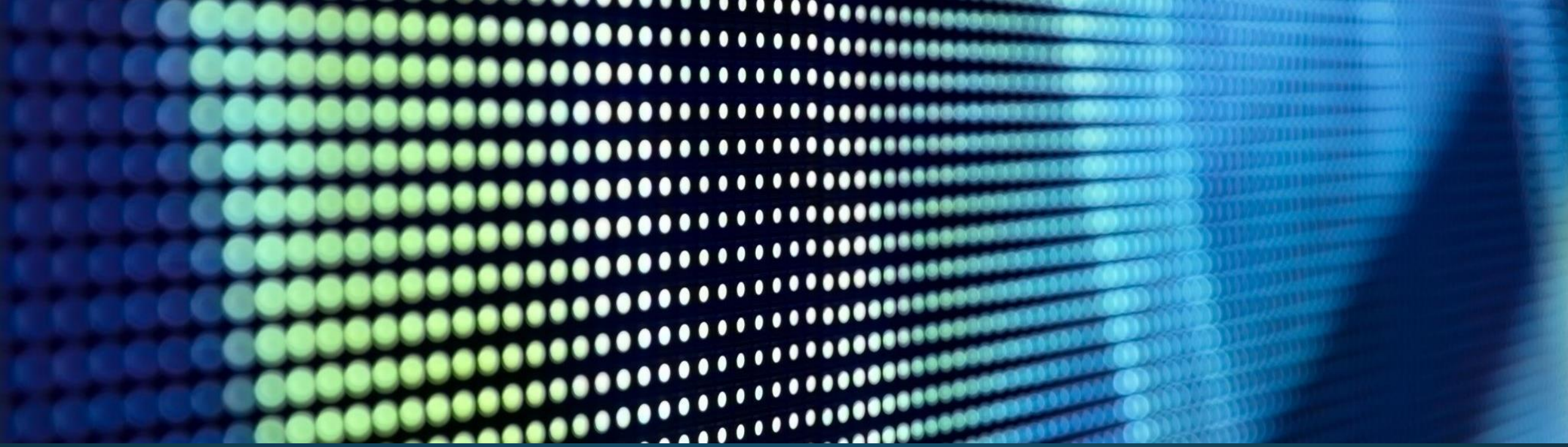


CIE Research Student Workshop: August 2023

Data Visualisation for Lighting

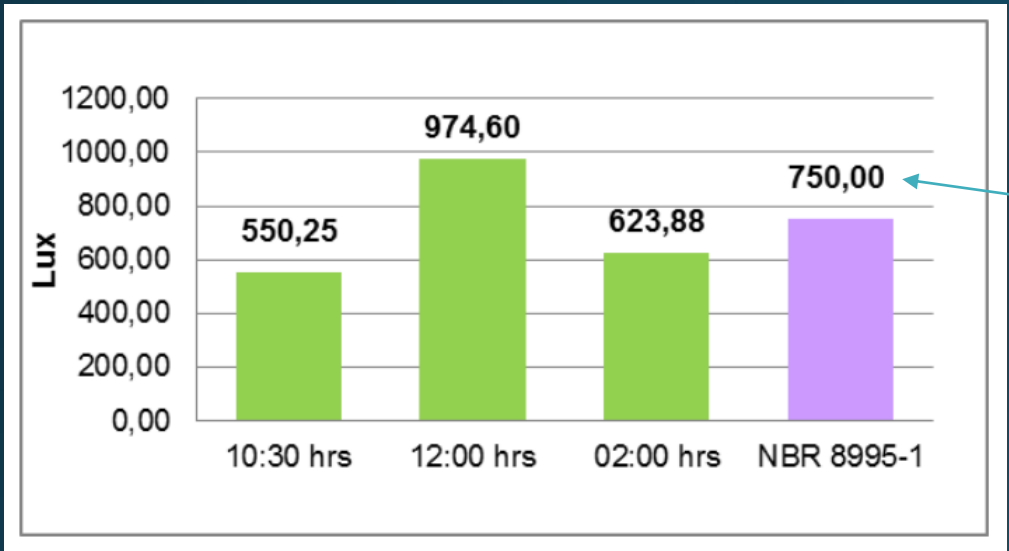
Scope for today → data-driven, declarative visualisations

Types of data we often see…

- Quantitative:
  - Photometric data – illuminance, luminances
  - Statistical Analysis
  - Architectural information

- Qualitative:
  - Survey responses – perception and preference

Photometric data: a graph or a table?



If the labelling of values seems essential, then a table might be better

Does the graphical presentation add meaning?

