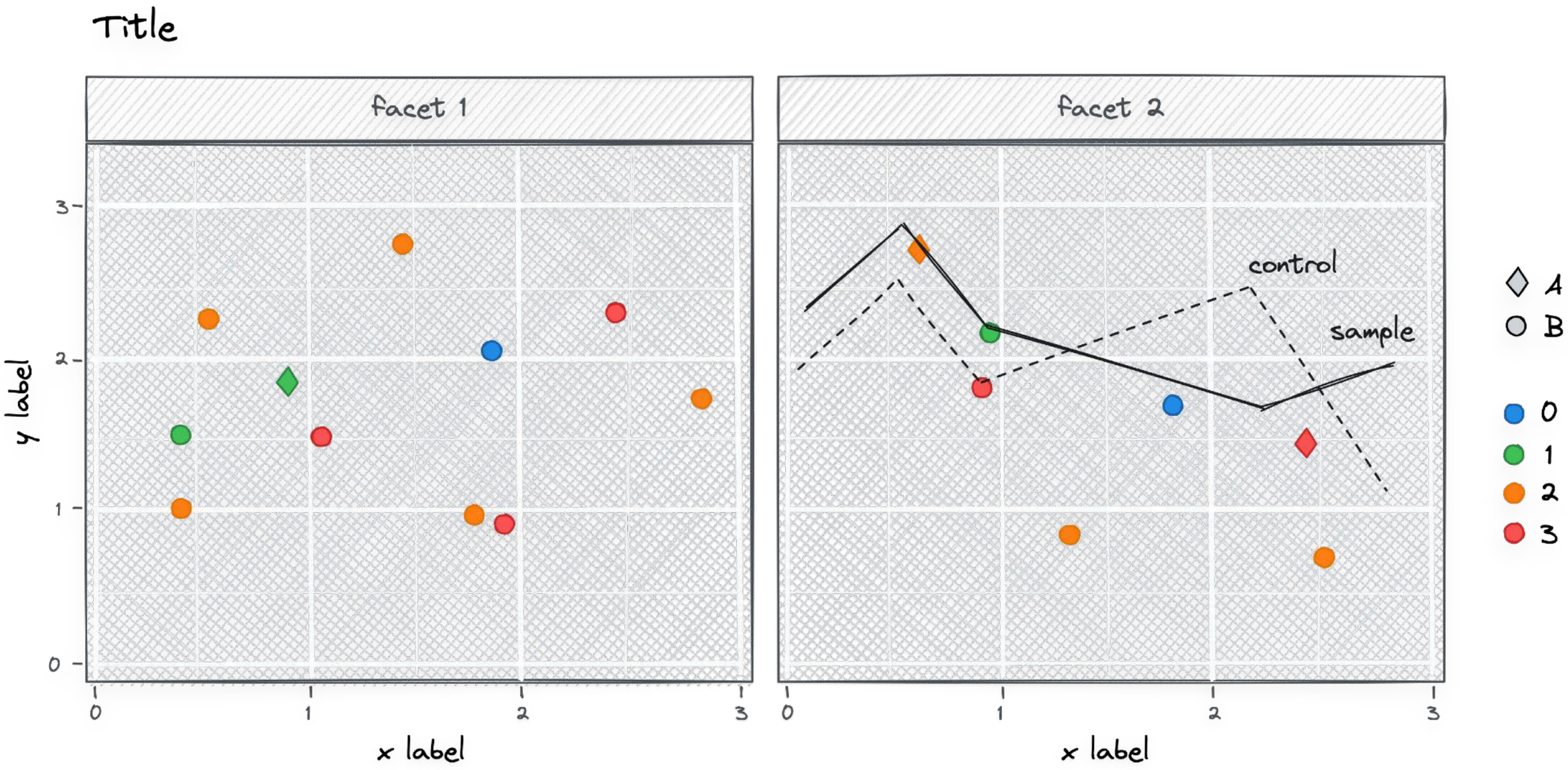


clauswilke.com/dataviz



socviz.co

WHAT'S IN A PLOT?



Taxonomy of graphics

Deviation

Emphasise variations (+/-) from a fixed reference point. Typically the reference point is zero but it can also be a target or a long-term average. Can also be used to show sentiment (positive/neutral/negative).

Example FT uses
Trade surplus/deficit; climate change

Diverging bar

A simple standard bar chart that can handle both negative and positive magnitude values.

Diverging stacked bar

Perfect for presenting survey results which involve sentiment (eg disagree/neutral/agree).

Spine

Splits a single value into two contrasting components (eg male/female).

Surplus/deficit filled line

The shaded area of these charts allows a balance to be shown – either against a baseline or between two series.

Correlation

Show the relationship between two or more variables. Be mindful that, unless you tell them otherwise, many readers will assume the relationships you show them to be causal (i.e. one causes the other).

Example FT uses
Inflation and unemployment, income and life expectancy

Scatterplot

The standard way to show the relationship between two continuous variables, each of which has its own axis.

Column + line timeline

A good way of showing the relationship between an amount (columns) and a rate (line).

Connected scatterplot

Usually used to show how the relationship between 2 variables has changed over time.

Bubble

Like a scatterplot, but adds additional detail by sizing the circles according to a third variable.

XY heatmap

A good way of showing the patterns between 2 categories of data, less effective at showing fine differences in amounts.

Ranking

Use where an item's position in an ordered list is more important than its absolute or relative value. Don't be afraid to highlight the points of interest.

Example FT uses
Wealth, deprivation, league tables, constituency election results

Ordered bar

Standard bar charts display the ranks of values much more easily when sorted into order.

Ordered column

See above.

Ordered proportional symbol

Use when there are big variations between values and/or seeing fine differences between data is not so important.

Dot strip plot

Dots placed in order on a strip are a space-efficient method of laying out ranks across multiple categories.

Slope

Perfect for showing how ranks have changed over time or vary between categories.

Lollipop

Lollipops draw more attention to the data value than standard bar/column and can also show rank and value effectively.

Bump

Effective for showing changing rankings across multiple dates. For large datasets, consider grouping lines using colour.

Distribution

Show values in a dataset and how often they occur. The shape (or 'skew') of a distribution can be a memorable way of highlighting the lack of uniformity or equality in the data.

Example FT uses
Income distribution, population (age/sex) distribution, revealing inequality

Histogram

The standard way to show a statistical distribution - keep the gaps between columns small to highlight the 'shape' of the data.

Dot plot

A simple way of showing the change or range (min/max) of data across multiple categories.

Dot strip plot

Good for showing individual values in a distribution, can be a problem when too many dots have the same value.

Barcode plot

Like dot strip plots, good for displaying all the data in a table, they work best when highlighting individual values.

Boxplot

Summarise multiple distributions by showing the median (centre) and range of the data

Violin plot

Similar to a box plot but more effective with complex distributions (data that cannot be summarised with simple average).

Population pyramid

A standard way for showing the age and sex breakdown of a population distribution; effectively, back to back histograms.

Cumulative curve

A good way of showing how unequal a distribution is; y axis is always cumulative frequency, x axis is always a measure.

Frequency polygons

For displaying multiple distributions of data. Like a regular line chart, best limited to a maximum of 3 or 4 datasets.

Beeswarm

Use to emphasise individual points in a distribution. Points can be sized to an additional variable. Best with medium-sized datasets

Change over Time

Give emphasis to changing trends. These can be short (intra-day) movements or extended series traversing decades or centuries. Choosing the correct time period is important to provide suitable context for the reader.

Example FT uses
Share price movements, economic time series, sectoral changes in a market

Line

The standard way to show a changing time series. If data are irregular, consider markers to represent data points.

Column

Columns work well for showing change over time - but usually best with only one series of data at a time.

Column + line timeline

A good way of showing the relationship over time between an amount (columns) and a rate (line).

Slope

Good for showing changing data as long as the data can be simplified into 2 or 3 points without missing a key part of story.

Area chart

Use with care – these are good at showing changes to total, but seeing change in components can be very difficult.

Candlestick

Usually focused on day-to-day activity, these charts show opening/closing and high/low points of each day.

Fan chart (projections)

Use to show the uncertainty in future projections - usually this grows the further forward to projection.

Connected scatterplot

A good way of showing changing data for two variables whenever there is a relatively clear pattern of progression.

Calendar heatmap

A great way of showing temporal patterns (daily, weekly, monthly) – at the expense of showing precision in quantity.

Priestley timeline

Great when date and duration are key elements of the story in the data.

Circle timeline

Good for showing discrete values of varying size across multiple categories (eg earthquakes by continent).

Vertical timeline

Presents time on the Y axis. Good for displaying detailed time series that work especially well when scrolling on mobile.

Seismogram

Another alternative to the circle timeline for showing series where there are big variations in the data.

Streamgraph

A type of area chart; use when seeing changes in proportions over time is more important than individual values

Magnitude

Show size comparisons. These can be relative (just being able to see larger/bigger) or absolute (need to see fine differences). Usually these show a 'counted' number (for example, barrels, dollars or people) rather than a calculated rate or per cent.

Example FT uses
Commodity production, market capitalisation, volumes in general

Column

The standard way to compare the size of things. Must always start at 0 on the axis.

Bar

See above. Good when the data are not time series and labels have long category names.

Paired column

As per standard column but allows for multiple series. Can become tricky to read with more than 2 series.

Paired bar

See above.

Marimekko

A good way of showing the size and proportion of data at the same time – as long as the data are not too complicated.

Proportional symbol

Use when there are big variations between values and/or seeing fine differences between data is not so important.

Isotype (pictogram)

Excellent solution in some instances – use only with whole numbers (do not slice off an arm to represent a decimal).

Lollipop

Lollipop charts draw more attention to the data value than standard bar/column – does not have to start at zero (but preferable).

Radar

A space-efficient way of showing value of multiple variables– but make sure they are organised in a way that makes sense to reader.

Parallel coordinates

An alternative to radar charts – again, the arrangement of the variables is important. Usually benefits from highlighting values.

Bullet

Good for showing a measurement against the context of a target or performance range.

Grouped symbol

An alternative to bar/column charts when being able to count data or highlight individual elements is useful.

Part-to-whole

Show how a single entity can be broken down into its component elements. If the reader's interest is solely in the size of the components, consider a magnitude-type chart instead.

Example FT uses
Fiscal budgets, company structures, national election results

Stacked column/bar

A simple way of showing part-to-whole relationships but can be difficult to read with more than a few components.

Marimekko

A good way of showing the size and proportion of data at the same time – as long as the data are not too complicated.

Pie

A common way of showing part-to-whole data – but be aware that it's difficult to accurately compare the size of the segments.

Donut

Similar to a pie chart – but the centre can be a good way of making space to include more information about the data (eg total).

Treemap

Use for hierarchical part-to-whole relationships; can be difficult to read when there are many small segments.

Voronoi

A way of turning points into areas – any point within each area is closer to the central point than any other centroid.

Arc

A hemicycle, often used for visualising parliamentary composition by number of seats.

Gridplot

Good for showing % information, they work best when used on whole numbers and work well in small multiple layout form.

Venn

Generally only used for schematic representation.

Waterfall

Can be useful for showing part-to-whole relationships where some of the components are negative.

Spatial

Aside from locator maps only used when precise locations or geographical patterns in data are more important to the reader than anything else.

Example FT uses
Population density, natural resource locations, natural disaster risk/impact, catchment areas, variation in election results

Basic choropleth (rate/ratio)

The standard approach for putting data on a map – should always be rates rather than totals and use a sensible base geography.

Proportional symbol (count/magnitude)

Use for totals rather than rates – be wary that small differences in data will be hard to see.

Flow map

For showing unambiguous movement across a map.

Contour map

For showing areas of equal value on a map. Can use deviation colour schemes for showing +/- values

Equalised cartogram

Converting each unit on a map to a regular and equally-sized shape – good for representing voting regions with equal value.

Scaled cartogram (value)

Stretching and shrinking a map so that each area is sized according to a particular value.

Dot density

Used to show the location of individual events/locations – make sure to annotate any patterns the reader should see.

Heat map

Grid-based data values mapped with an intensity colour scale. As choropleth map – but not snapped to an admin/political unit.

Flow

Show the reader volumes or intensity of movement between two or more states or conditions. These might be logical sequences or geographical locations.

Example FT uses
Movement of funds, trade, migrants, lawsuits, information; relationship graphs.

Sankey

Shows changes in flows from one condition to at least one other; good for tracing the eventual outcome of a complex process.

Waterfall

Designed to show the sequencing of data through a flow process, typically budgets. Can include +/- components.

Chord

A complex but powerful diagram which can illustrate 2-way flows (and net winner) in a matrix.

Network

Used for showing the strength and inter-connectedness of relationships of varying types.

Source:
ft.com/vocabulary

But different representations of the exact same data can lead to different understanding and, more importantly, to different decisions.

—R. Kosara

from Data to Viz

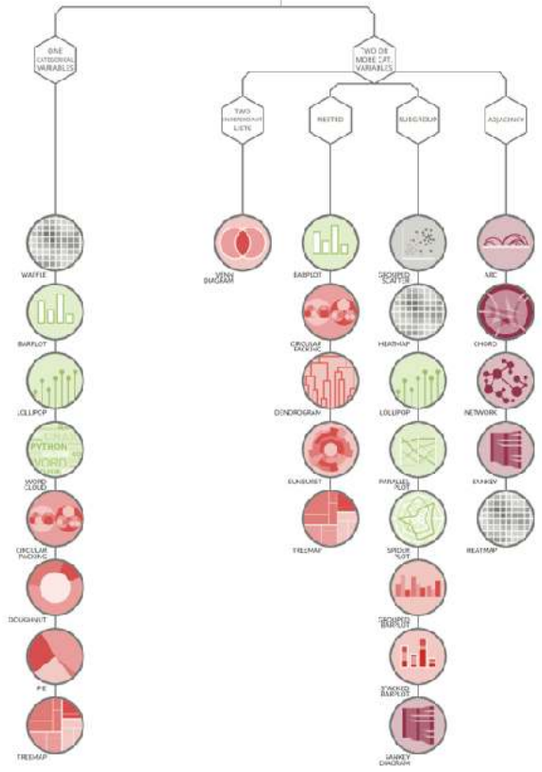
'From Data to Viz' is a classification of chart types based on input data format. It will help you find the perfect chart in three simple steps :

1. Identify what type of data you have.
2. Go to the corresponding decision tree and follow it down to a set of possible charts.
3. Choose the chart from the set that will suit your data and your needs best.

