

Visual Aids

IMN Presentation Workshop

Overview

1

Introduction

2

Design basics

3

Data visualisation

4

Colour

5

Tools

Introduction

1 My background



Molecular Biologist
(Web Designer)



Bioinformatician



Software developer
Community builder

1 My background



Molecular Biologist



Web Designer



Bioinformatician



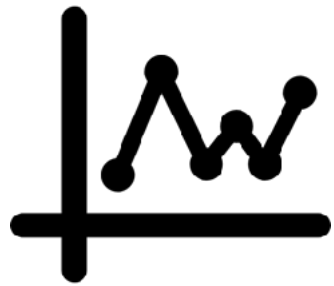
Software developer



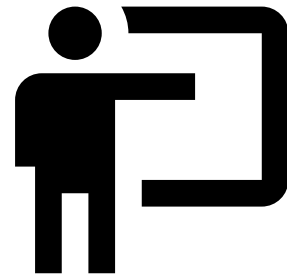
Community builder

1

Visual aids: What



Figures



Talk slides



Posters

1

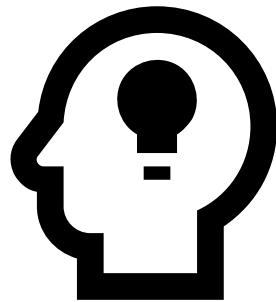
Visual aids: Why



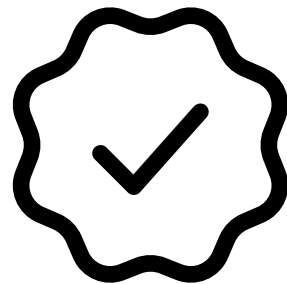
- Evolution has tuned our brains to interpret images quickly and accurately
- Text comprehension is comparatively slow and difficult
- Visual aids can give context and subtext, implication and association
- If you managed to read this far, you did well