Does a trend or pattern emerge that the table wouldn't show?

Measurement times (h)	Values Obtained (%)
10:30 a.m.	4.42
12:00	7.23
02:00 p.m.	5.39

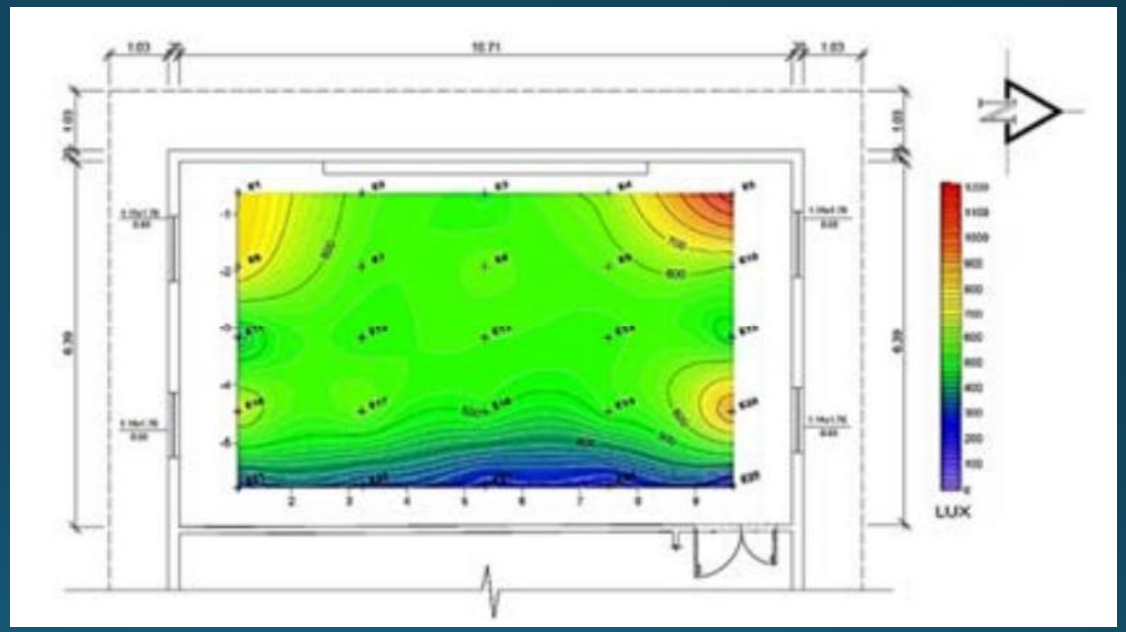
Explore the alternatives...

Mapping photometric data in a space

High level of photometric detail; but often easier to understand lighting effect.