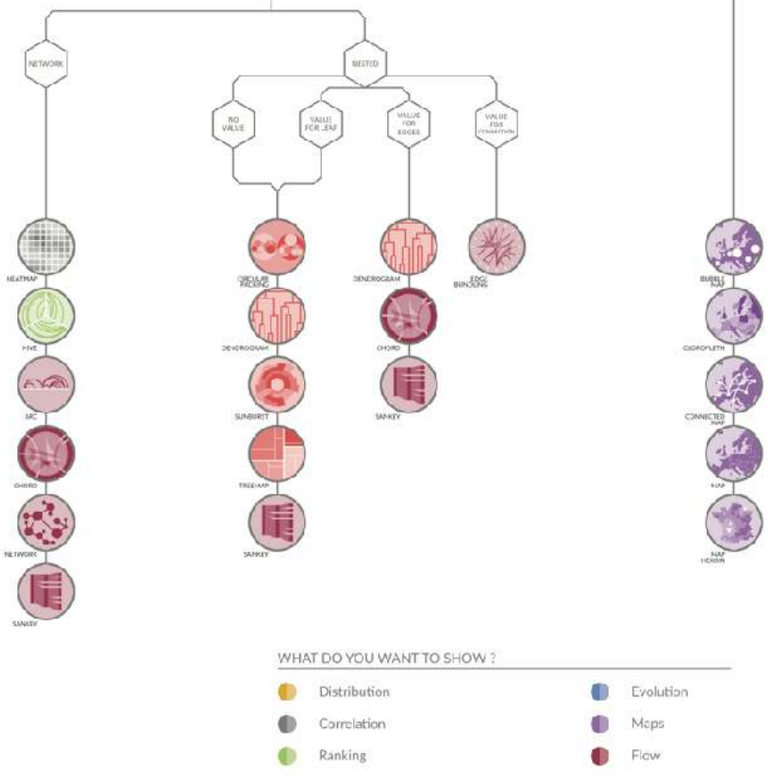
Dataviz is a world with endless possibilities and this project does not claim to be exhaustive. However it should provide you with a good starting point. For an interactive version and much more, visit:

data-to-viz.com

CATEGORIC

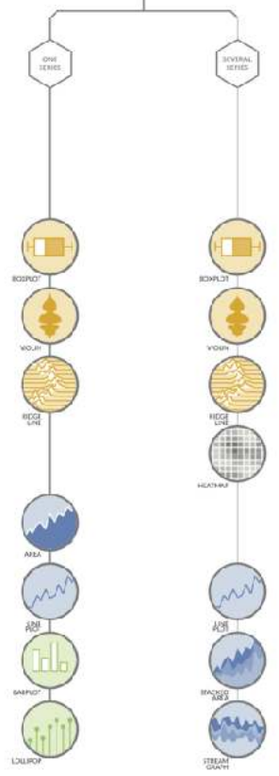


RELATIONAL



MAP

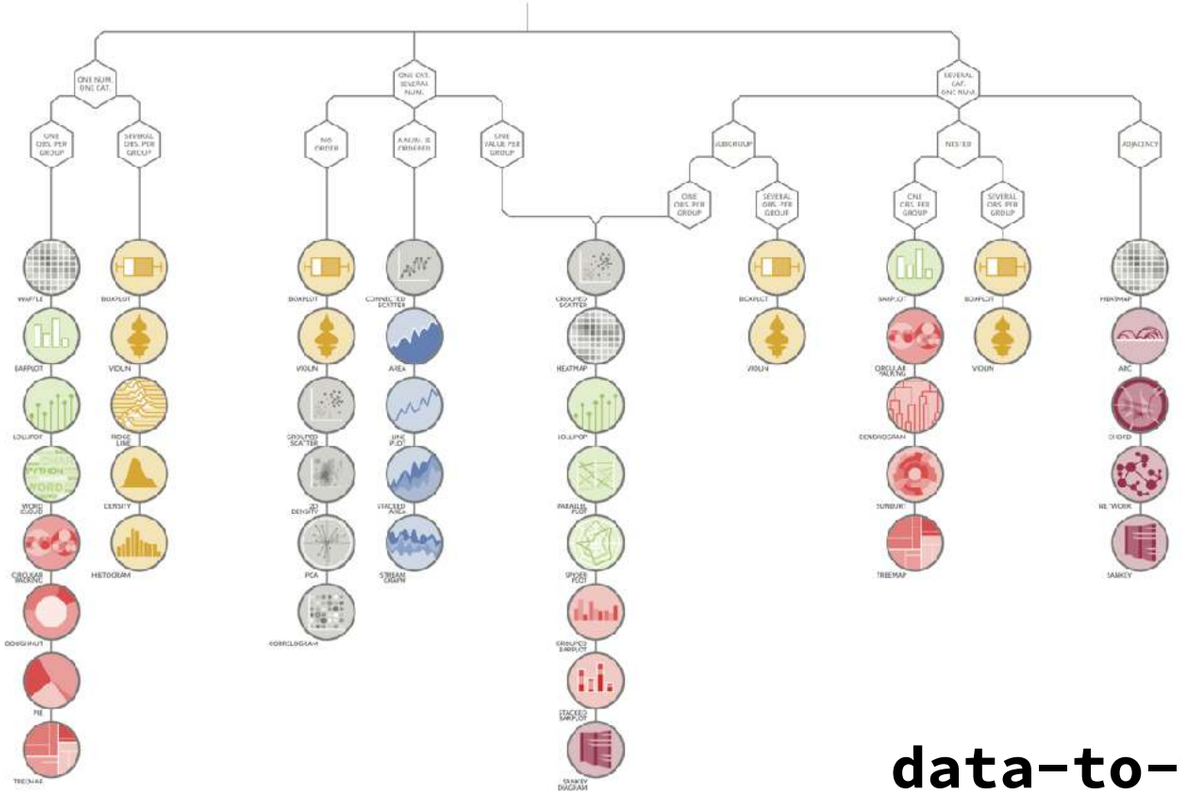
TIME SERIES



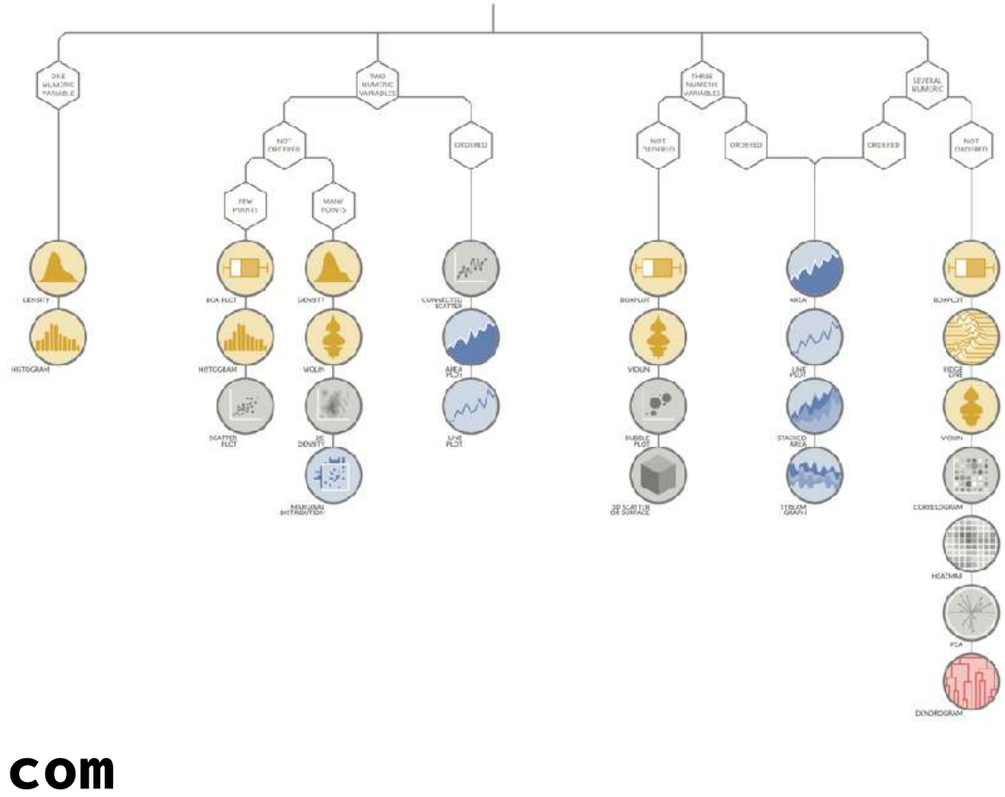
WHAT DO YOU WANT TO SHOW ?

- Distribution
- Correlation
- Ranking
- Part of a whole
- Evolution
- Maps
- Flow

CATEGORIC AND NUMERIC



NUMERIC



data-to-viz.com

TRIAL AND ERROR
IS A POWEFUL TEACHER

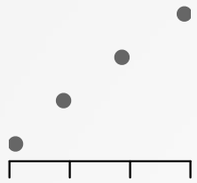
– Jen Christiansen

GRAMMAR OF GRAPHICS

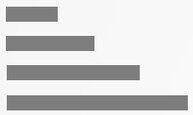
101

MAPPING DATA

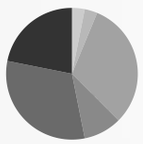
- **POSITION**



- **LENGTH**



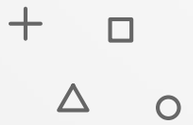
- ANGLE



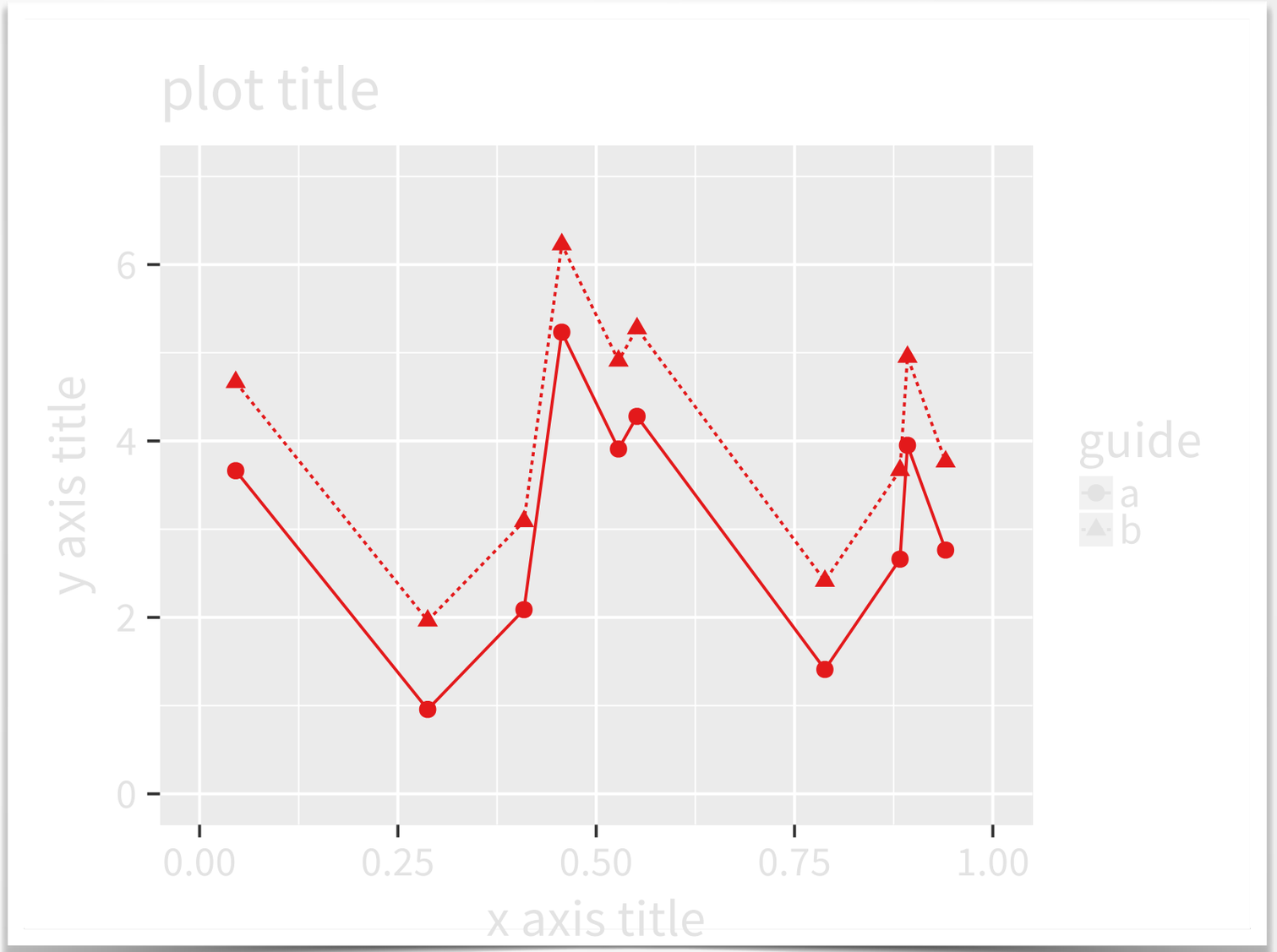
- AREA

- **COLOUR**

- **SHAPE**



- **LINE TYPE, SIZE,** TIME**, …**



EXPRESSIVITY, LEGIBILITY, REPRODUCIBILITY

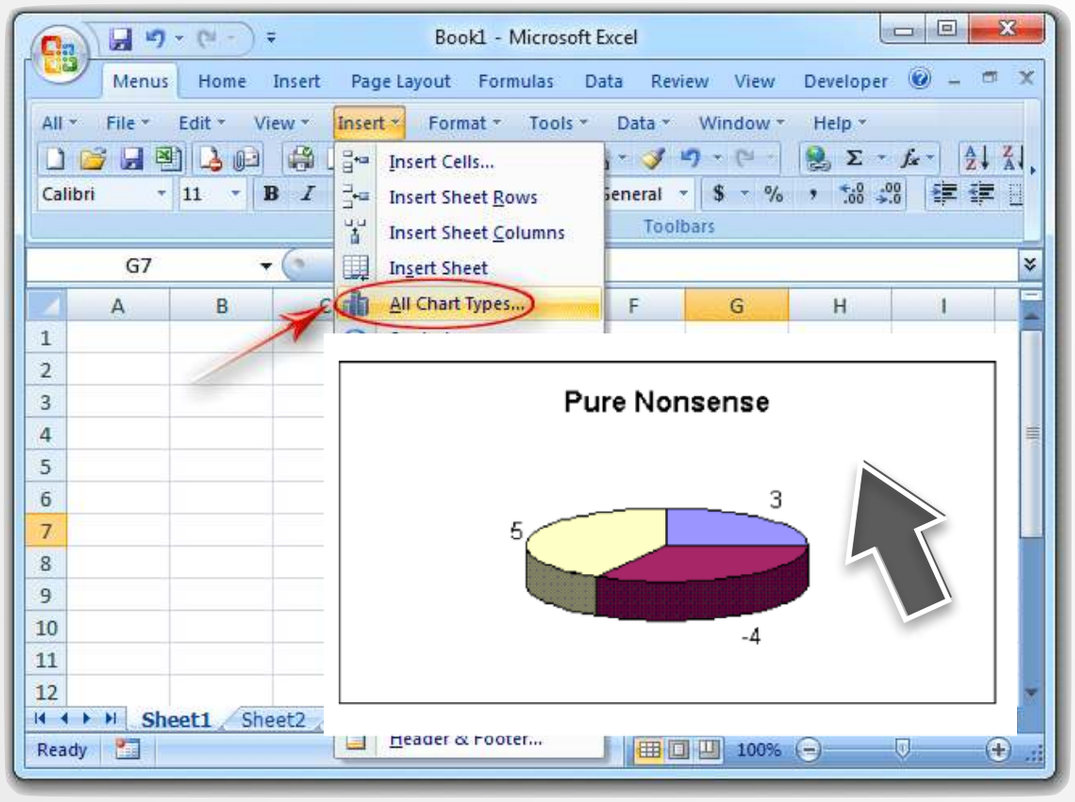
Point & Click

Yeah but, no but, yeah but, no but ! ! !

yeah but . . . I swear * * * * * * * ! ! ! ? ! ! !