1

Visual aids: Why



Help to explain



Memorable



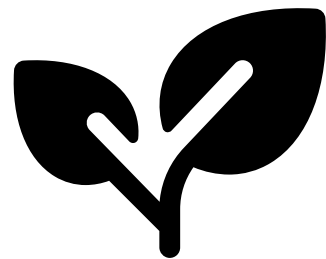
Interesting

1

Visual aids: How



Know your
audience

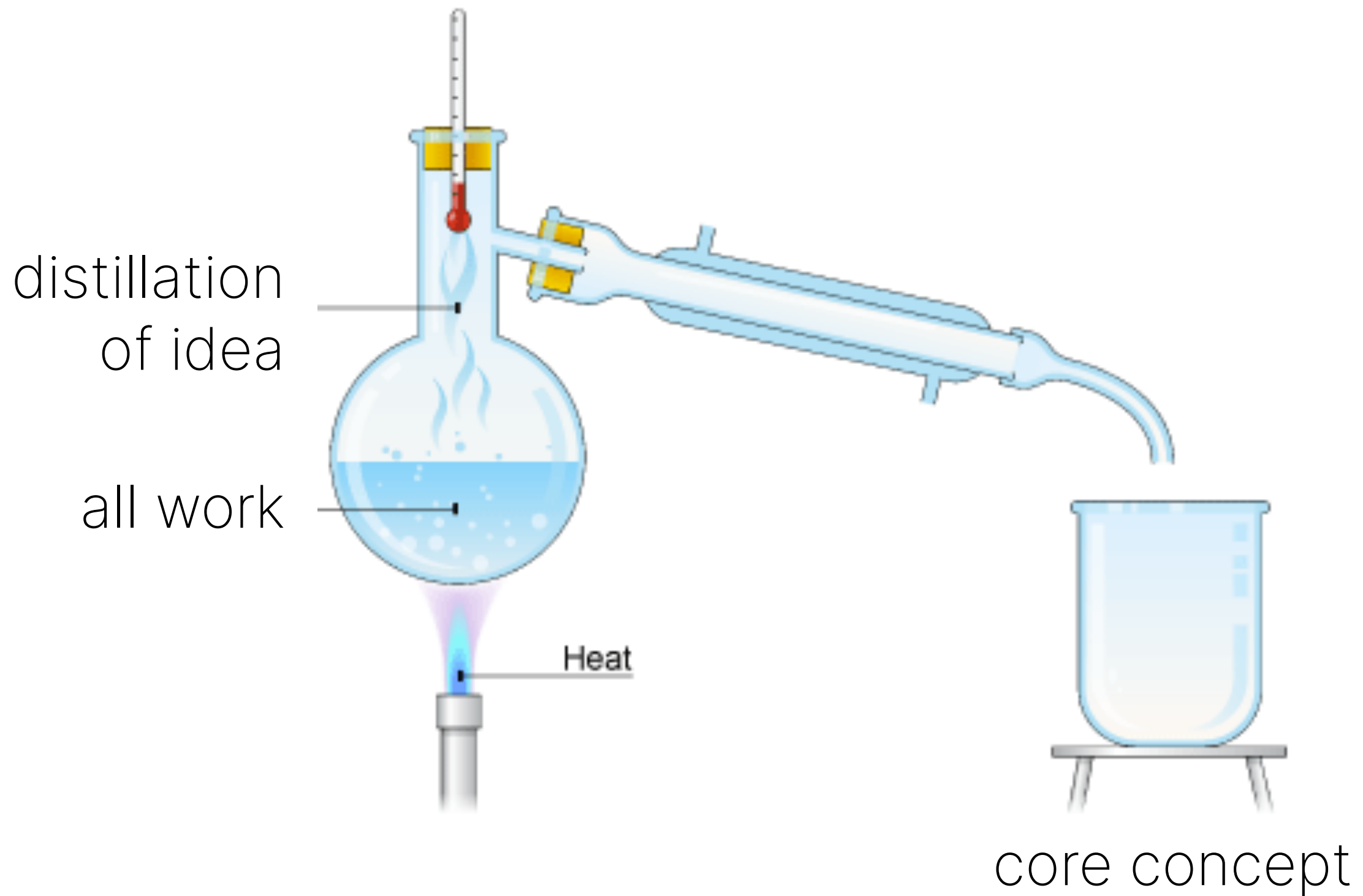


Keep it simple

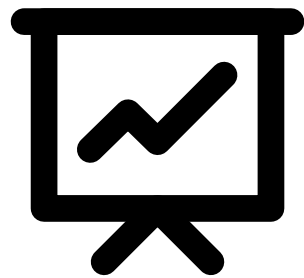


Plan an outline

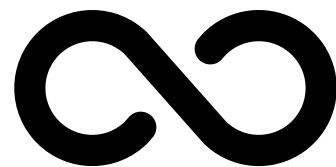
1 Keep it simple



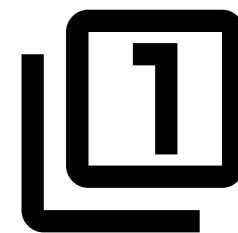
1 Visual aids: Examples



Talk slides



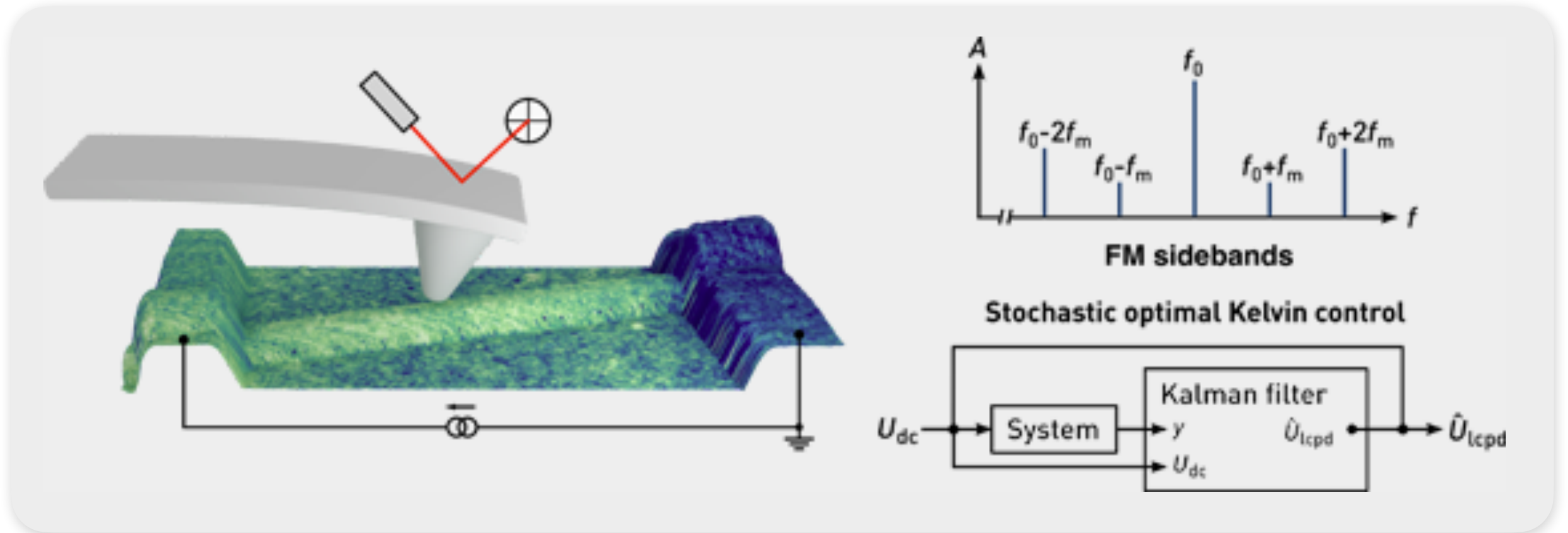
Icons



Header elements

1

Visual aids: Examples

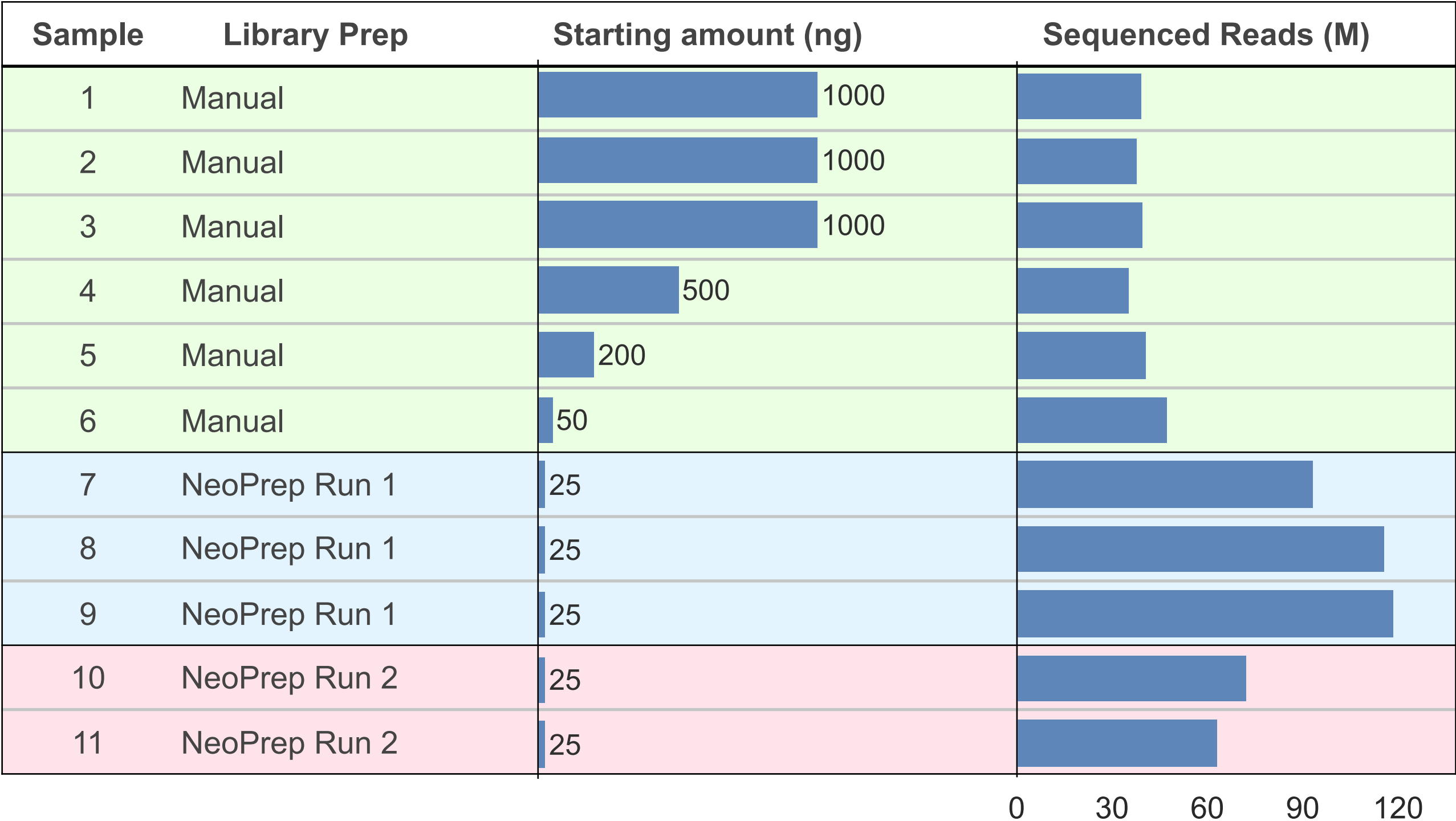


Kelvin probe force microscopy for local characterisation of active nanoelectronic devices