Blends photometric data and architectural information

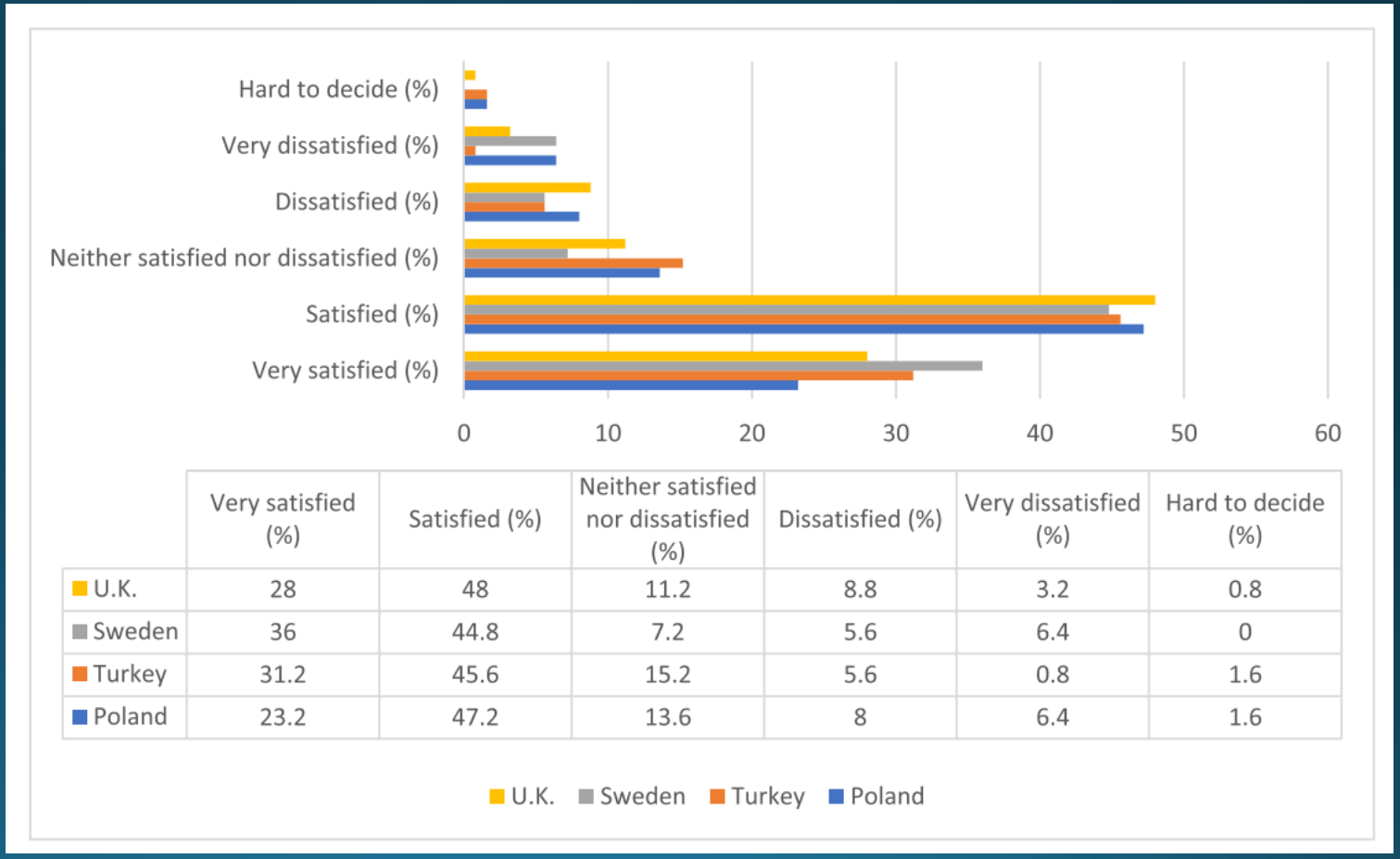
Must have readable and consistent scales.



Graph/Table hybrids

Decide

* Which is easier to read & understand?
* Does the table tell the whole story?
* Is the graph missing necessary detail?



	Very satisfied (%)	Satisfied (%)	Neither satisfied nor dissatisfied (%)	Dissatisfied (%)	Very dissatisfied (%)	Hard to decide (%)
U.K.	28	48	11.2	8.8	3.2	0.8
Sweden	36	44.8	7.2	5.6	6.4	0
Turkey	31.2	45.6	15.2	5.6	0.8	1.6
Poland	23.2	47.2	13.6	8	6.4	1.6