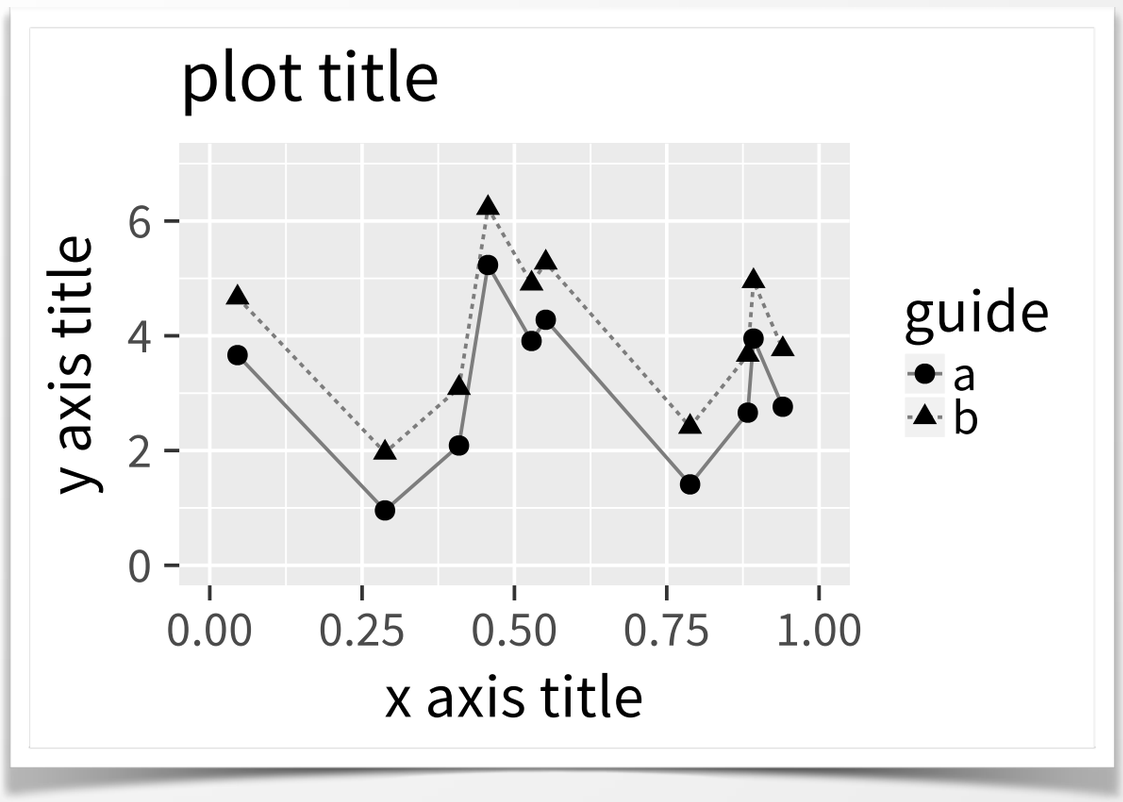
. . . but yeah _(ツ)_/ **COMPUTER SAYS NO**

Ctrl-Z



Grammar of Graphics

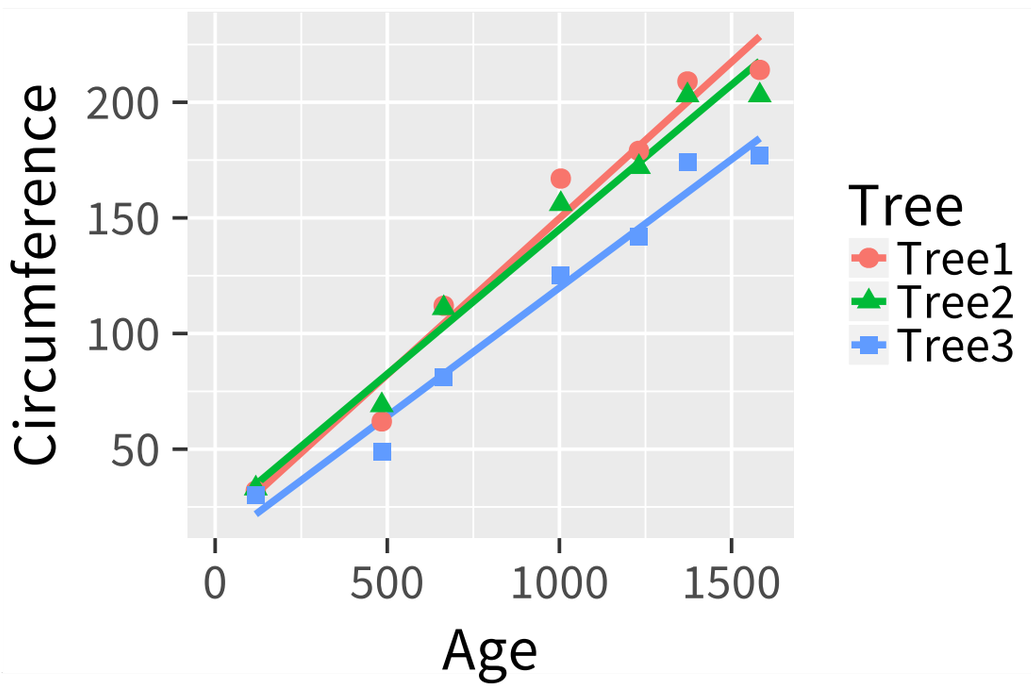
```
plot(data, map(x, y)) +
  layer(point, map(shape = z))    +
  layer(line,  map(linetype = t)) +
  theme(fontsize = 12)
```



MAPPING DATA TO VISUAL ATTRIBUTES (GLYPHS)

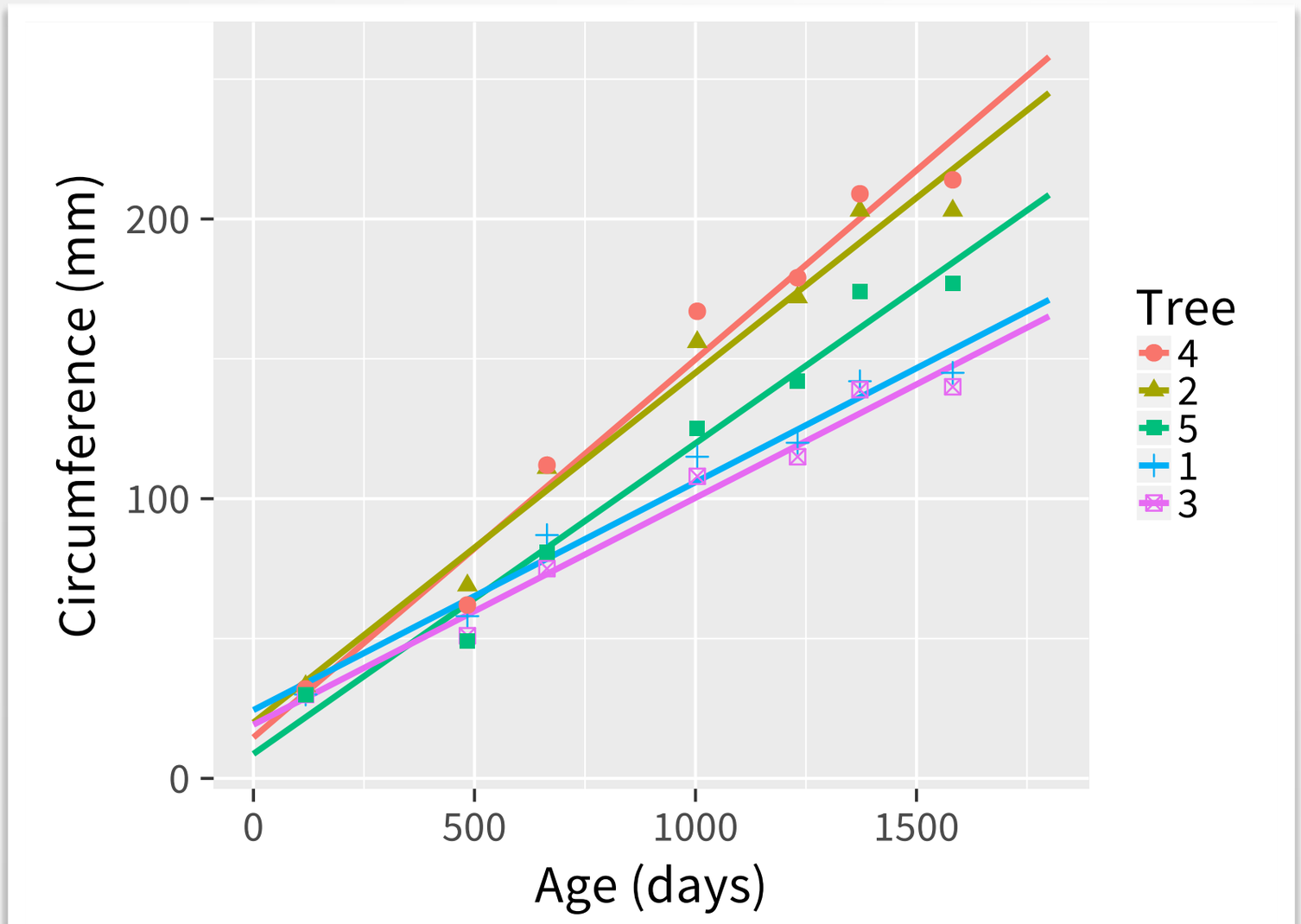
```
plot(data = d,
     mapping = map(x = age,
                   y = circumference)) +
  layer(type = point,
        mapping = map(shape  = Tree,
                      colour = Tree))  +
  layer(type = line,
        mapping = map(colour = Tree))
```

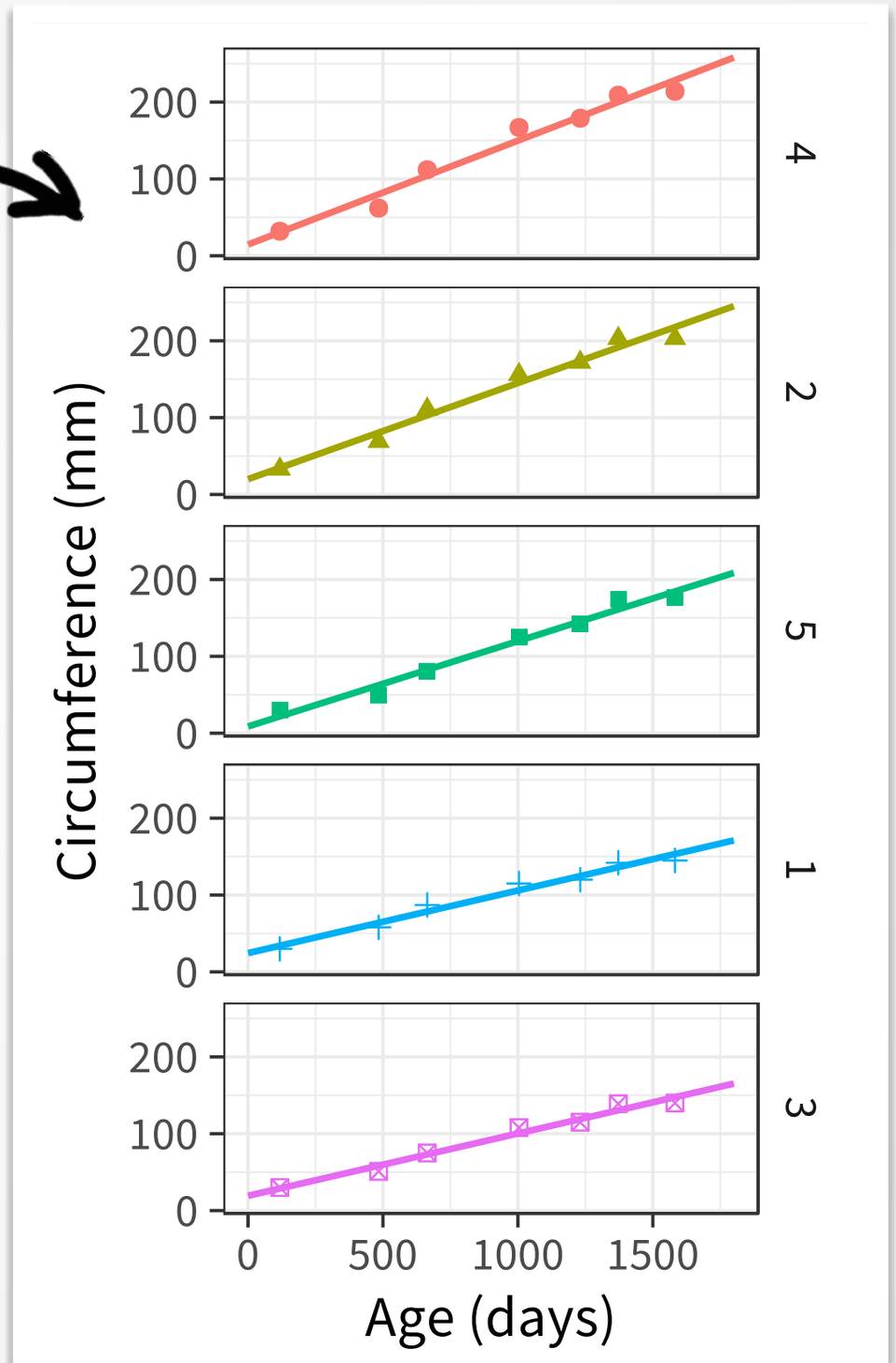
	Tree	age	circ.
1	Tree1	1582	214
2	Tree1	118	32
3	Tree2	118	33
4	Tree2	1372	203
5	Tree3	484	49
6	Tree3	1372	174
7	Tree3	1004	125



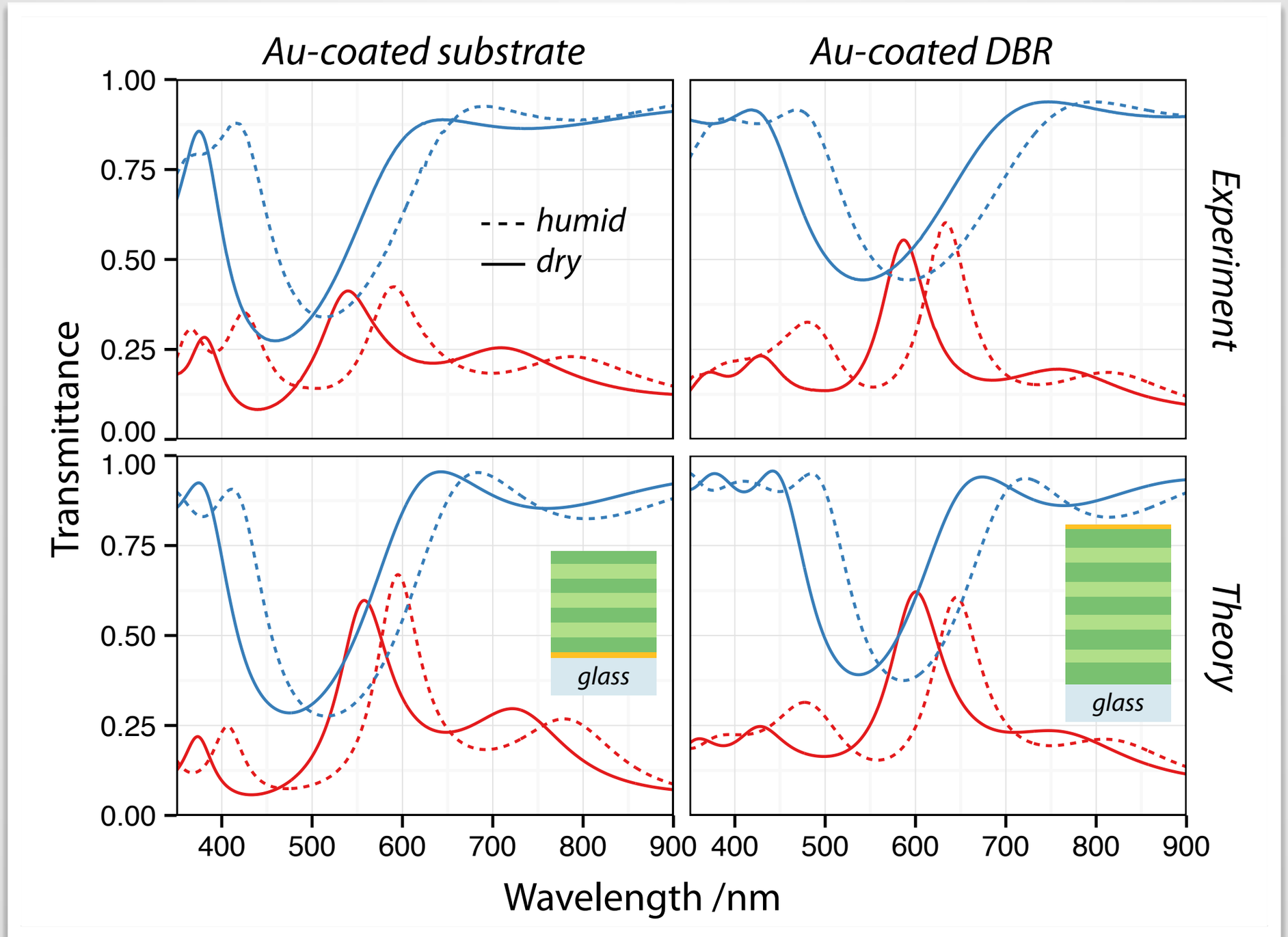
GRAPHICAL EXPLORATIONS — D.R.Y. PRINCIPLE

```
last_plot() +
  facet_grid(Tree ~ .) +
  theme_publication
```





FACETING — SMALL MULTIPLES



10 PRACTICAL TIPS

TIP #1| AVOID RESCALING IMAGES

Donec leo. Morbi vulputate convallis est. Integer aliquet. Pellentesque aliquet sodales urna.