1 Visual aids: Examples

SciLifeLab ID	Library Prep	Starting amount	Sequenced Reads
P1102_101	Manual	1000 ng	38995594
P1102_102	Manual	1000 ng	37663274
P1102_103	Manual	1000 ng	39666722
P1102_104	Manual	500 ng	35332272
P1102_105	Manual	200 ng	40568034
P1102_106	Manual	50 ng	47044650
P2011_1005	NeoPrep Run 1	25 ng	93316971
P2011_1006	NeoPrep Run 1	25 ng	115648988
P2011_1007	NeoPrep Run 1	25 ng	118489187
P2013_1004	NeoPrep Run 2	25 ng	72128476
P2013_1005	NeoPrep Run 2	25 ng	62774142

1 Visual aids: Examples



Design basics

Introduction

- Don't underestimate the impact of your first few slides
 - Fonts and visual presentation immediately set the tone for your audience
- Anchor your work in the context of your audience's work
- Go slow - everyone will thank you for it
 - This includes not using too much content
 - Try not to read every bullet point from the screen - talk around your slides instead
 - Don't put all of your bullets up at once, the audience will read them instead of listening to you
- Now is the perfect time to use a visual aid

Introduction

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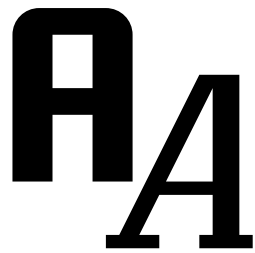
2 Visual design



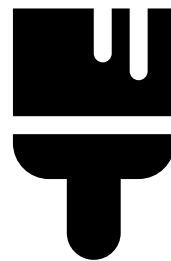
Important



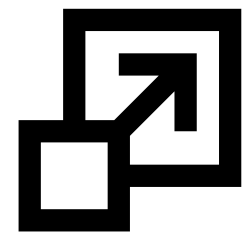
Easy



Fonts



Colours



Layout

2 Fonts



Avoid (MS Office) defaults

Cambria
Calibri



Use Google Fonts



Make use of font weights

Bold
Medium
Regular
Light
Thin
Hairline

2 Fonts



Pick a font and stick to it



Consider what the font says
about the content

2 Fonts



2 Fonts

serif

sans-serif

decorative

Block text



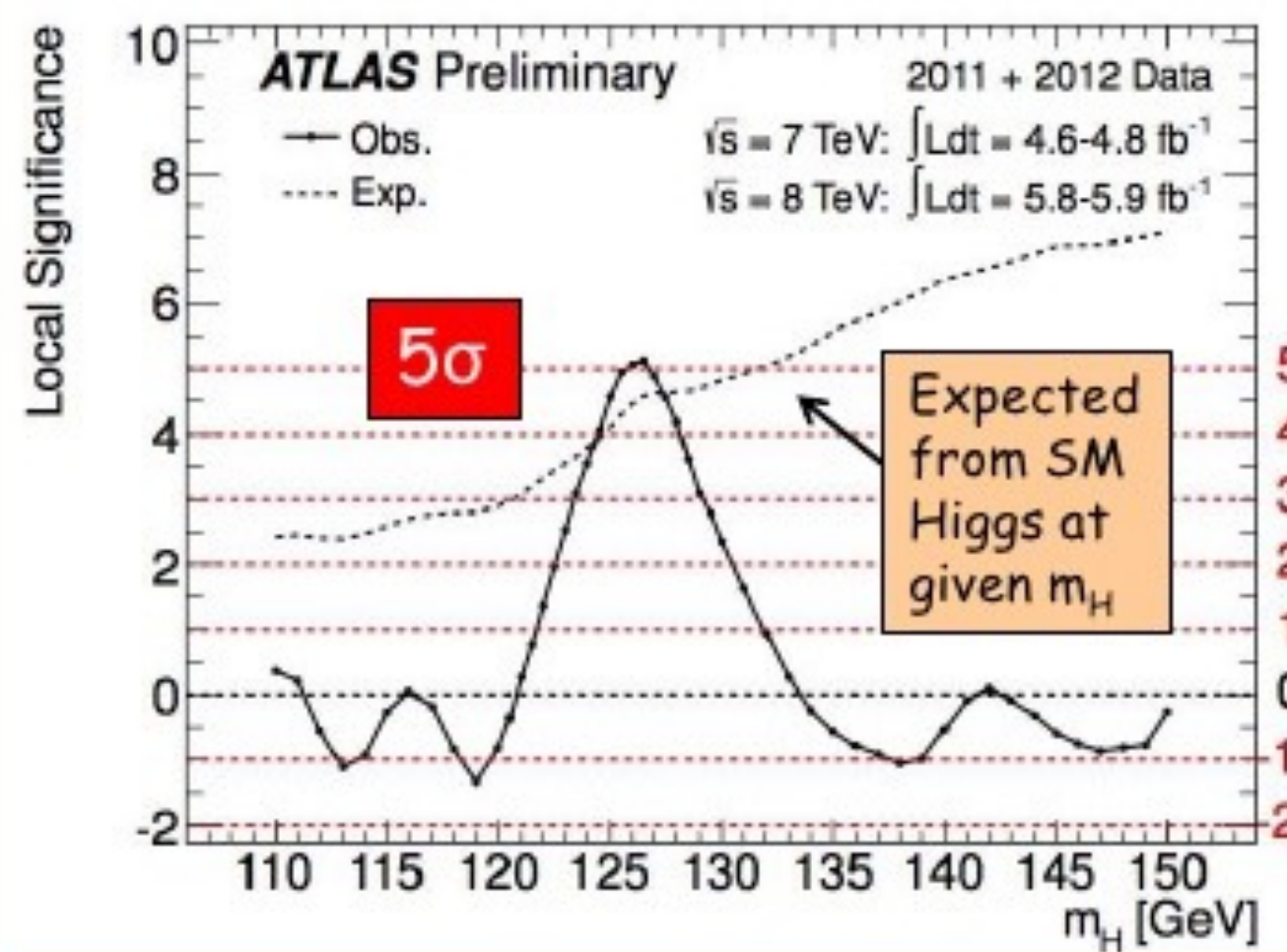
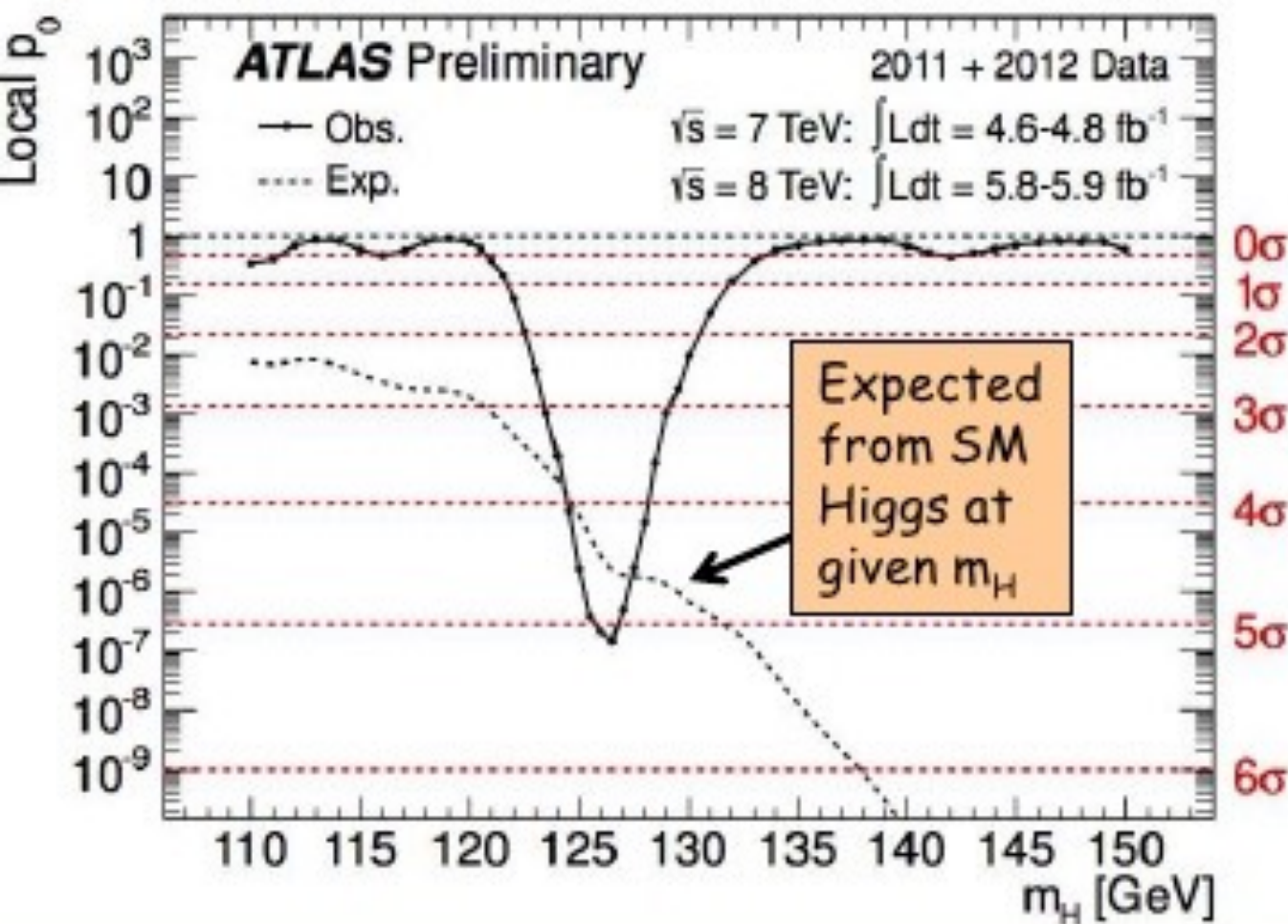
Figures