The (elusive) *successful* graph/table hybrid

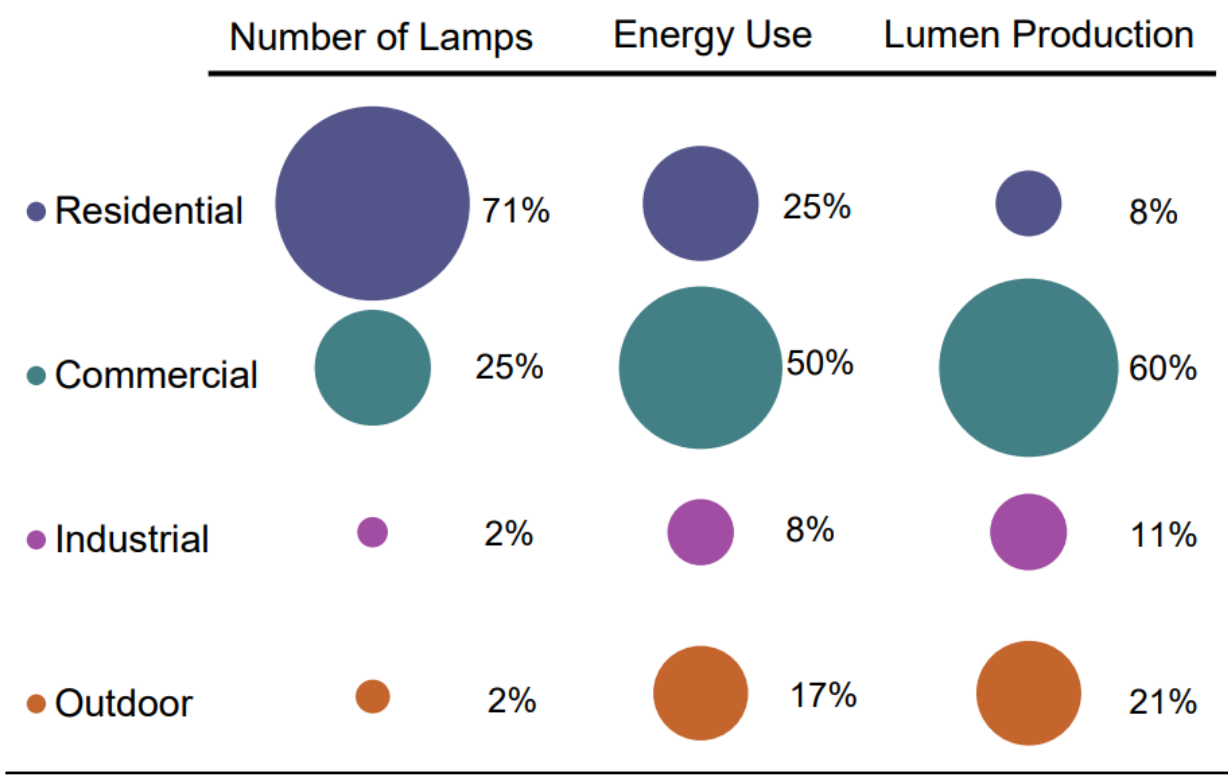
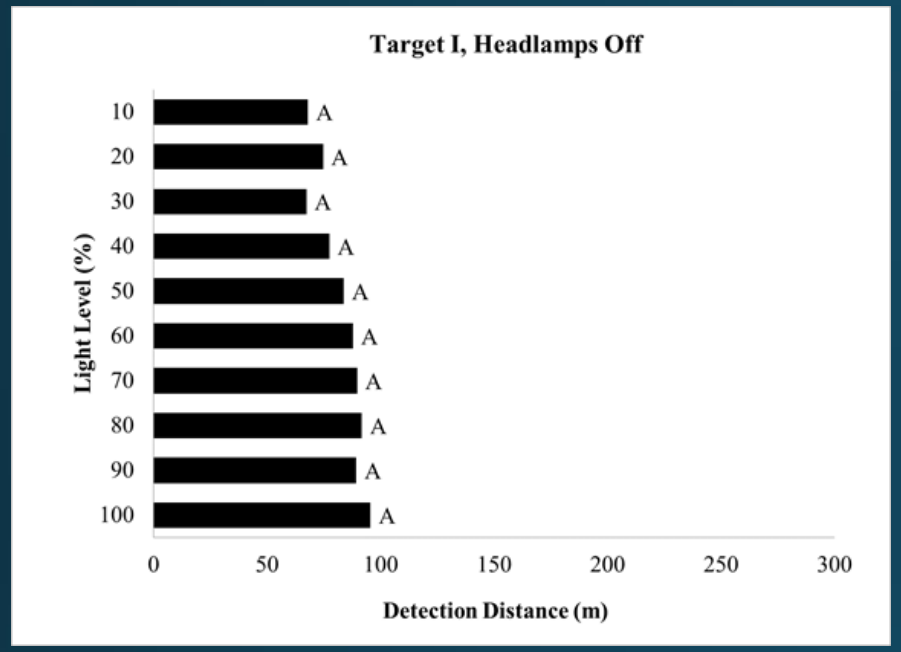


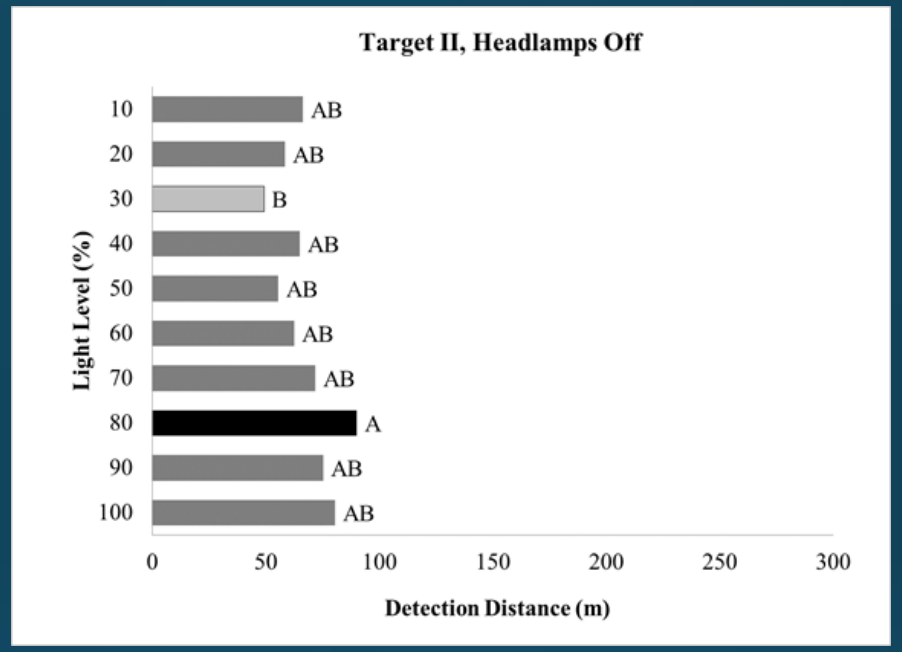
FIGURE 2.3 U.S. LIGHTING INVENTORY, ELECTRICITY CONSUMPTION, AND LUMEN PRODUCTION, 2010 [1]
Source: 2010 U.S. Lighting Market Characterization. Prepared by Navigant Consulting, Inc., January 2012.