Columnwidth: 3.18143in
Textwidth: 6.50127in

Include the figures without rescaling,

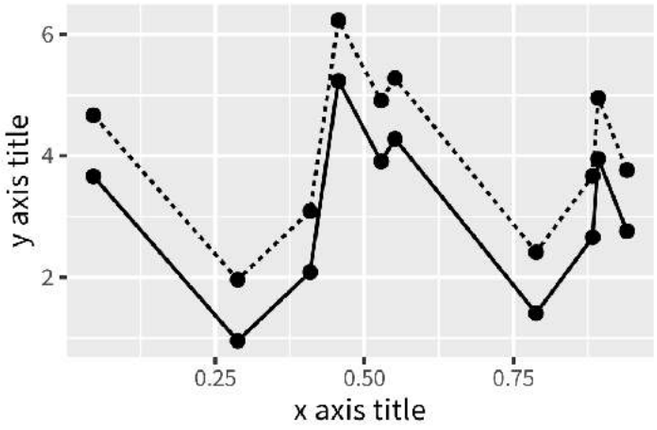


Figure 1: Nunc sed pede. Praesent vitae lectus. Praesent neque justo, vehicula eget, interdum id, facilisis et, nibh. Phasellus at purus et libero lacinia dictum. Fusce aliquet. Nulla eu ante placerat leo semper dictum.

Lorem ipsum dolor sit amet, consectetuer adipiscing elit. Etiam lobortis facilisis sem. Nullam

lectus velit ultrices augue, a dignissim nibh lectus placerat pede. Vivamus nunc nunc, molestie ut, ultricies vel, semper in, velit. Ut porttitor. Praesent in sapien. Lorem ipsum dolor sit amet, consectetuer adipiscing elit. Duis fringilla tristique neque. Sed interdum libero ut metus. Pellentesque placerat. Nam rutrum augue a leo. Morbi sed elit sit amet ante lobortis sollicitudin. Praesent blandit blandit mauris. Praesent lectus tellus, aliquet aliquam, luctus a, egestas a, turpis. Mauris lacinia lorem sit amet ipsum. Nunc quis urna dictum turpis accumsan semper.

Lorem ipsum dolor sit amet, consectetuer adipiscing elit. Etiam lobortis facilisis sem. Nullam nec mi et neque pharetra sollicitudin. Praesent imperdiet mi nec ante. Donec ullamcorper, felis non sodales commodo, lectus velit ultrices augue, a dignissim nibh lectus placerat pede. Vivamus nunc nunc, molestie ut, ultricies vel, semper in, velit. Ut porttitor. Praesent in sapien. Lorem ipsum dolor sit amet, consectetuer adipiscing elit. Duis fringilla tristique neque. Sed interdum libero ut metus. Pellentesque placerat. Nam rutrum augue a leo. Morbi sed elit sit amet ante lobortis sollicitudin. Praesent blandit blandit mauris. Praesent lectus tellus, aliquet ali-

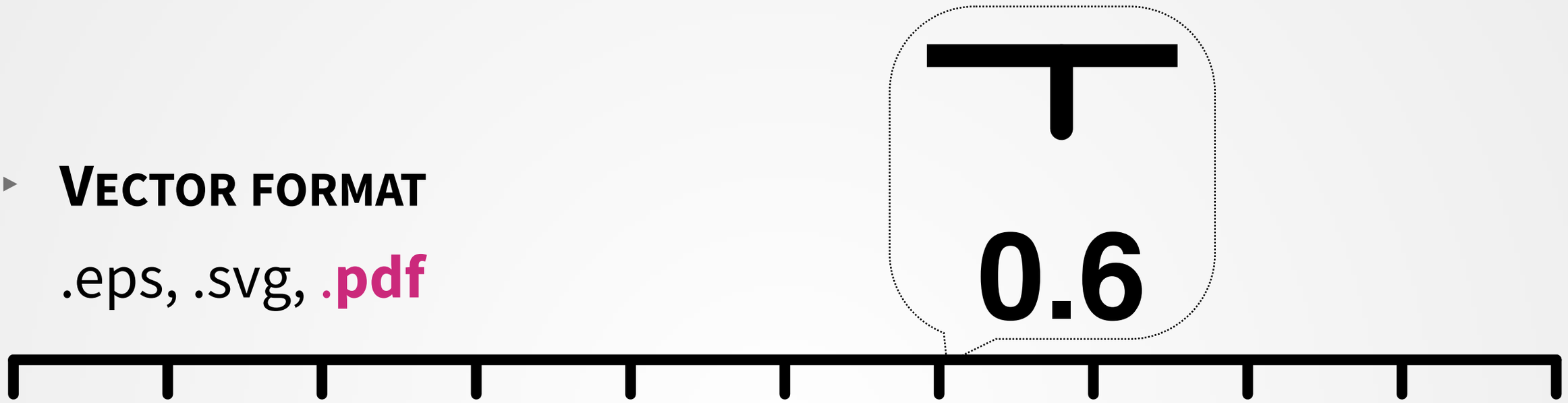
LaTeX tip

```
\usepackage{layouts}
\printinunitsof{in}\prntlen{\columnwidth}
\printinunitsof{in}\prntlen{\textwidth}
```