Presentations



Combined results: the excess



Maximum excess observed at

$m_H = 126.5 \text{ GeV}$

Local significance (including energy-scale systematics)

5.0 σ

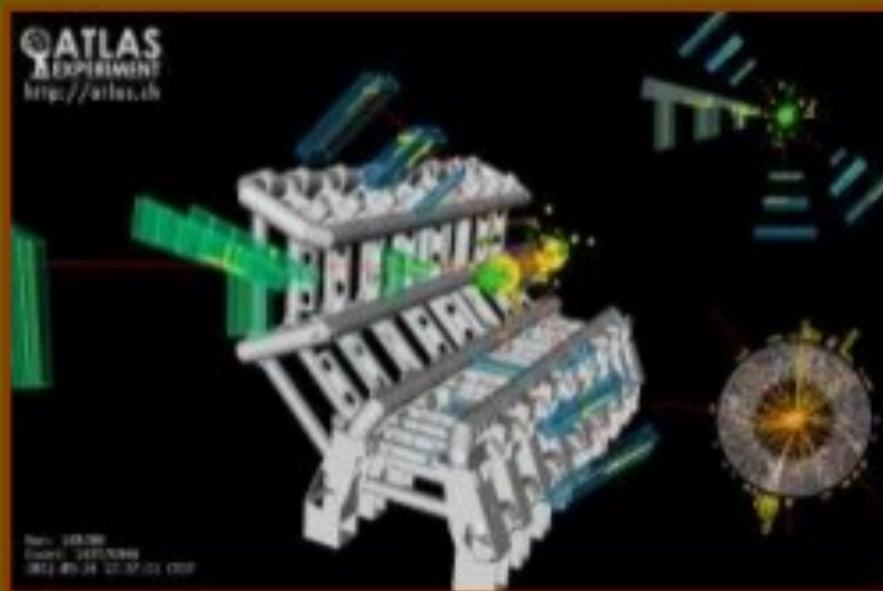
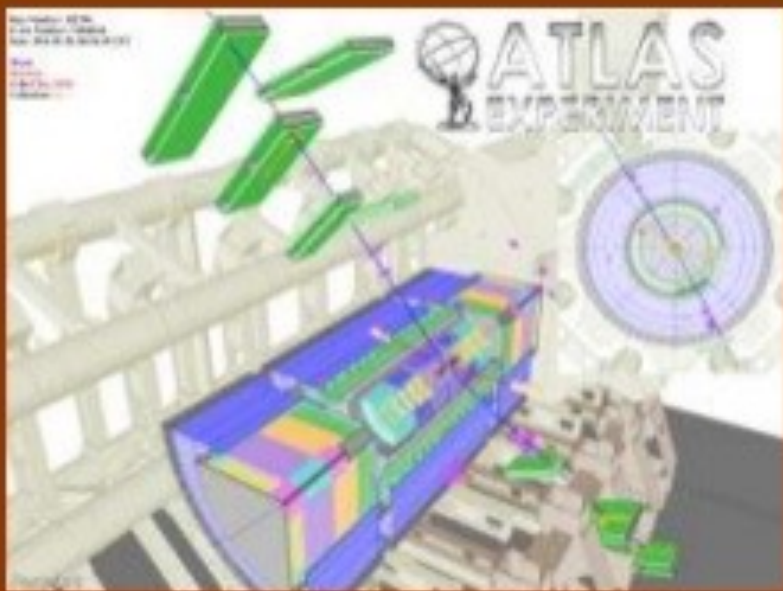
Probability of background up-fluctuation