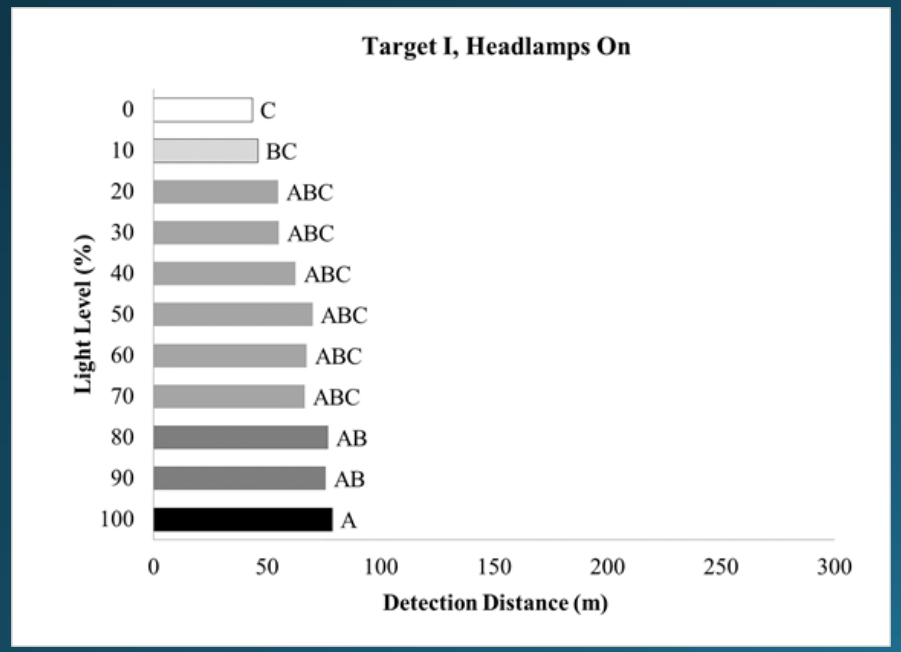
Statistical Analysis: Sometimes you need to present all the data for completeness.

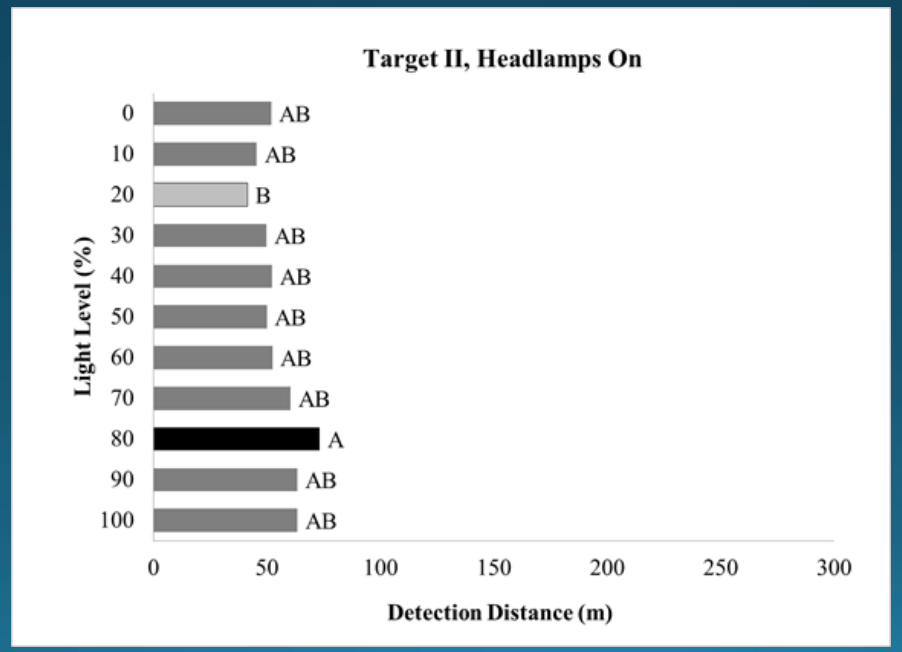
Consider whether that data can be provided separately from a graphic that is easier for the audience to process.