TIP #2| FILE FORMATS

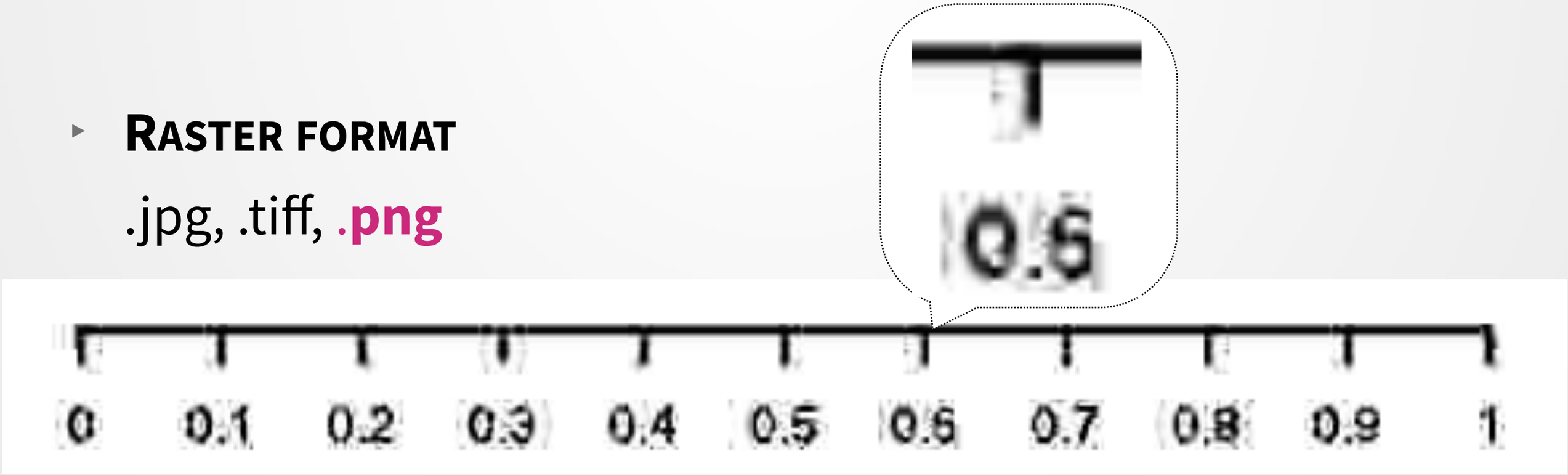
- **VECTOR FORMAT**

  .eps, .svg, **.pdf**

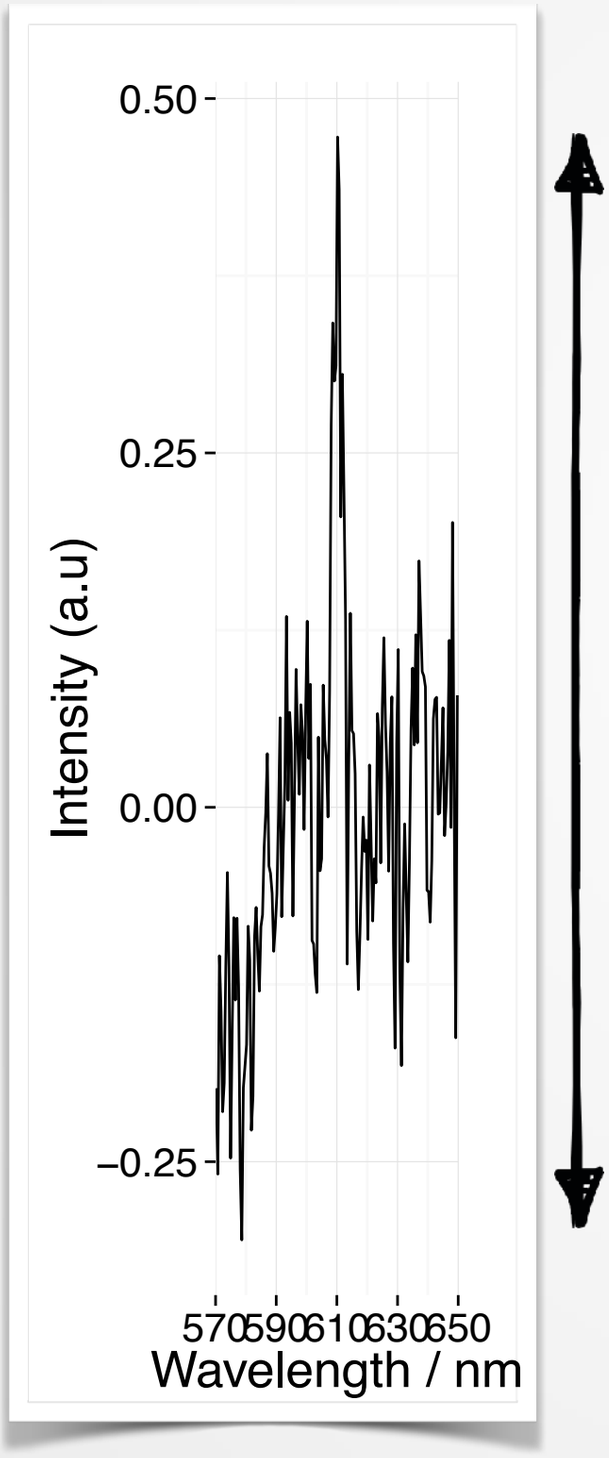


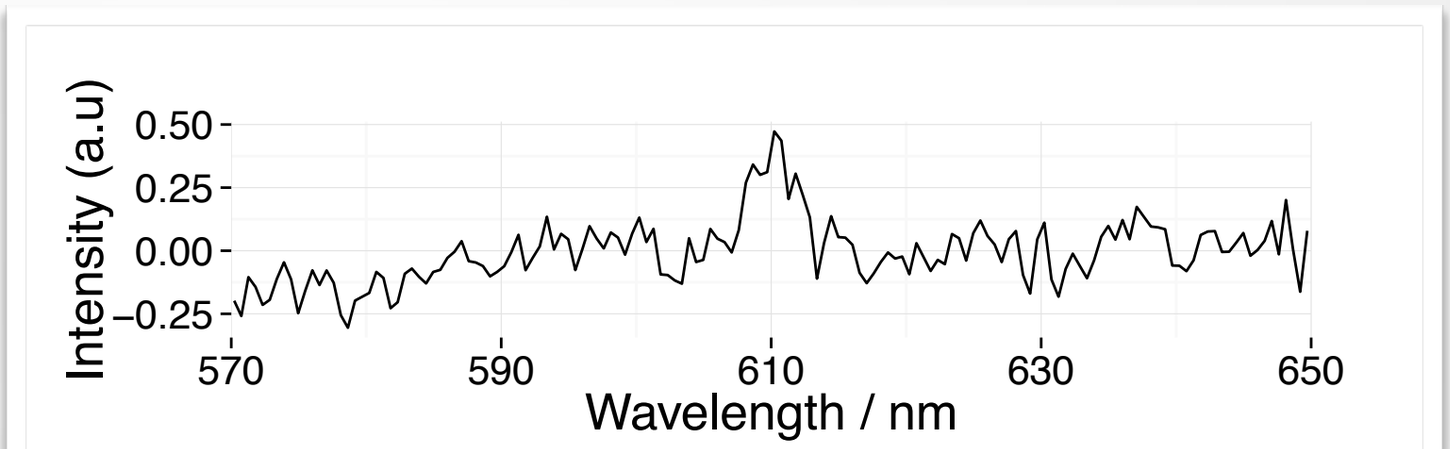
- **RASTER FORMAT**

  .jpg, .tiff, **.png**



TIP #3| ASPECT RATIO

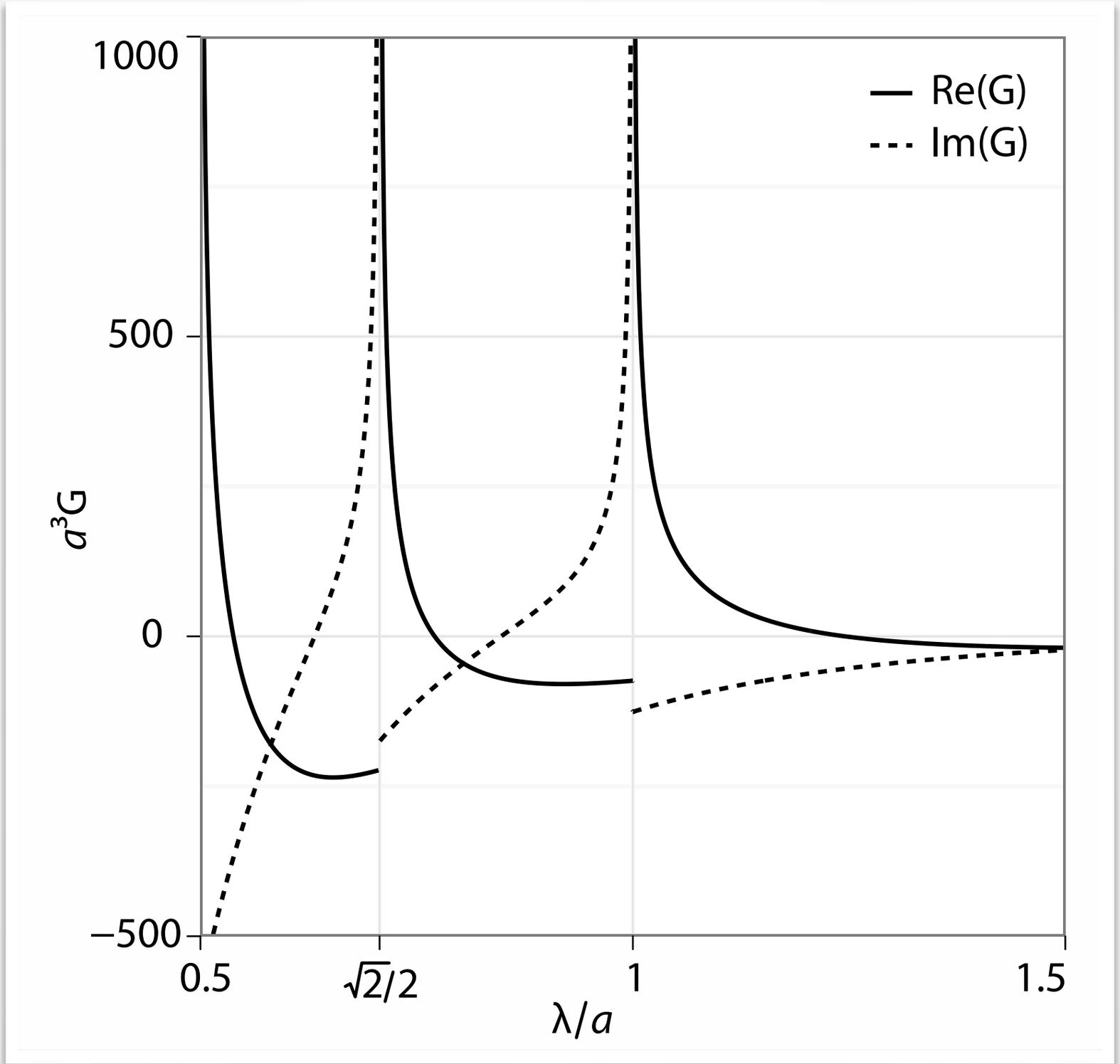




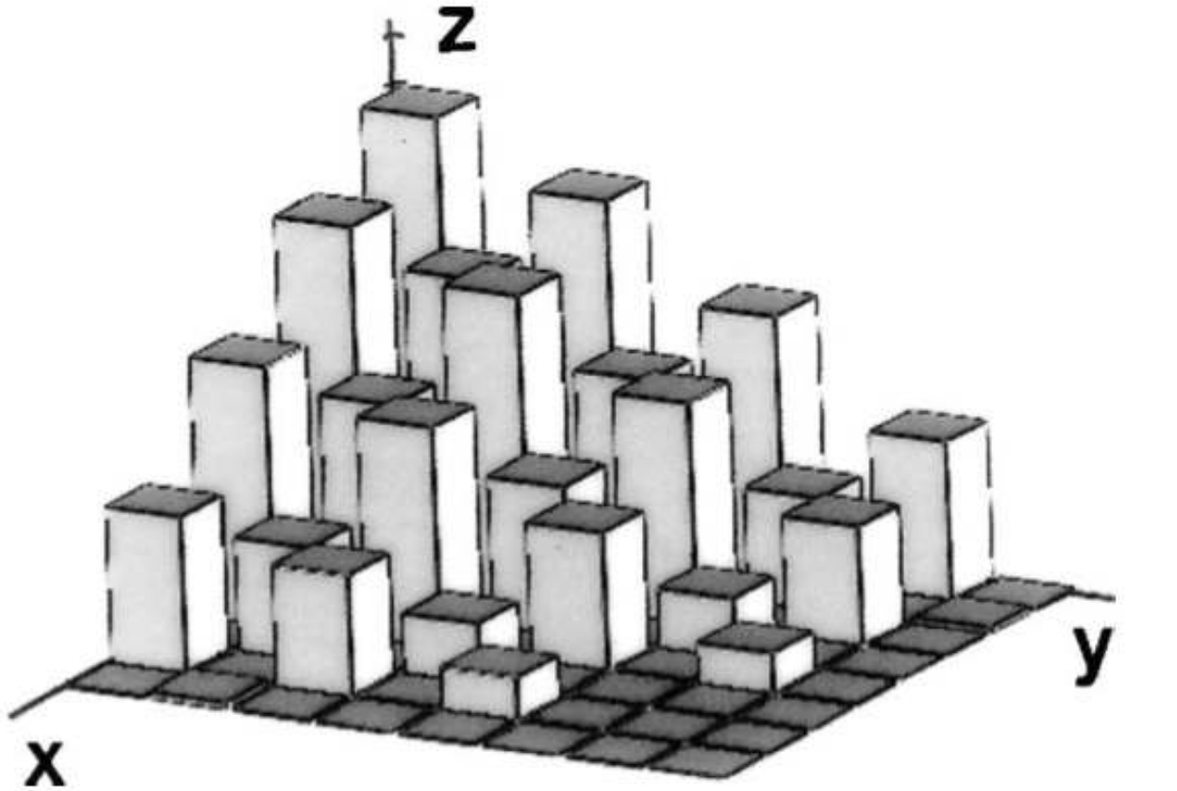
Try

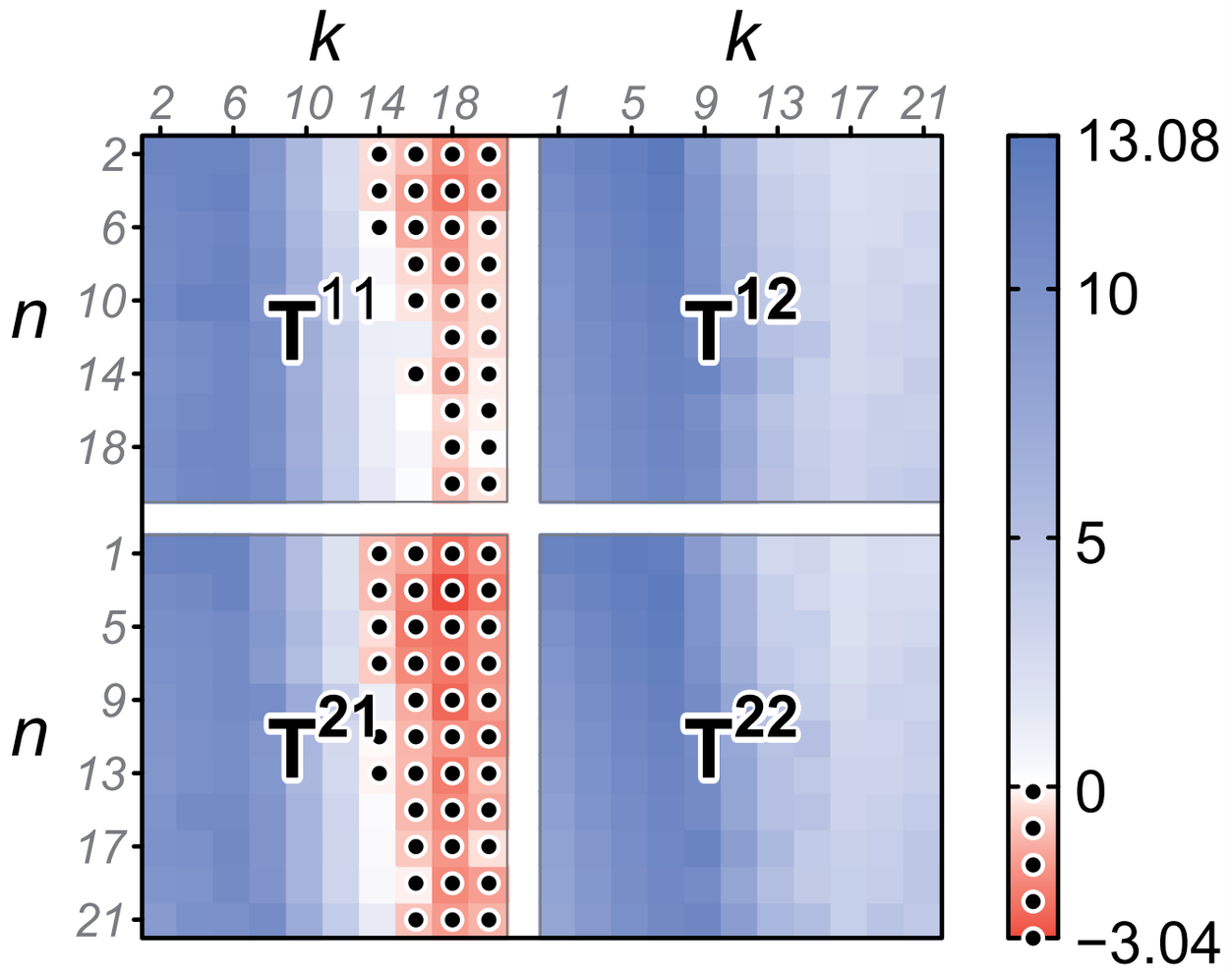
- "banking" at 45°
- standard ratios, e.g 6x4

TIP #4| DATA-TO-INK RATIO —— IS MORE

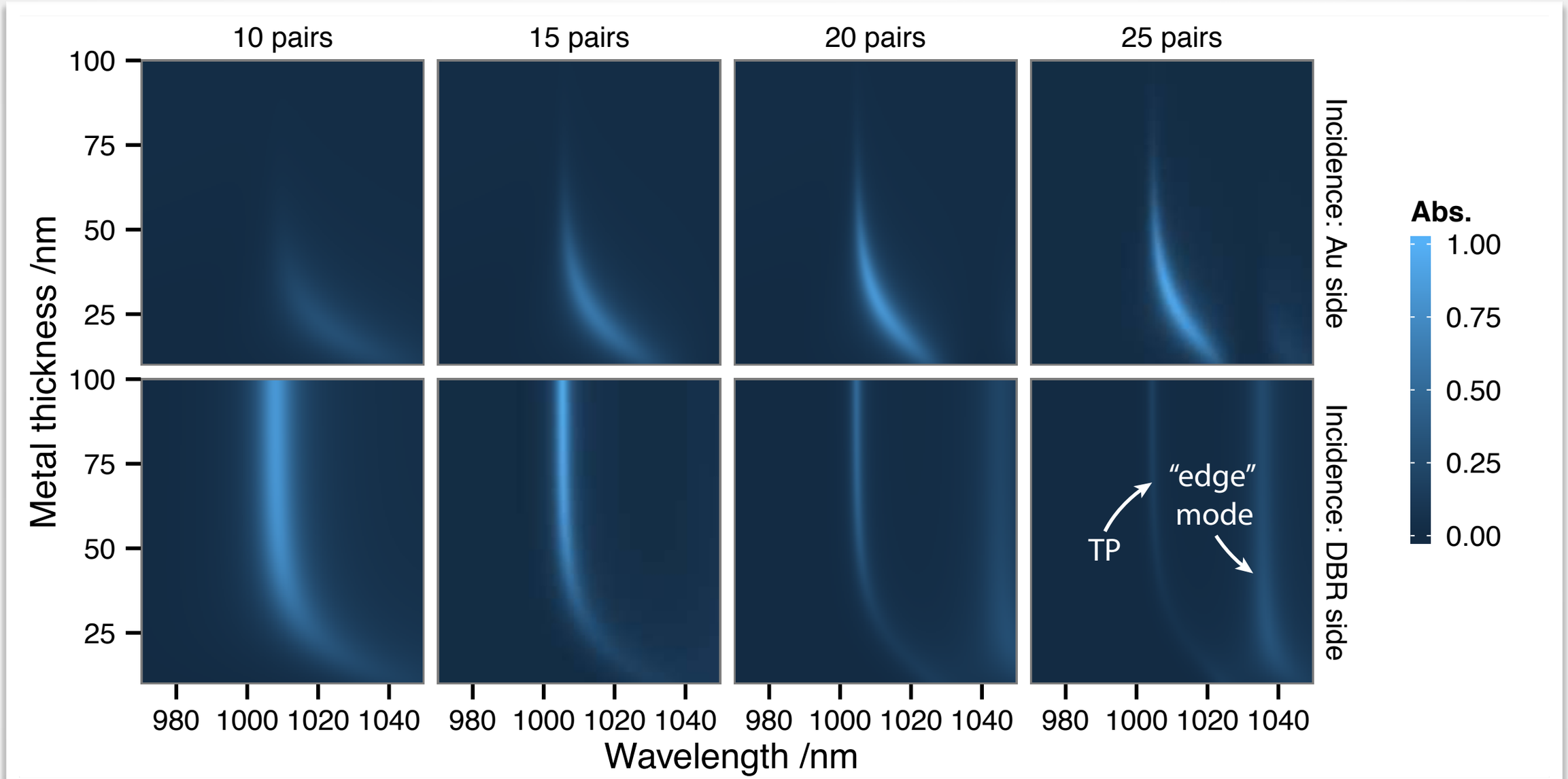


TIP #5| FAKE 3D IS OFTEN DETRIMENTAL

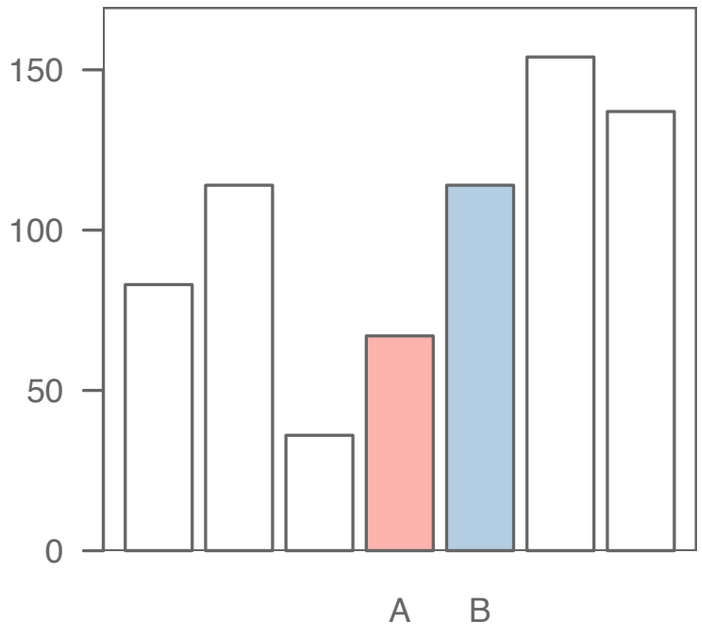


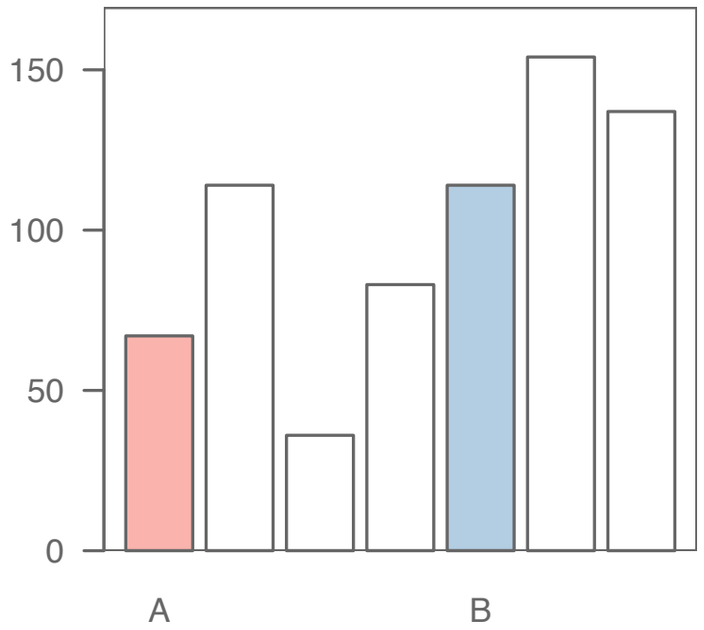


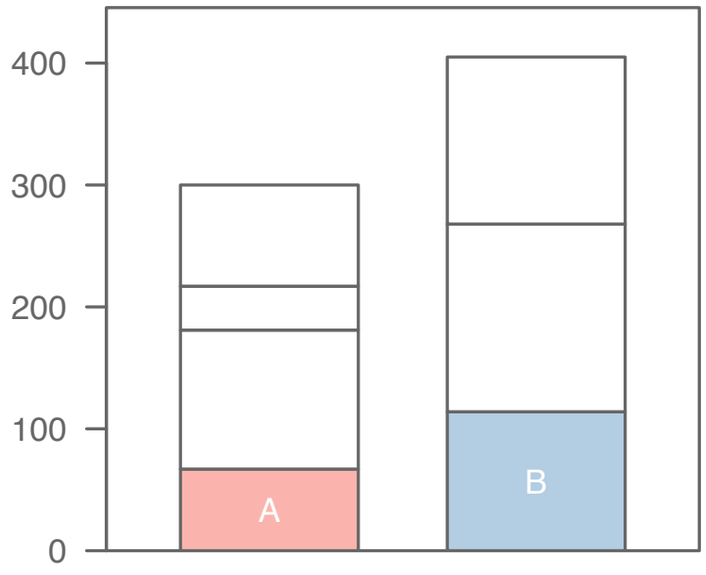
TIP #6| SMALL MULTIPLES

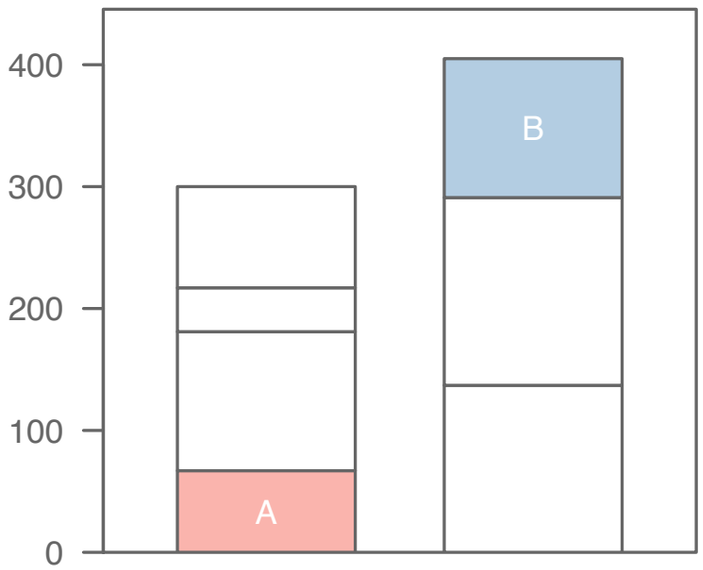


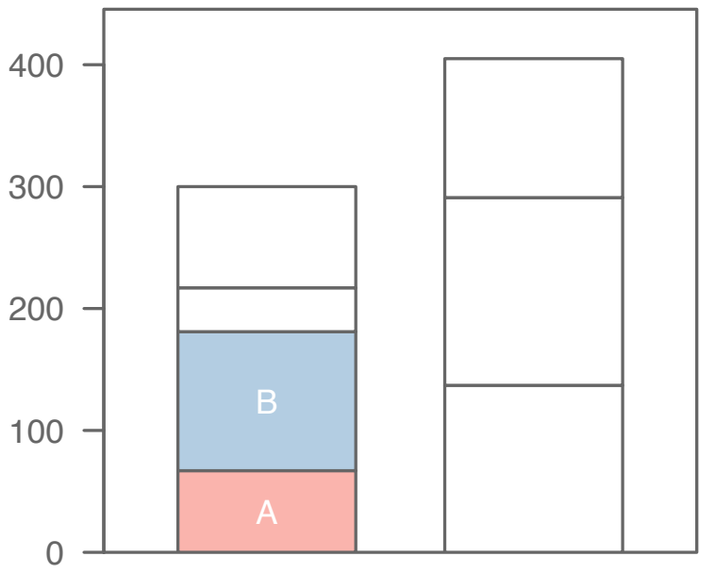
TIP #7| MAKE IMPORTANT COMPARISONS EASIER