3×10^{-7}

Expected from SM Higgs $m_H=126.5$

4.6 σ

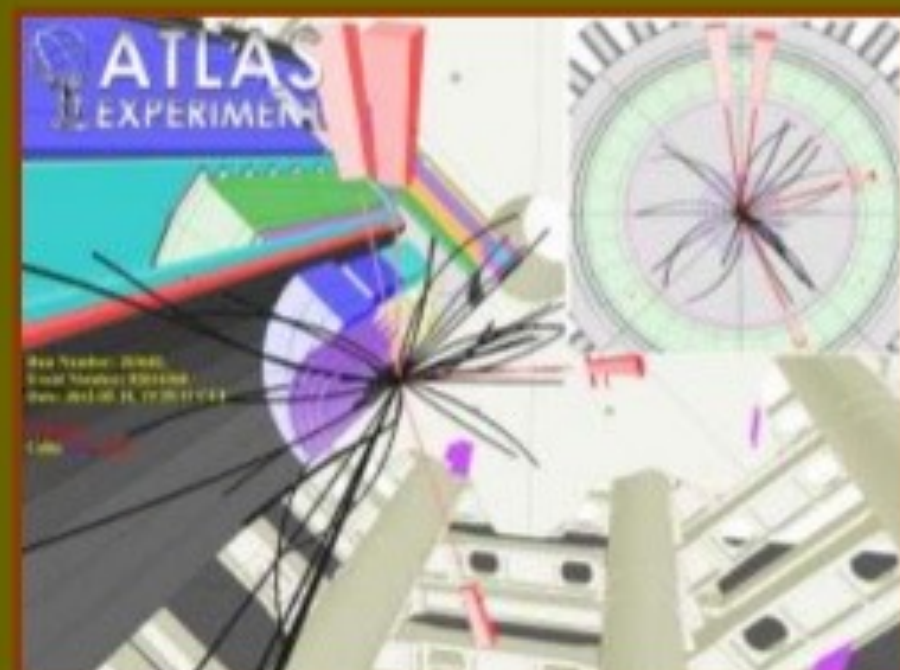
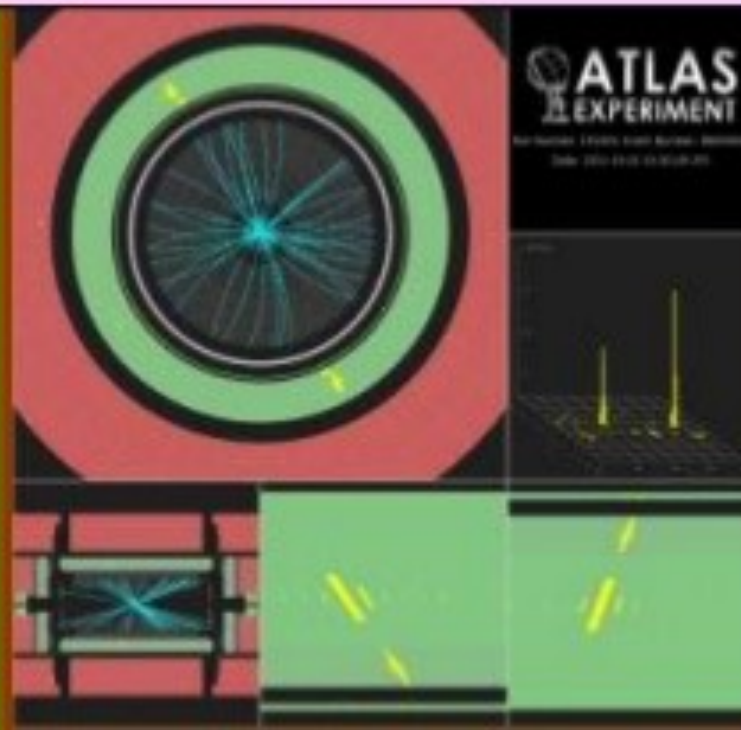
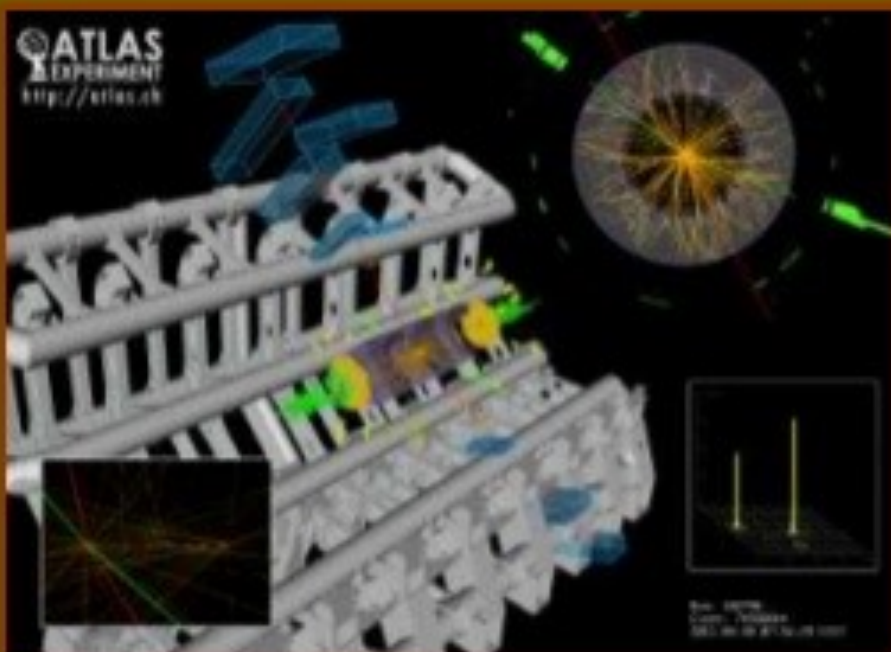
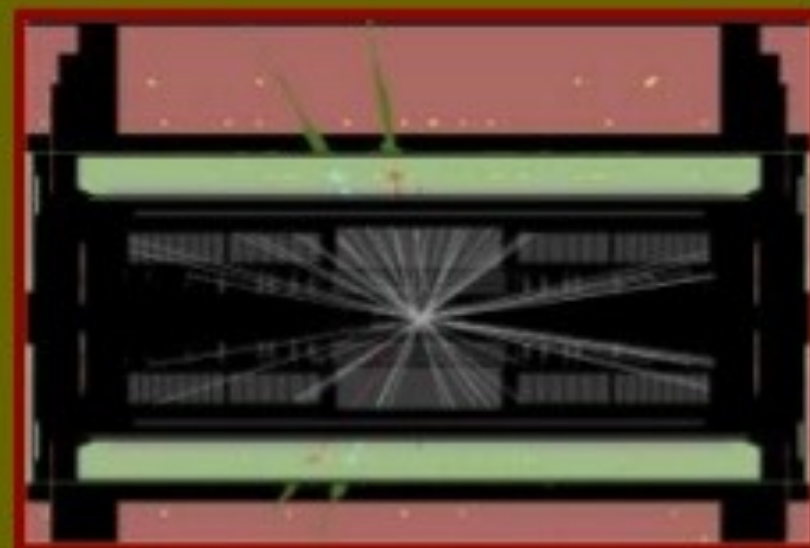
Global significance: 4.1-4.3 σ (for LEE over 110-600 or 110-150 GeV)