Chapter 6. Overhead-Lighting Level Experiment - Evaluation of The Impact of Spectral Power Distribution on Driver Performance , August 2015 - FHWA-HRT-15-047 (dot.gov)



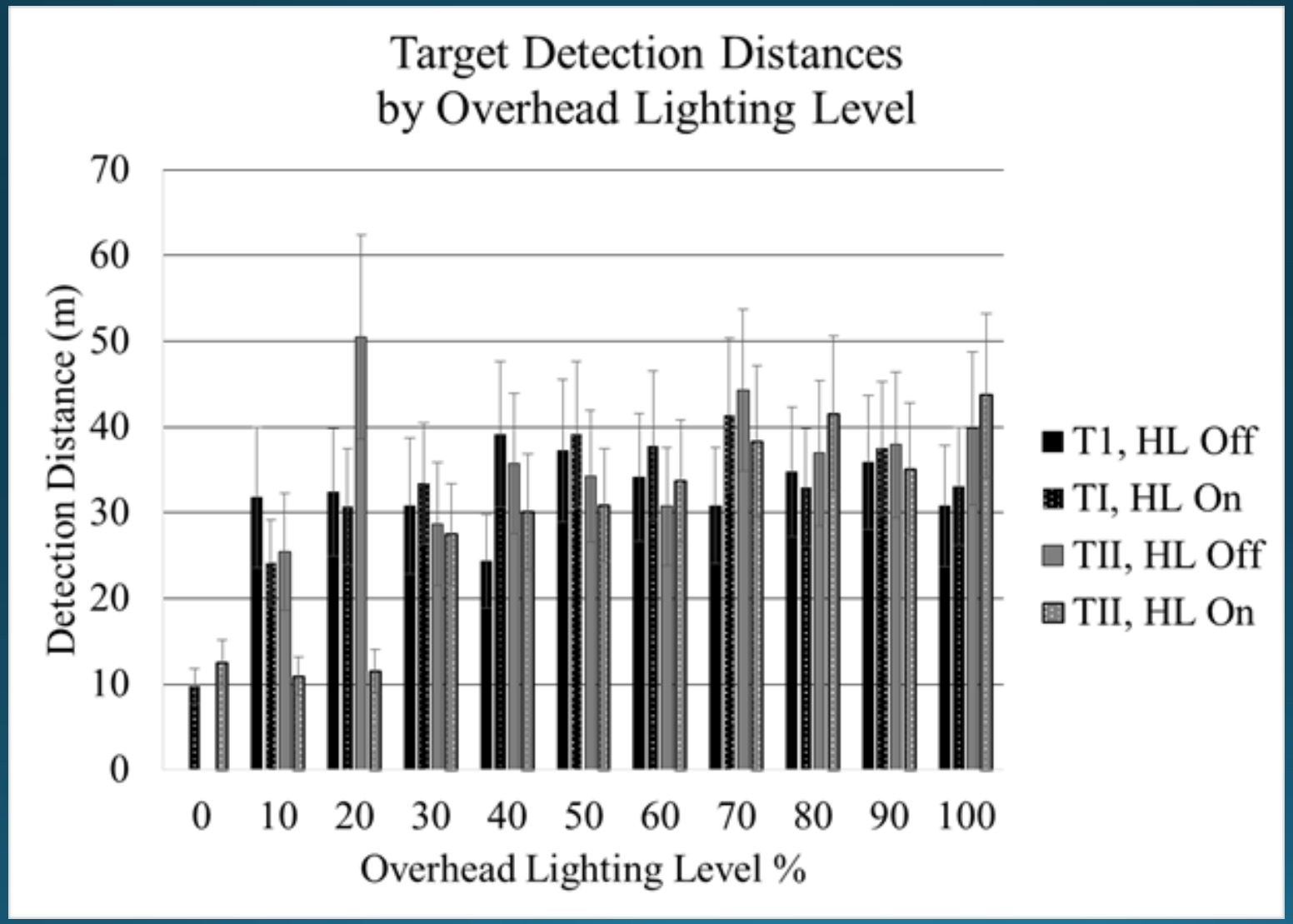




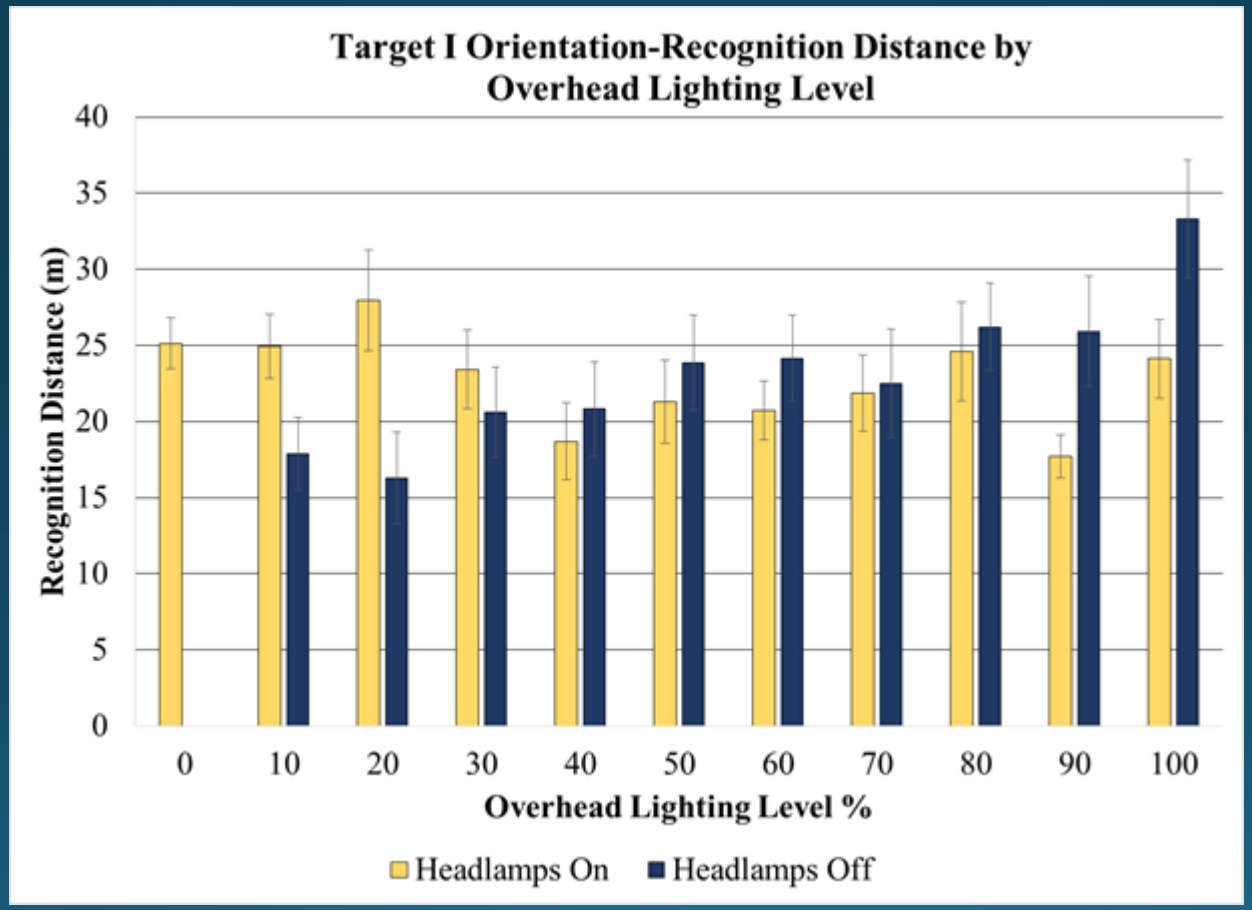


Many graphs, side by side?

Or one (comparison) graph?



Edit & refine: Pick the story you can tell



And you will read this last

You will read this first

And then you will read this

Then this one

To consider when planning your graphics

- Graph a manageable amount of data.
  - This is not a limit on the quantity of data points – but on the amount of overall information I am trying to convey in one graph
- What do I want the reader to immediately notice?
- What type of graph suits this data best?
- Scale: How can I fully utilise the space? Is the trend/pattern/message clear?