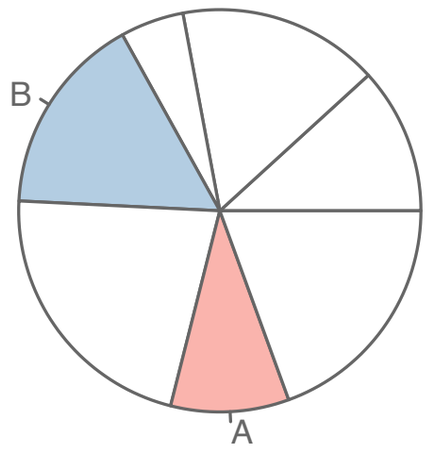




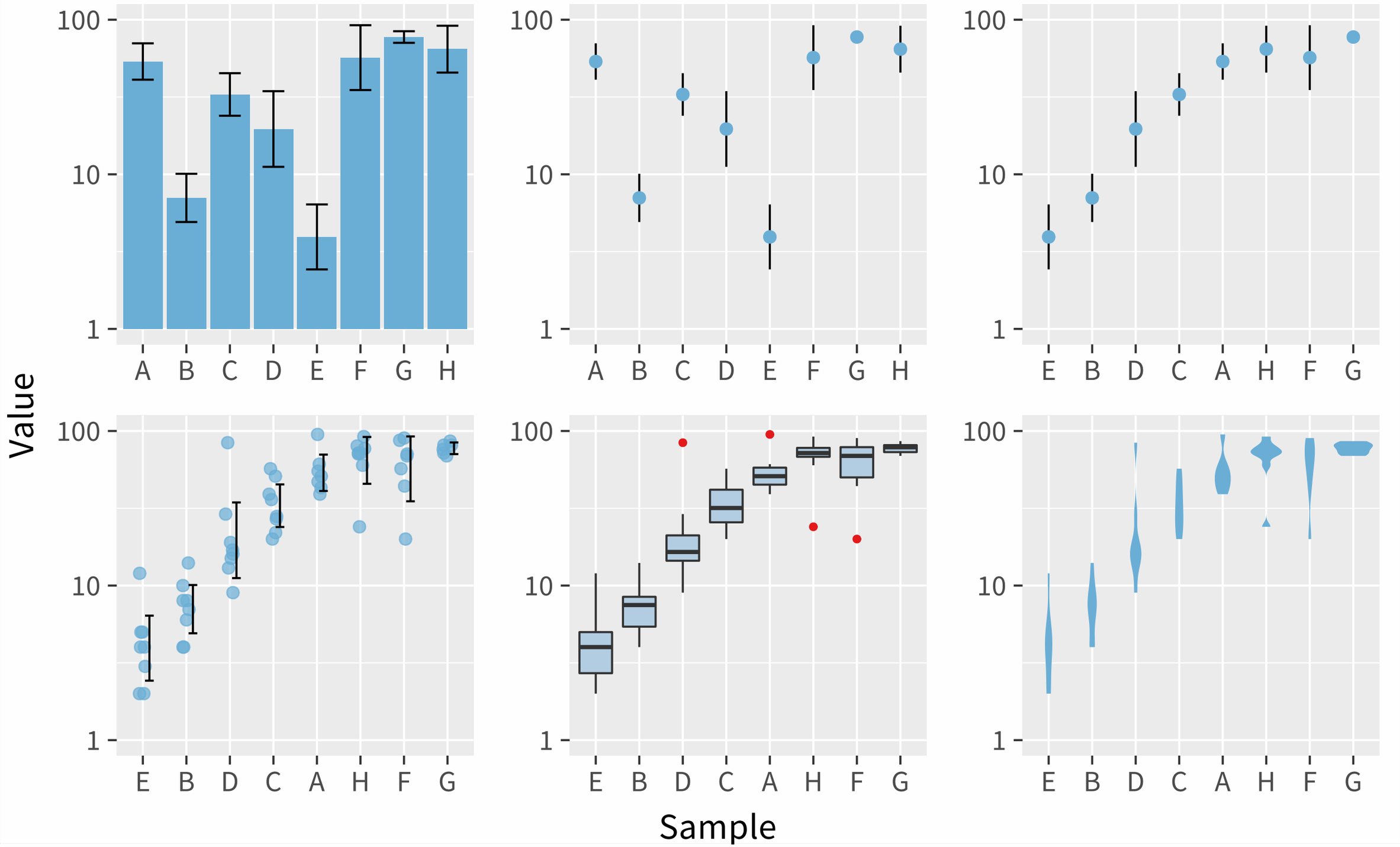




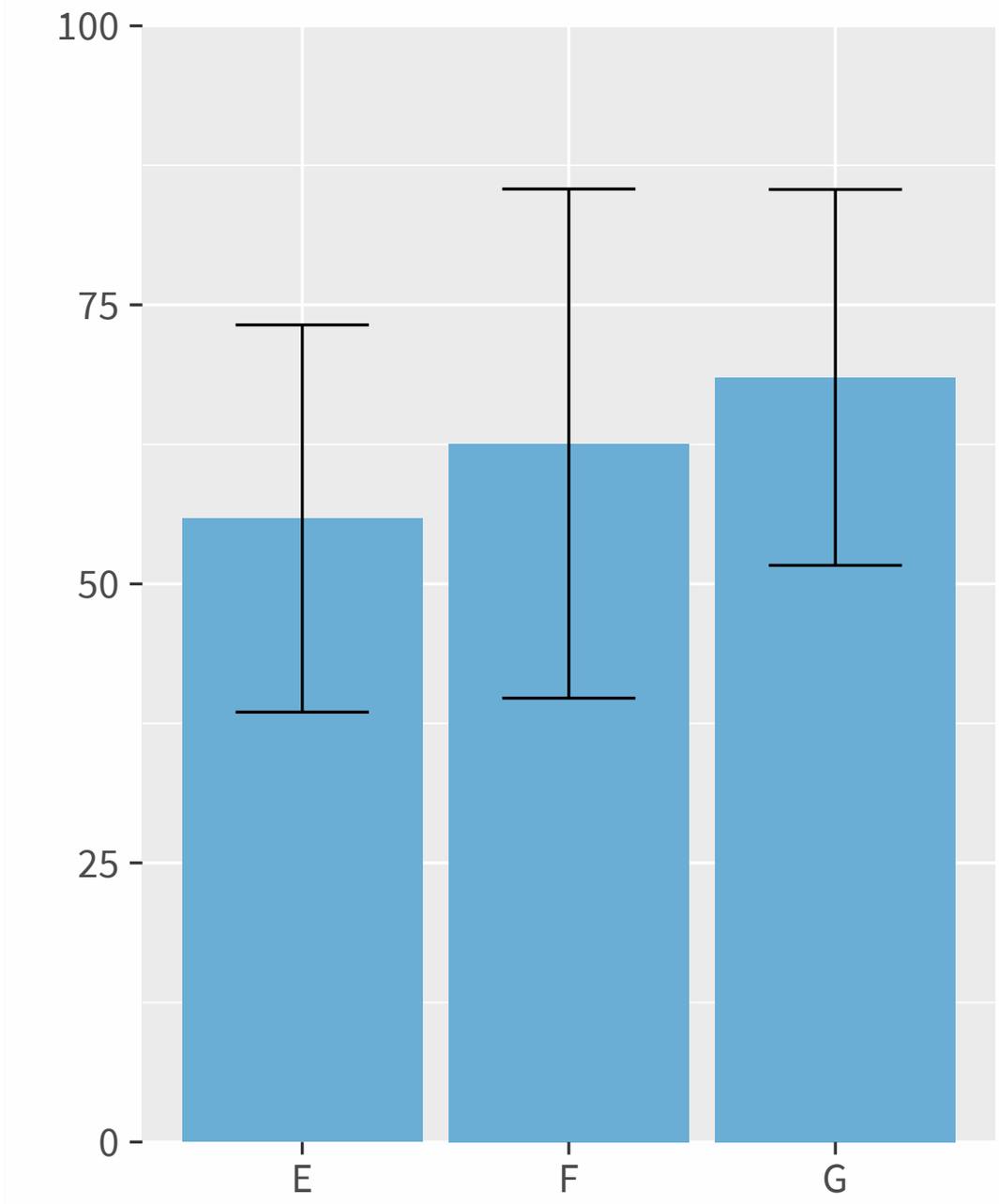


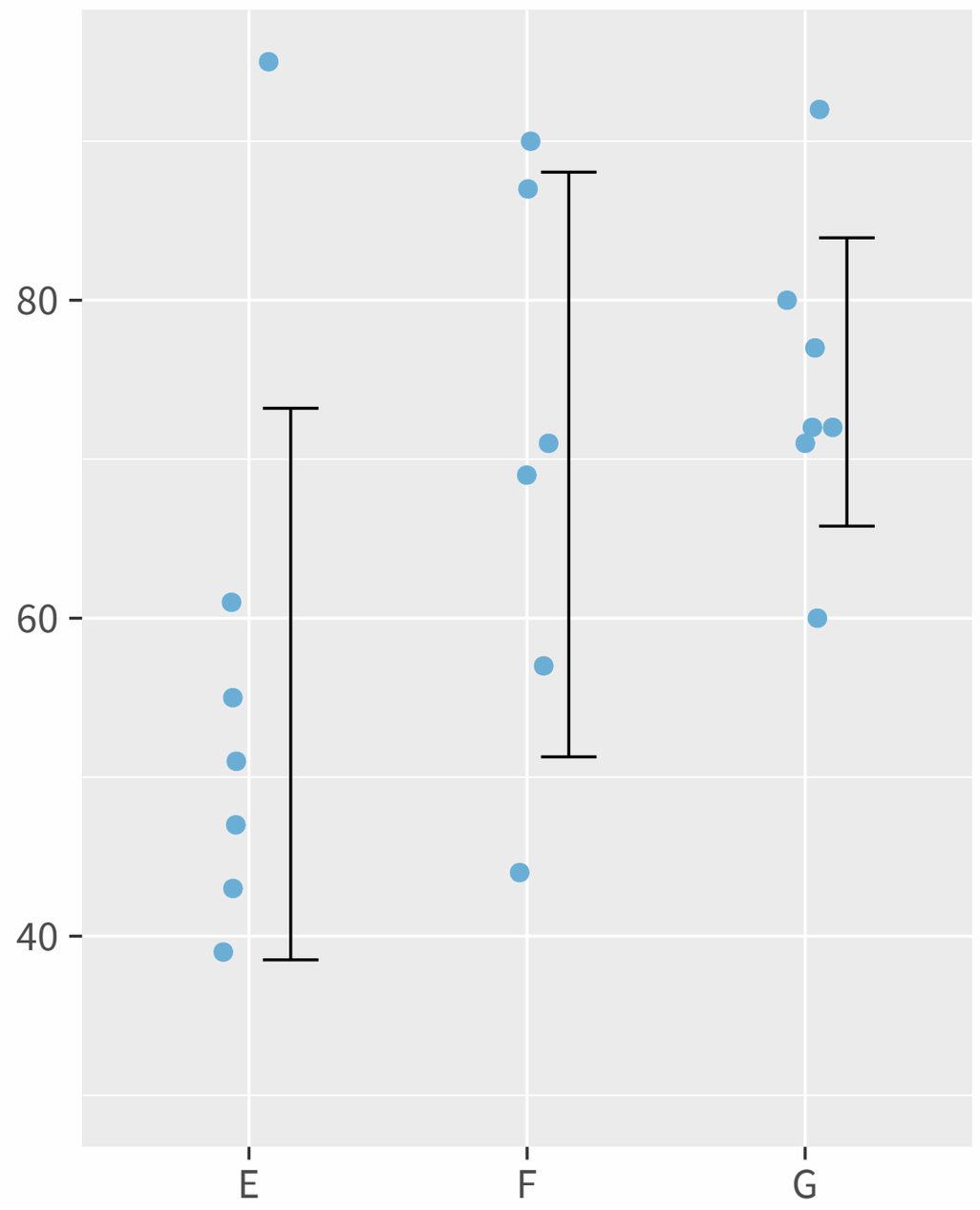


TIP #8| IMPROVING ON 'DYNAMITE PLOTS'