Status of Standard Model Higgs searches in ATLAS

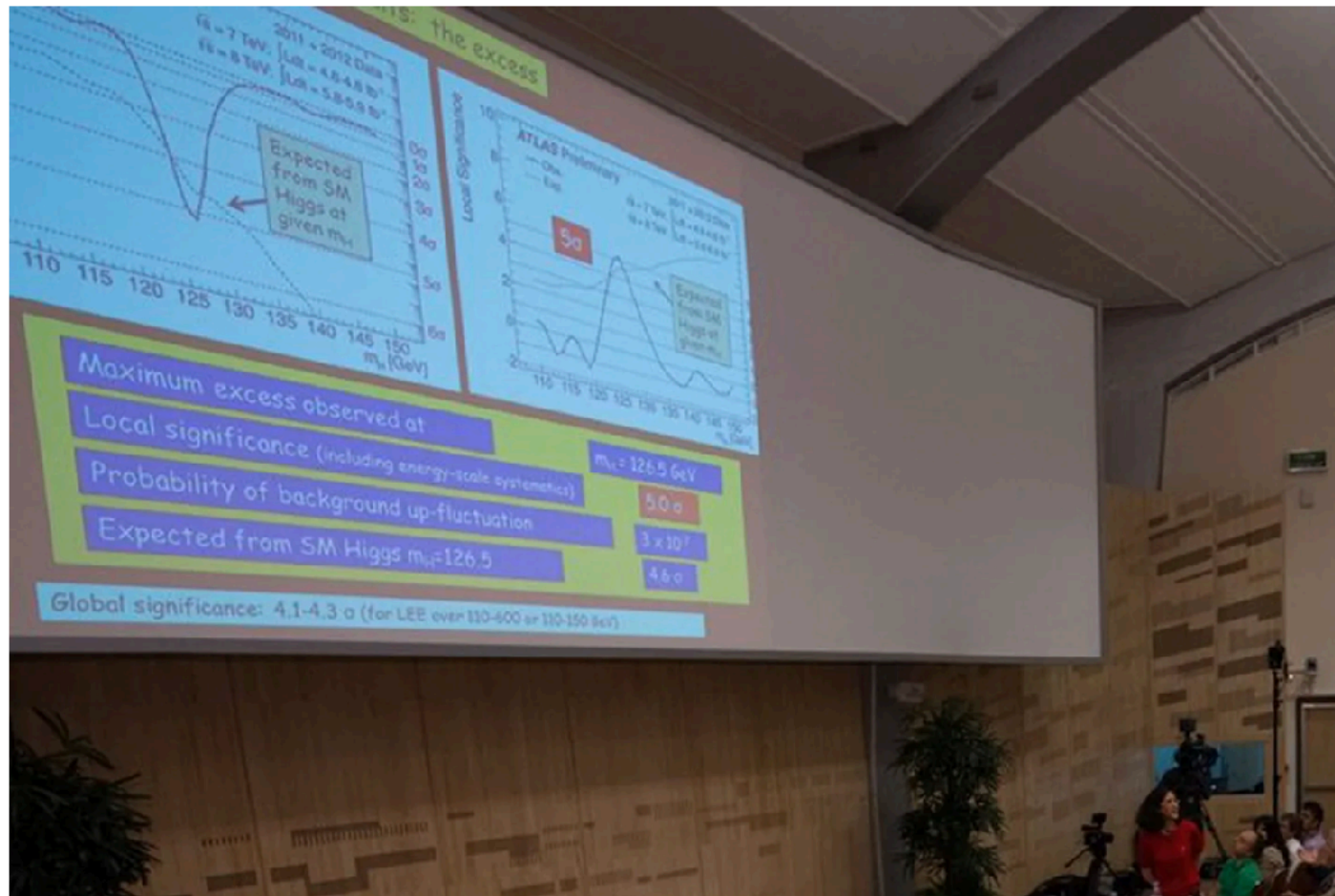
Using the full datasets recorded in 2011 at $\sqrt{s}=7$ TeV and 2012 at $\sqrt{s}=8$ TeV: up to 10.7 fb^{-1}

Fabiola Gianotti (CERN), representing the ATLAS Collaboration



SCIENCE / DESIGN / ENTERTAINMENT

CERN scientists inexplicably present Higgs boson findings in Comic Sans



CERN Comic Sans

By [Sam Byford](#)Image [CERN](#)Jul 4, 2012, 10:56 AM GMT+2 | [0 Comments](#) / [0 New](#)

For many of us, the most shocking revelation to come out of CERN's Higgs boson announcement today was quite unrelated to the science itself. Rather, we were blown away by the fact that a team made up of some of the most undoubtedly brilliant people in the world believe that

1 **Reddit CEO tells employees that subreddit blackout 'will pass'**

HELP PREVENT A TRAGEDY

If you see children or adults inside
or attempting to enter this substation
please call 08000 727282
or the local police immediately

SSE Power Distribution



**DANGER OF DEATH
KEEP OUT**

ADULT PROBATION & PAROLE

Sex Offender Registration Office

Offices are open 8:00 a.m. - 5:00 p.m.
unless otherwise noted.