To consider when reviewing your graphics…

- Titles are important → concise, but sufficient detail - *the words you use in the title will determine the reader focus*
- Can the graph be understood without going back through the body text? Or easily read by a live audience in a presentation?
- Remove redundant information
- Papers will often end up black and white – will the graphic survive?
- Presentations will be viewed by a live audience with a broad range of visual capabilities (e.g. 8% men and 0.5% women colourblind). Choose colours and font size wisely…

Chapter 6. Overhead-Lighting Level Experiment - Evaluation of The Impact of Spectral Power Distribution on Driver Performance , August 2015 - FHWA-HRT-15-047 (dot.gov)

Will the graph work in black and white?

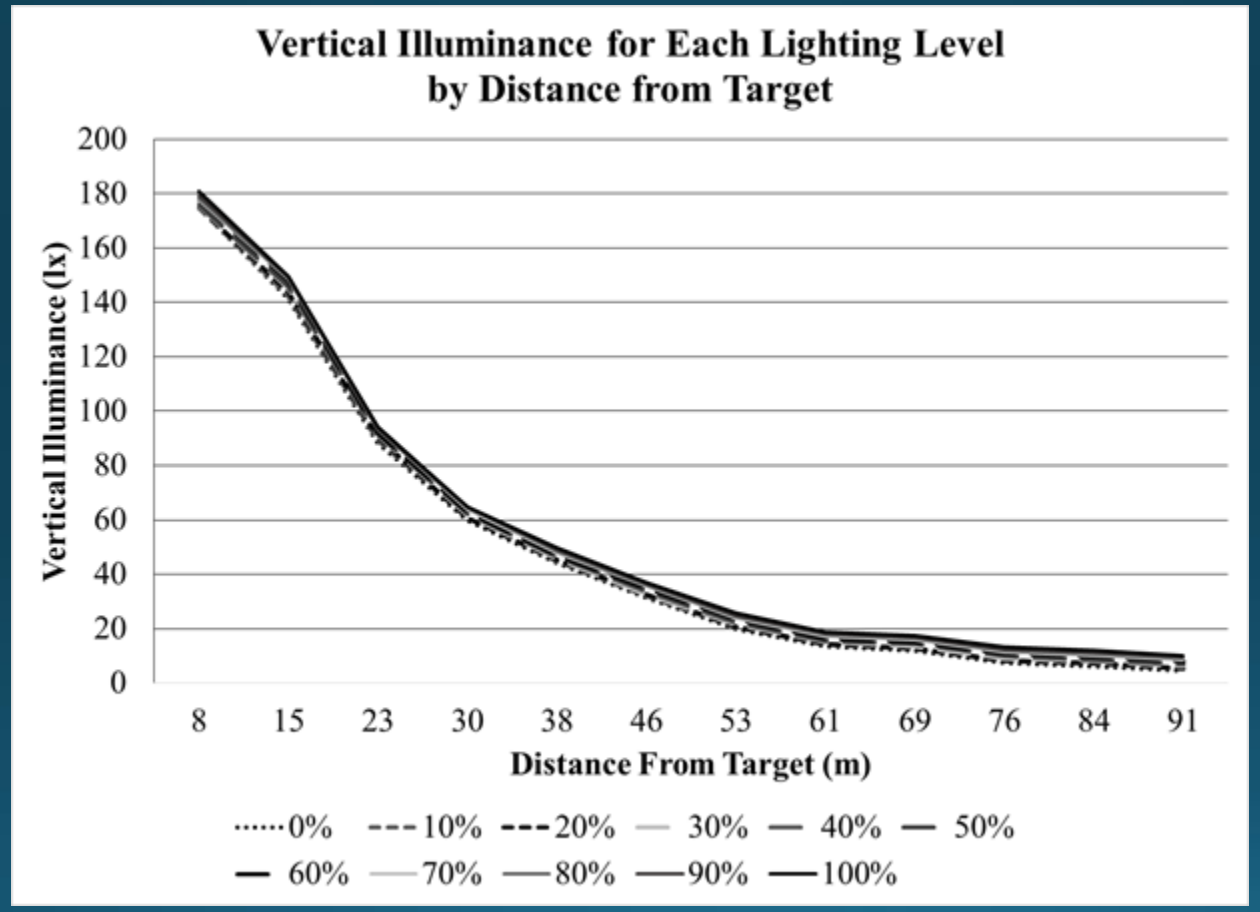


FIGURE 79. GRAPH. OVERHEAD-LIGHTING LEVEL EXPERIMENT—VI AT TARGET, VEHICLE WITH HEADLAMPS ON AT BETWEEN 91 AND 8 M (300 AND 25 FT) FROM TARGET, LUMINAIRES FROM 0 TO 100PERCENT.

What to consider when visualizing data for colorblind readers - Datawrapper Blog