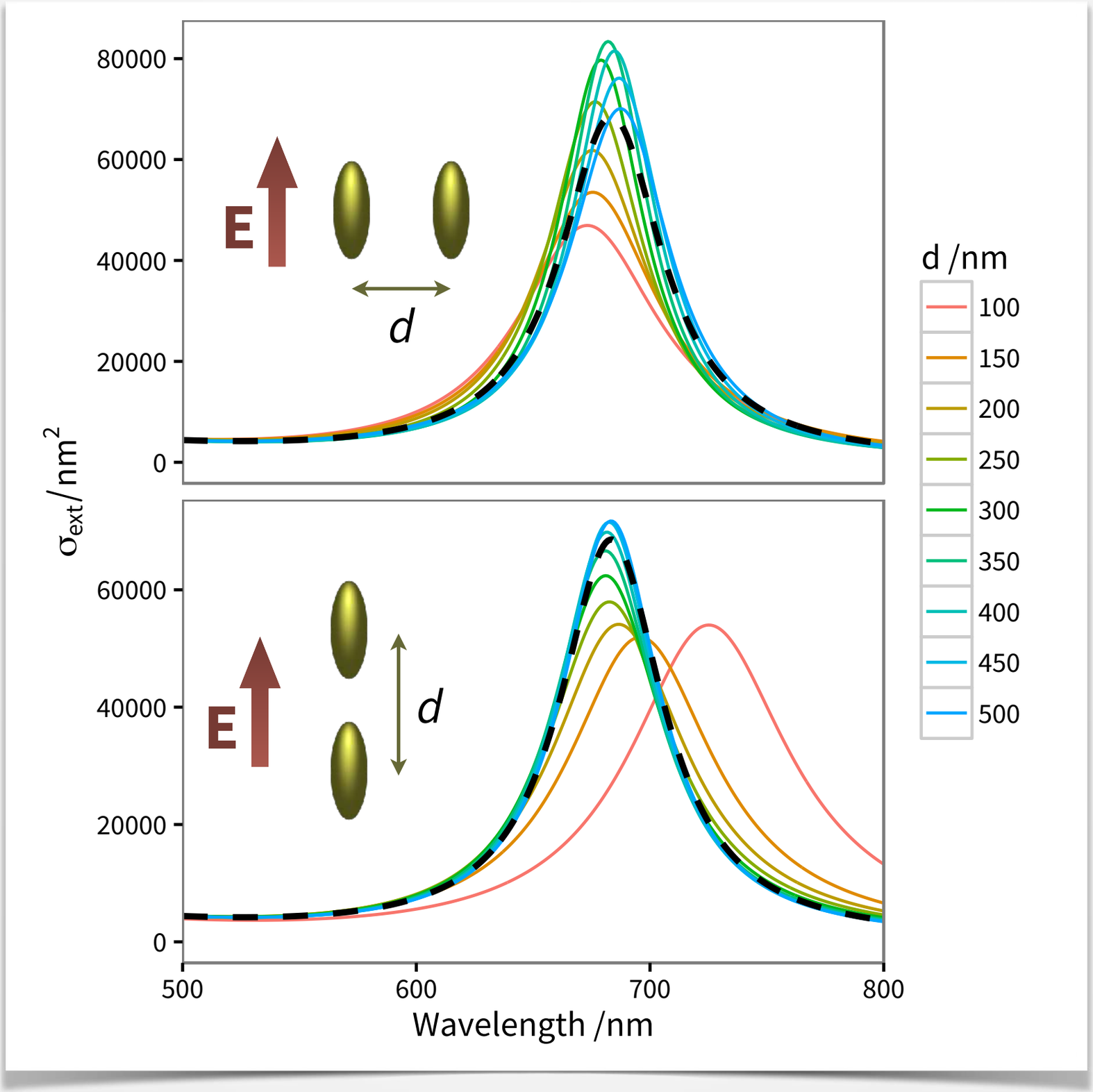


ALWAYS INCLUDE 0? IT DEPENDS





TIP #9| CONTEXTUAL ANNOTATIONS



TIP #10| USING COLOURS

- **USE COLOUR TO SYMBOLISE**

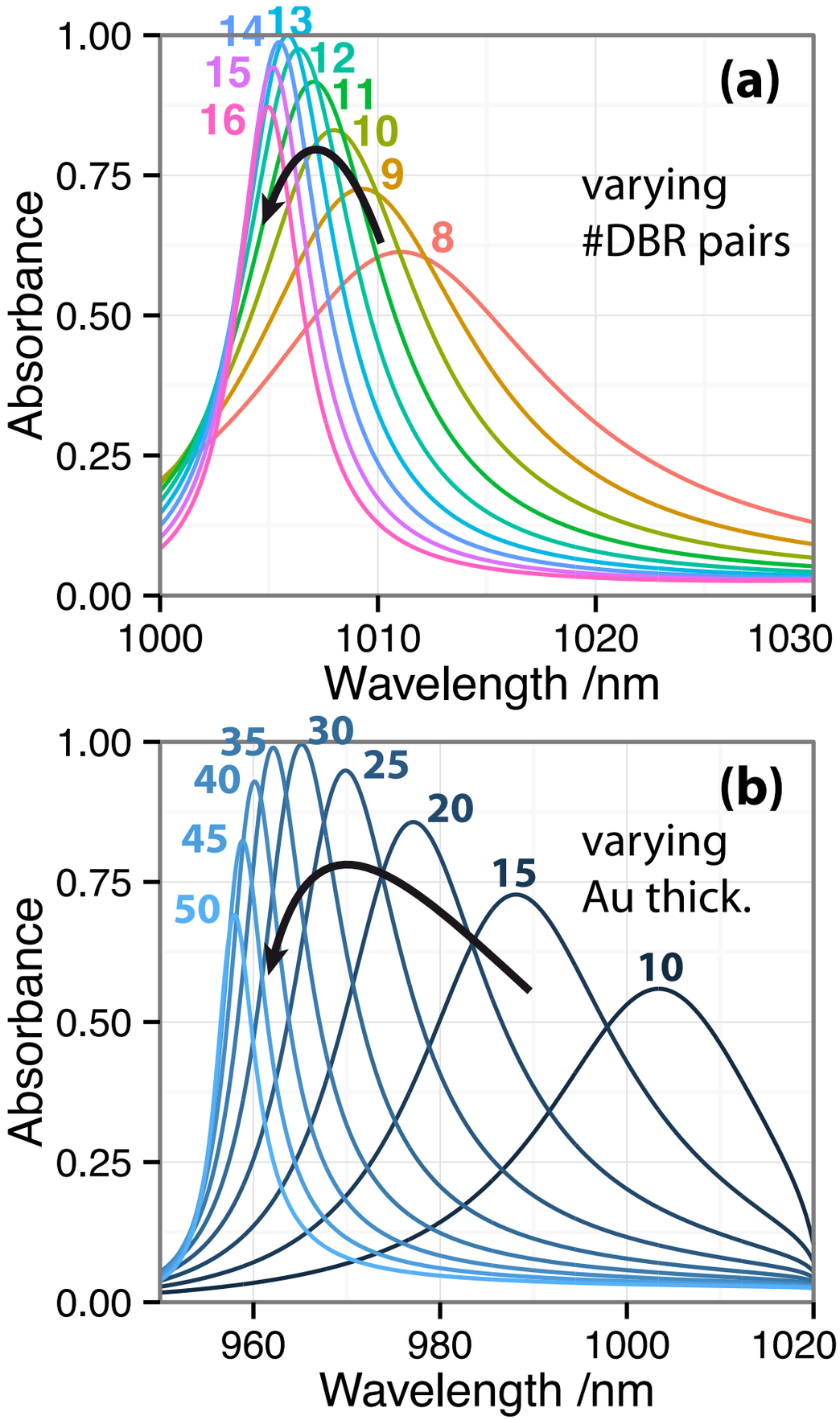
  Be logical & follow conventions

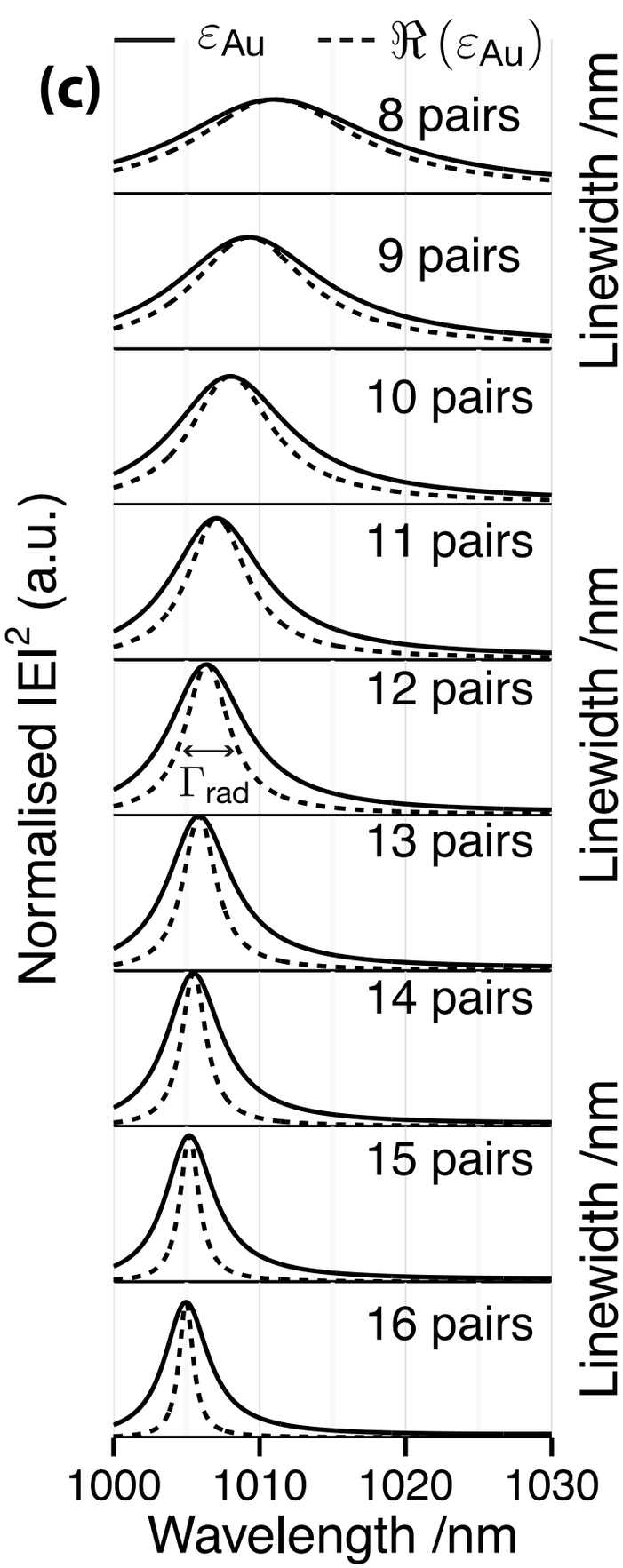
- **USE COLOUR TO PRIORITISE INFORMATION**

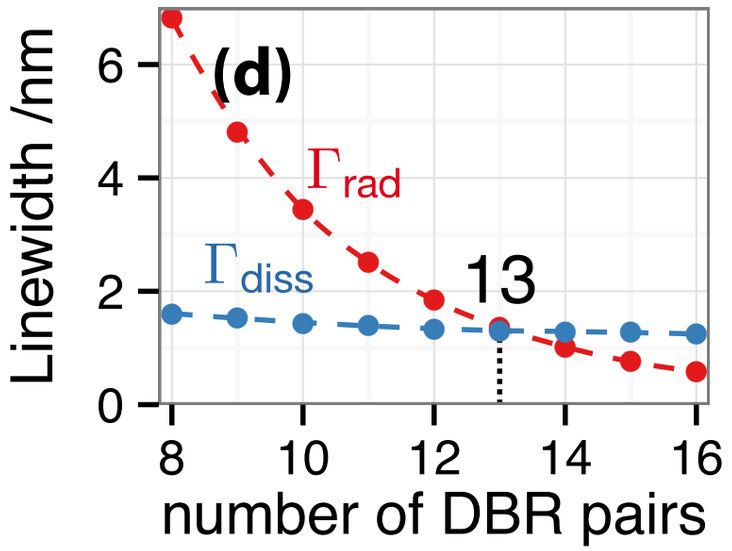
  Smaller areas brighter, larger areas lighter

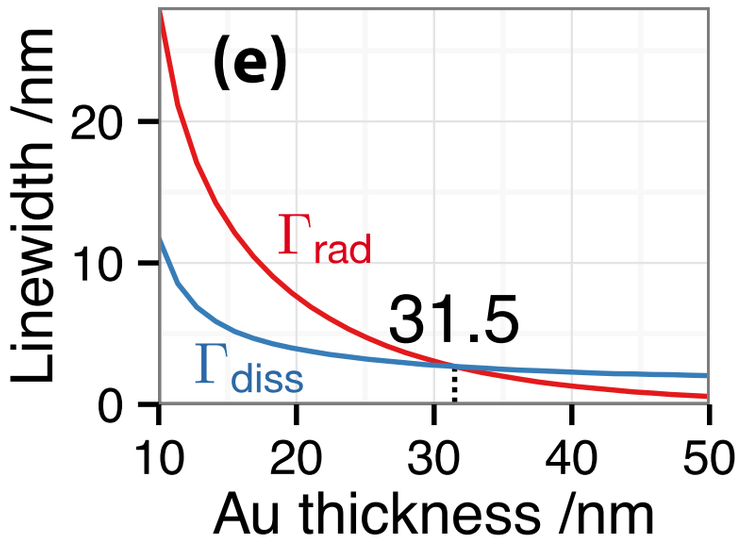
- **USE COLOUR TO IDENTIFY A RECURRING THEME**

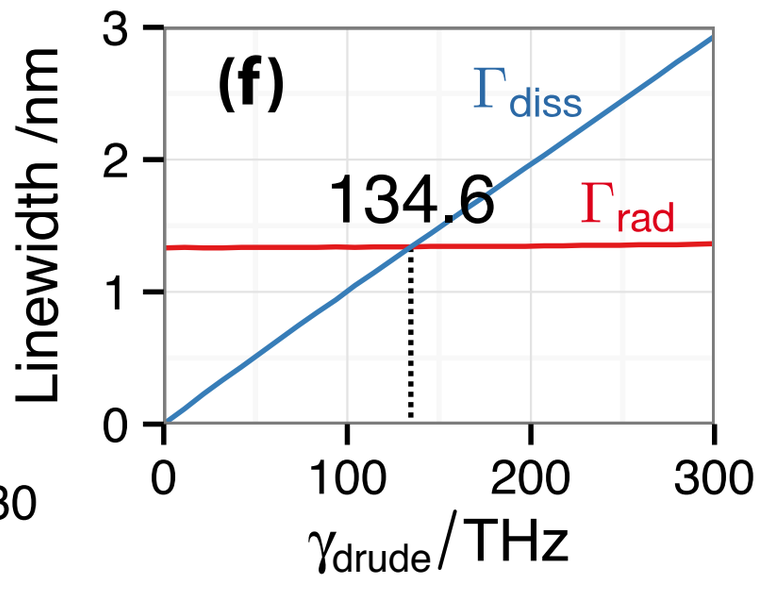
  Be consistent


(a)
varying
#DBR pairs
Absorbance
Wavelength /nm
(b)
varying
Au thick.
Absorbance
Wavelength /nm

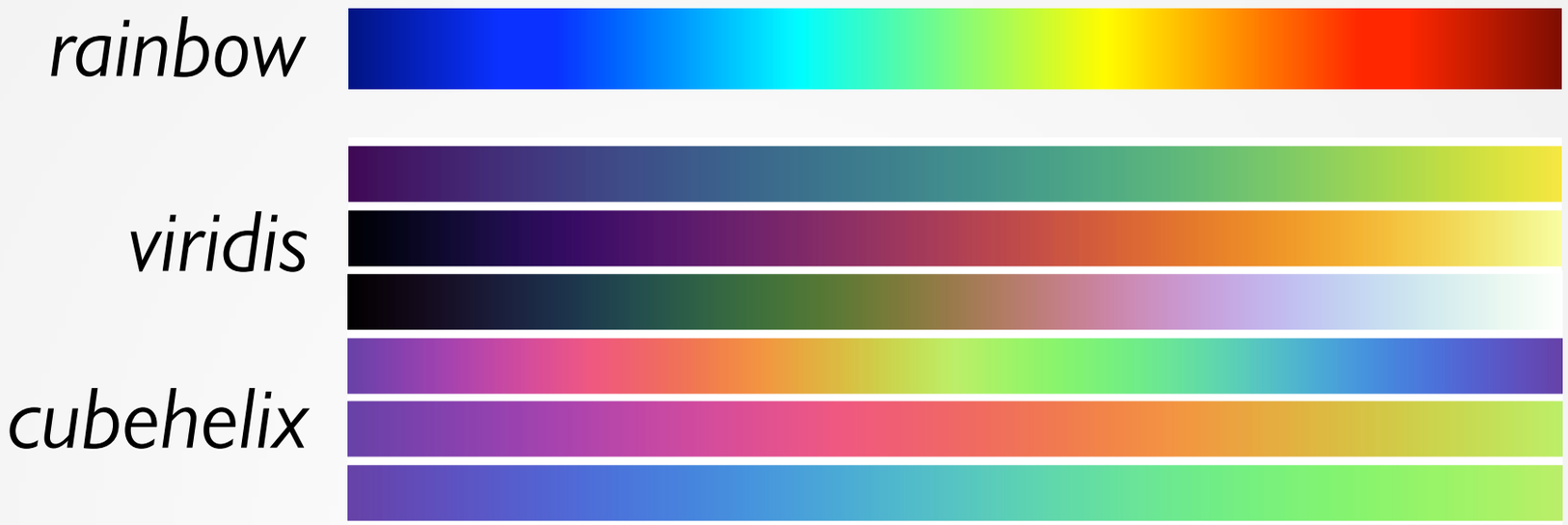

(c)
ε_{Au}
$\Re(\varepsilon_{Au})$
8 pairs
9 pairs
10 pairs
11 pairs
12 pairs
13 pairs
14 pairs
15 pairs
16 pairs
Γ_{rad}
Normalised |E|^2 (a.u.)
Wavelength /nm