South Salt Lake P.D.
2835 S. Main St.
South Salt Lake, Utah 84115
Phone: (801) 412-3600

Utah County Sheriff
51 S. University Ave. Ste. 105
Provo, Utah 84601
Phone: (801) 851-8360

Taylorsville P.D.
(Taylorsville residents only)
2600 W. Taylorsville Blvd

West Jordan P.D.
8000 S. Redwood Rd.
West Jordan, Utah 84088
Phone: (801) 569-5200

Salt Lake County Sheriff
3365 S. 900 W. #218
Salt Lake City, Utah 84119
Phone: (801) 743-5900



DEF

DEFIBRILL

**PLATTEVILLE
EMERGENCY MEDICAL SERVICE**

*Supported By
& Serving
Townships of:*

Elkgrove
Ellenboro
Lima
Smelser
Platteville
Belmont
Harrison
& the
City of Platteville

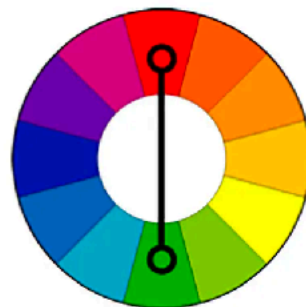
AMBULANCE

IF YOU
OF A RA
ASSAULT
MAKE A D
YOU CAN DO

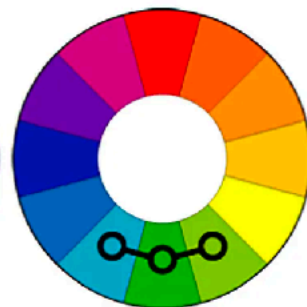
2

Colour

Red Excitement Strength Love Energy	Orange Confidence Success Bravery Sociability	Yellow Creativity Happiness Warmth Cheer	Green Nature Healing Freshness Quality	Blue Trust Peace Loyalty Competence
Pink Compassion Sincerity Sophistication Sweet	Purple Royalty Luxury Spirituality Ambition	Brown Dependable Rugged Trustworthy Simple	Black Formality Dramatic Sophistication Security	White Clean Simplicity Innocence Honest



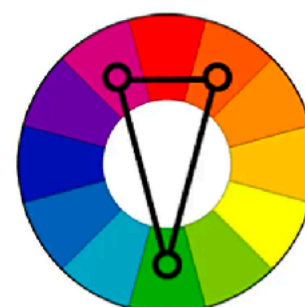
Complementary



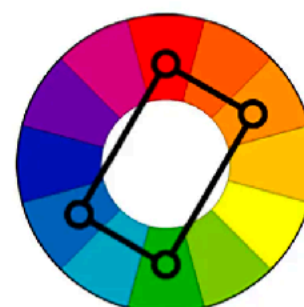
Analogous



Triadic



Split Complementary



Tetradic

Google Material Design Guidelines

Set of guidelines about design

- Aimed for app developers

- Includes some nice colour palettes

- Lots of good stuff about design theory

<https://www.google.com/design/spec/style/color.html>

2 Layout

 Spacing

 Alignment

 Sizing

2 Layout

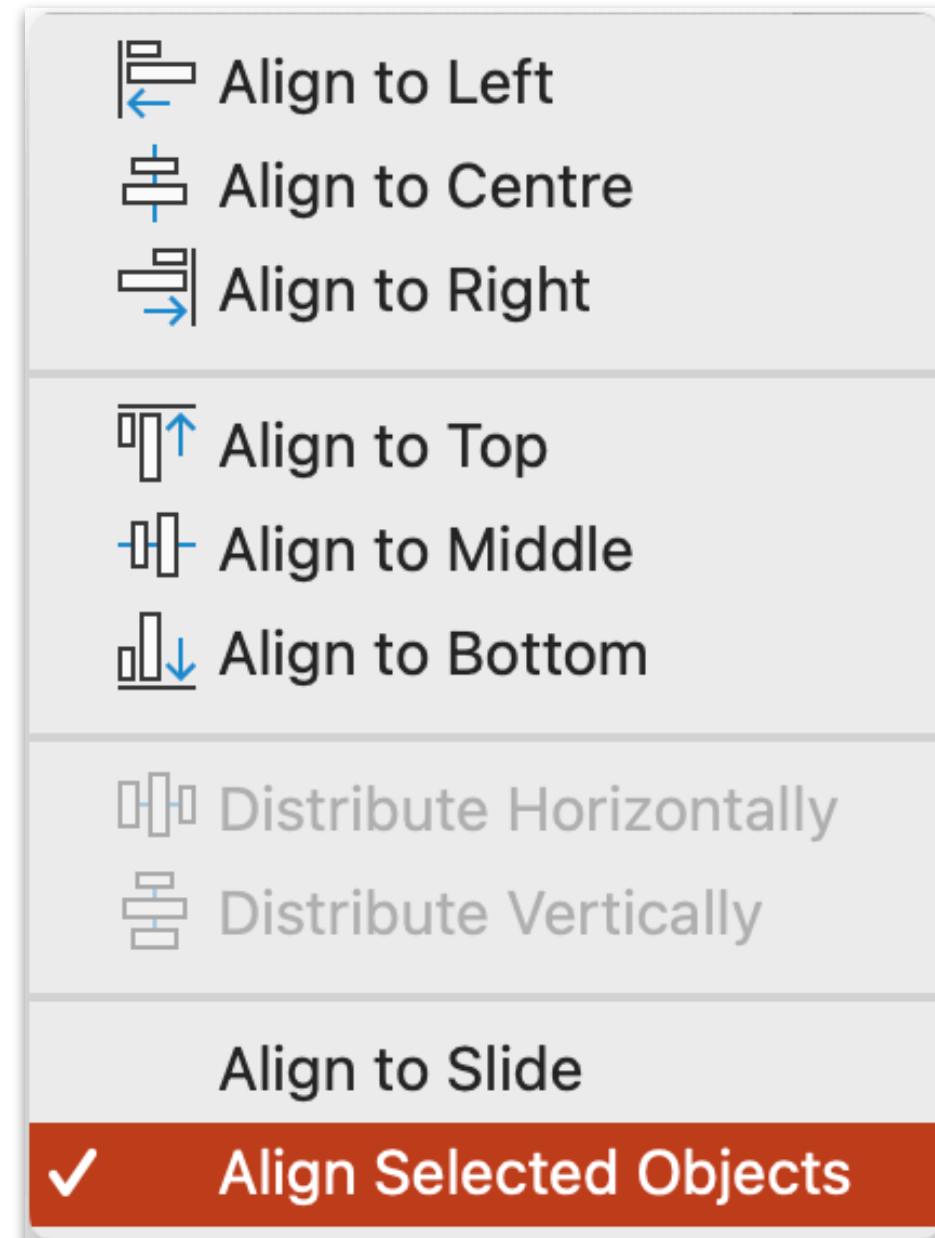
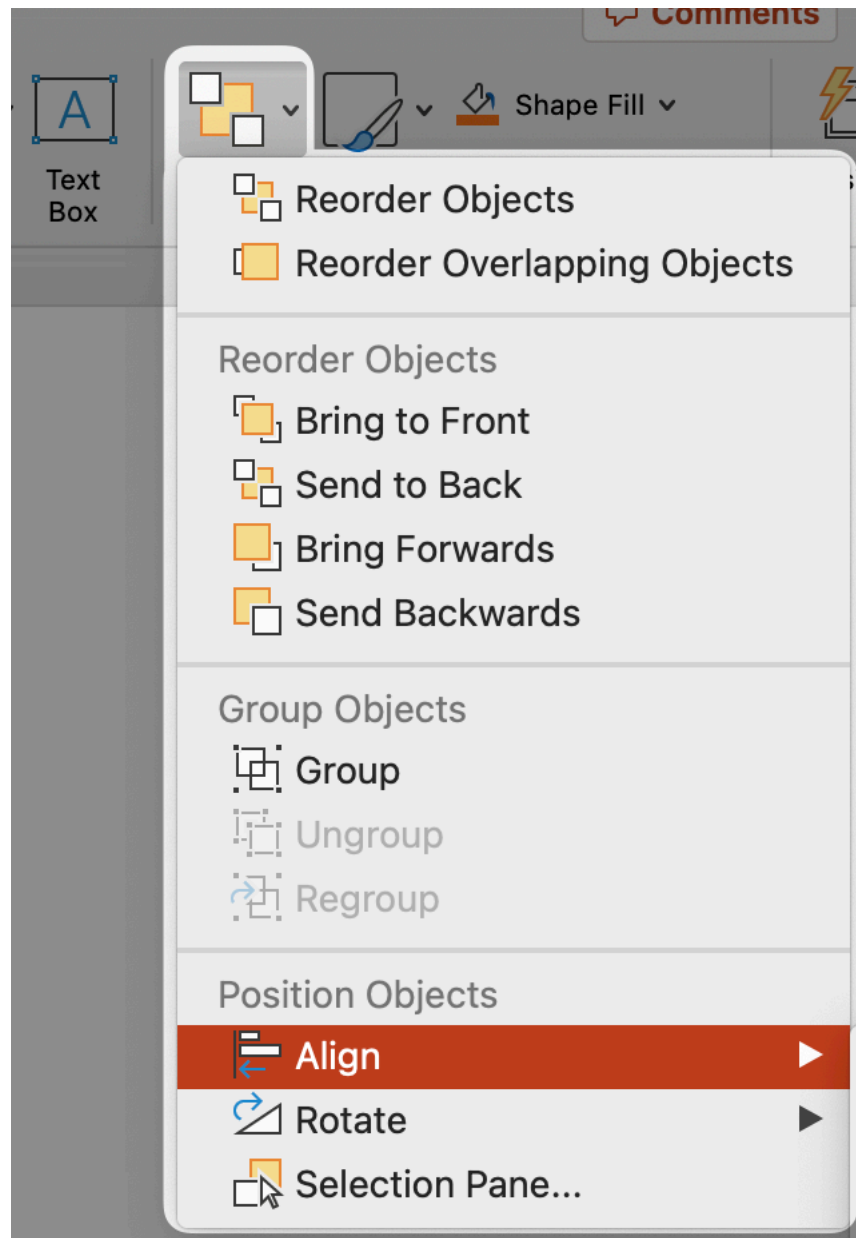
 Spacing