(d)
Γ_{rad}
Γ_{diss}
13
Linewidth /nm
number of DBR pairs


(e)
Γ_{rad}
Γ_{diss}
31.5
Linewidth /nm
Au thickness /nm

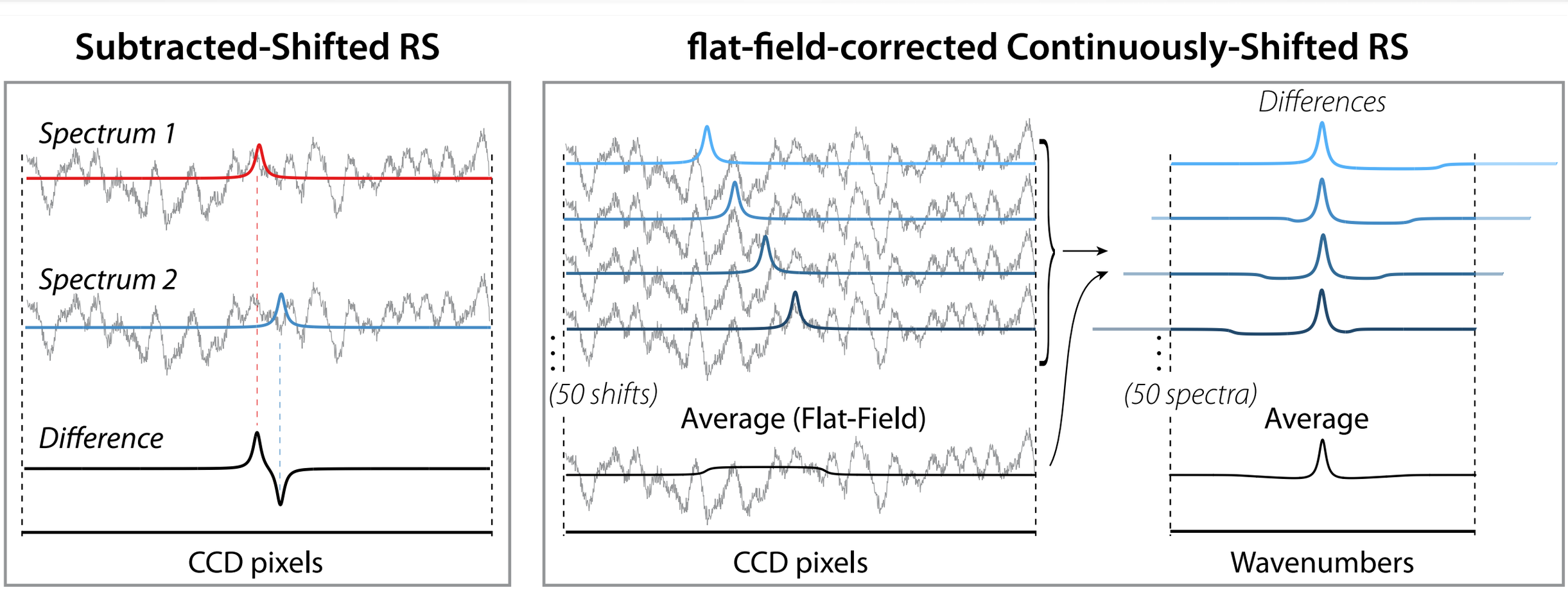

(f)
Γ_{diss}
Γ_{rad}
134.6
Linewidth /nm
γ_{drude}/THz

CHOOSING COLOUR PALETTES

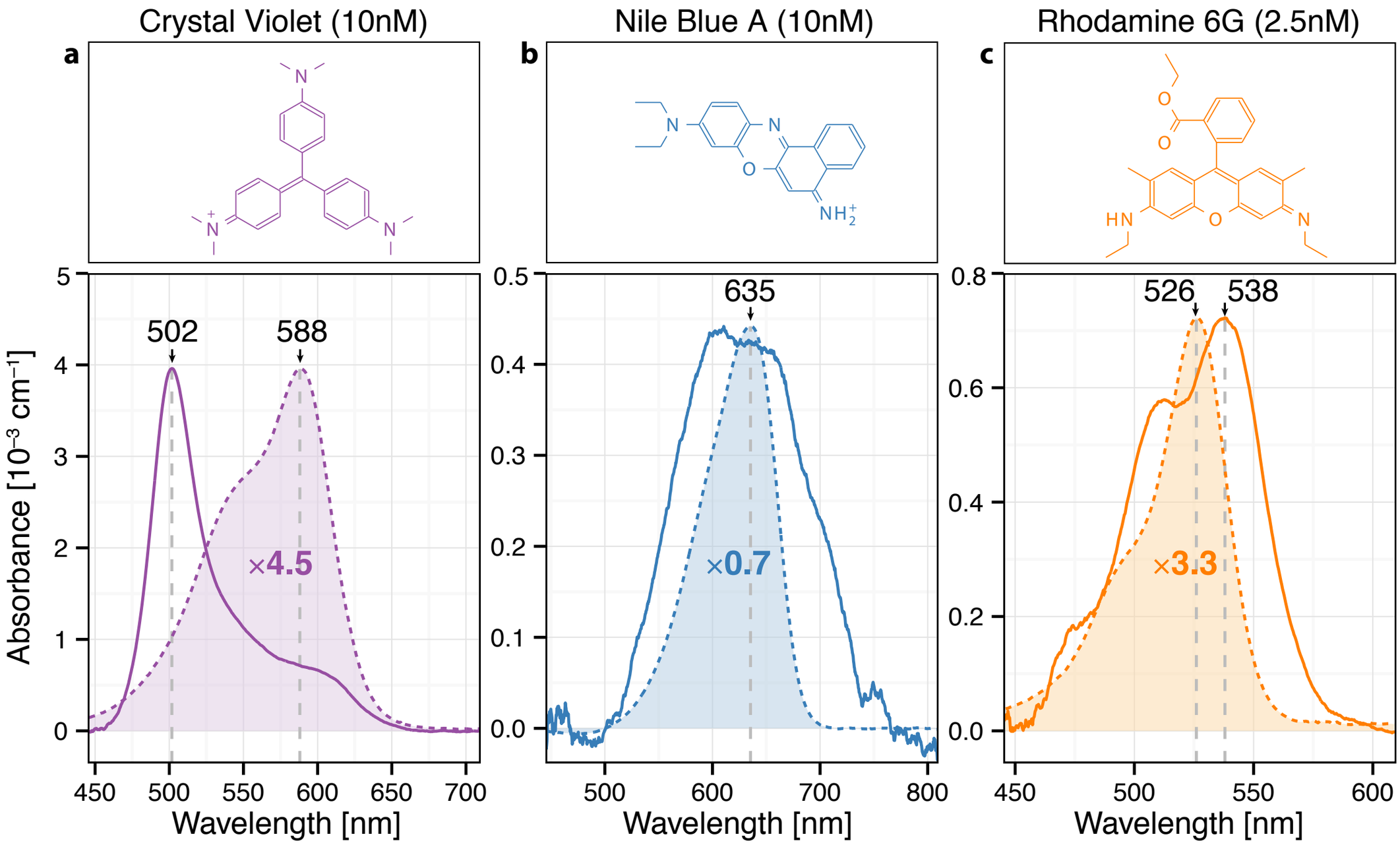


Note: ~**8**% of males, **0.5**% of females, are **COLOUR BLIND**

COLOUR HELPS IDENTIFY, FOCUS, ORGANISE



COLOUR AND CONTEXT



CLUSTER

positions
x
y
z
sizes
a
b
c
angles
φ
θ
ψ

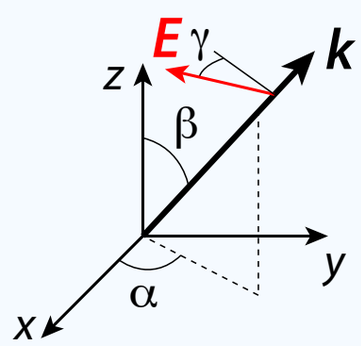
N_r

MATERIAL

λ

N_l

INCIDENCE

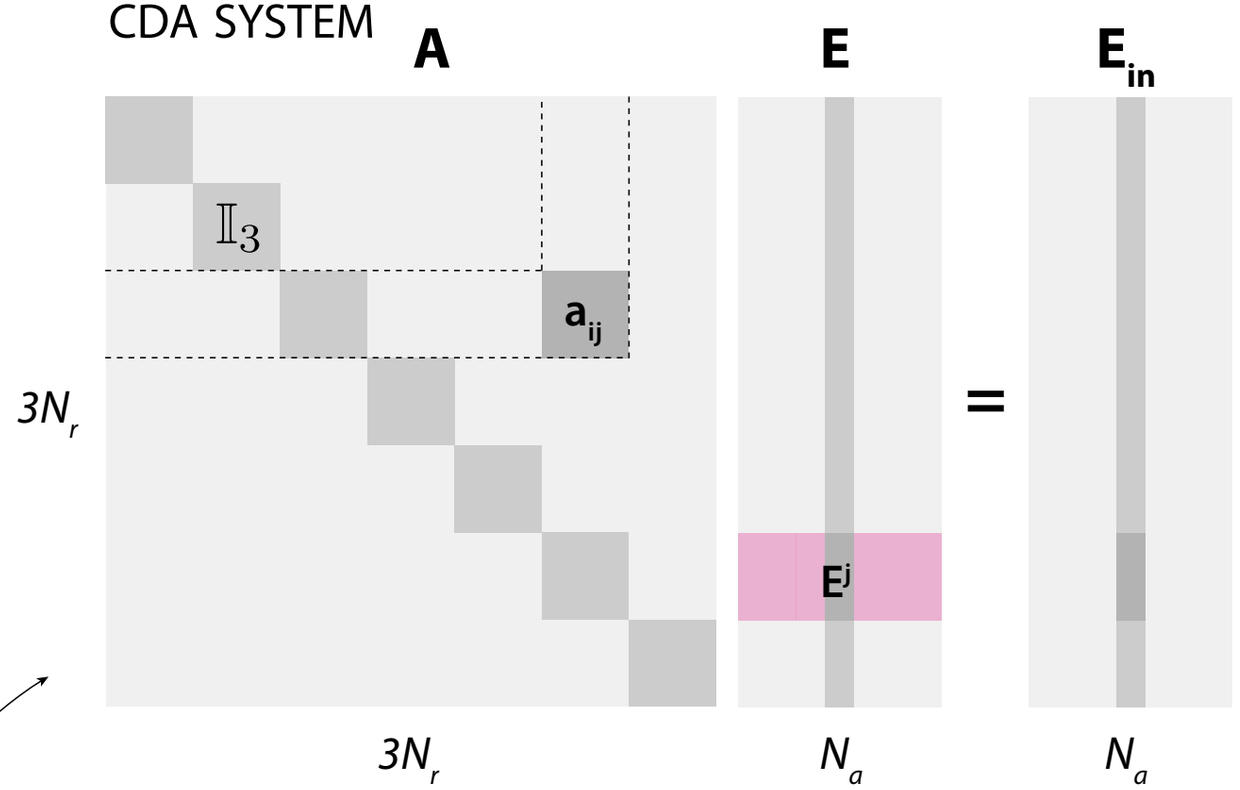


Incidence
α
β
γ

N_a

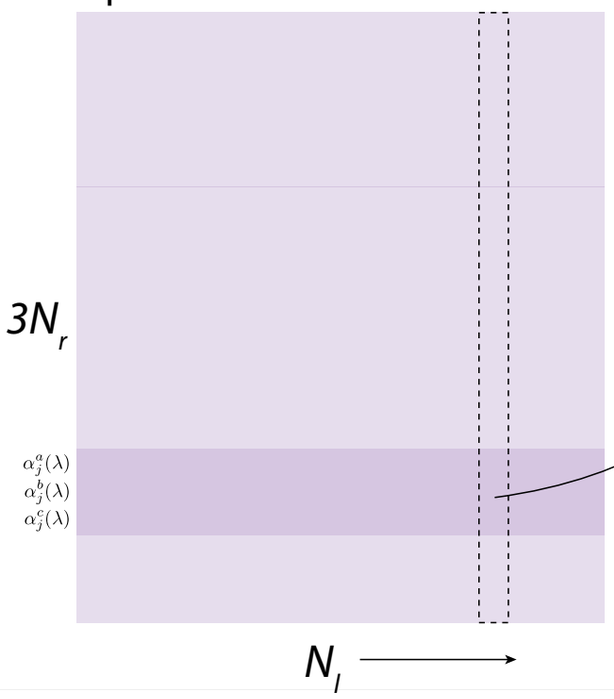
$\varepsilon(\lambda)$ or $\bar{\alpha}(\lambda)$

CDA SYSTEM



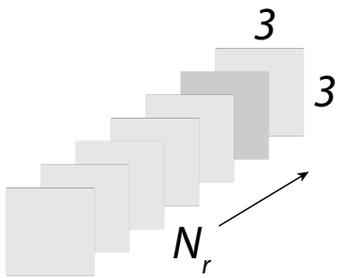
POLARISABILITY

Alpha



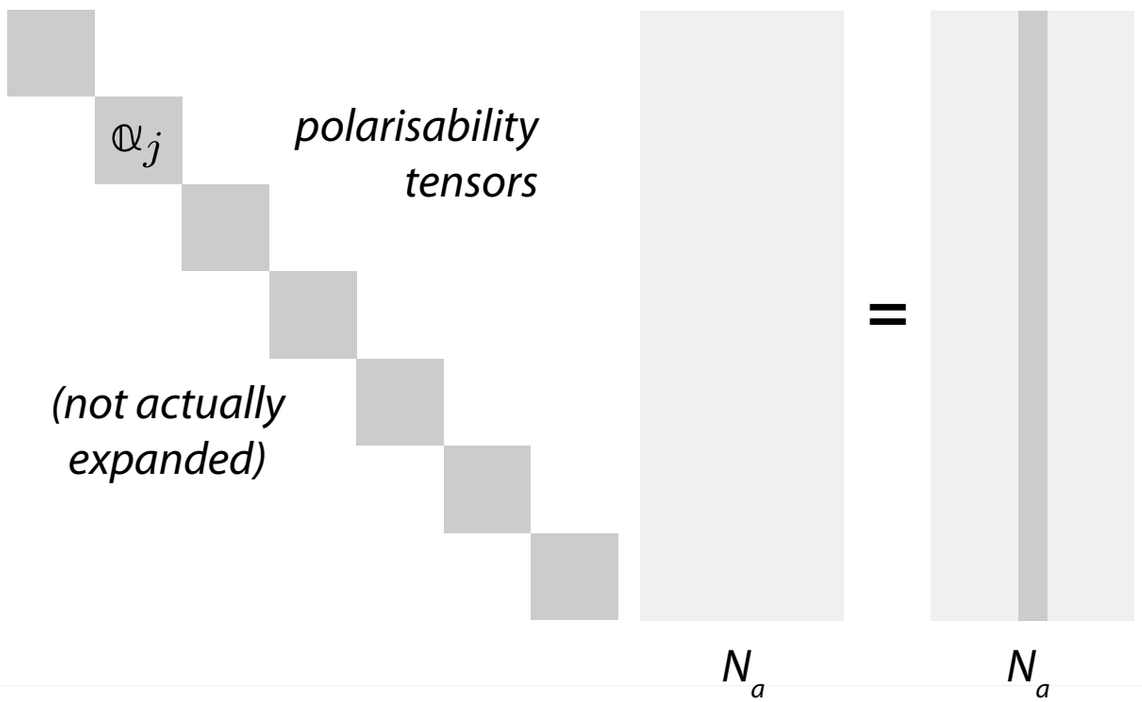
Rotation
(φ, θ, ψ)

R^{-1} $\begin{matrix}\alpha_j^a\\ \alpha_j^b\\ \alpha_j^c\end{matrix}$ R = $\mathbb{\alpha}_j$



AlphaBlocks

DIPOLE MOMENTS



TOOLS DON'T MATTER

but they kind of do...

If progress is to be made in graphics, we must be prepared to set aside old procedures when better ones are developed, just as is done in other areas of science.

—W.S. Cleveland

BENEFITS OF SCRIPTING GRAPHICS

- **EXPLORING MORE POSSIBILITIES**
  - Save time
  - Try multiple variations
- **CONSISTENCY**
  - Reproducible code & aesthetics
  - Self-documenting analysis

KEY POINTS

- **SHOW THE DATA '*AS NATURE INTENDED*'**
  - Maximise data-to-ink ratio (*no chart junk*)
  - Sort and organise (*meaningful order*)
  - Consider transformations (*log*, *difference*, …)

- **HELP THE READER**
  - Proximity of things to compare
  - Axes aligned to ease comparisons
  - Deliberate use of colour and labels