 Alignment

 Sizing

2

Layout

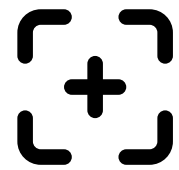


Data Visualisation

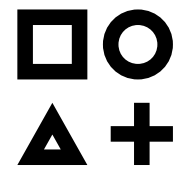
3 Choosing a plot



Which graph helps you to get your point across?



Which data are *really* necessary?



Which type of graph?

Relationship

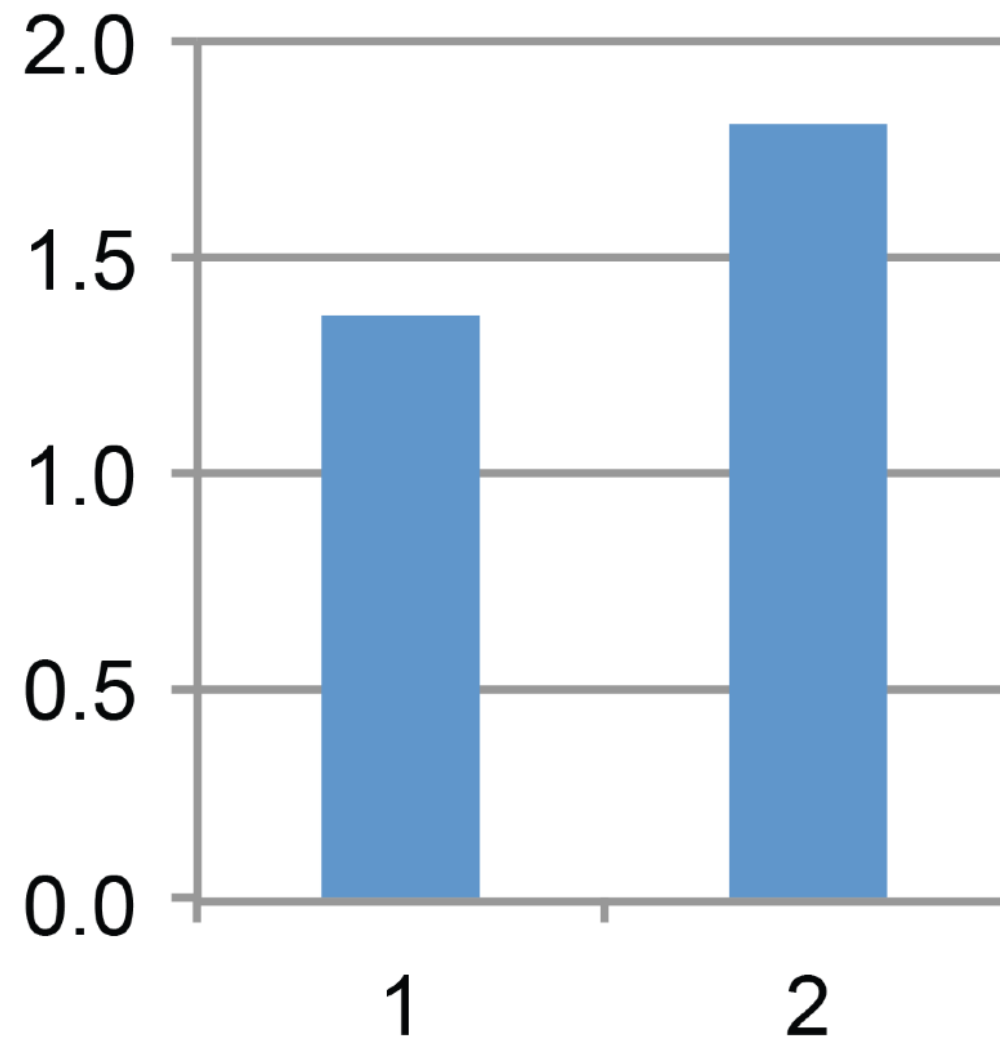
Composition

Comparison

Distribution

3

Choosing a plot

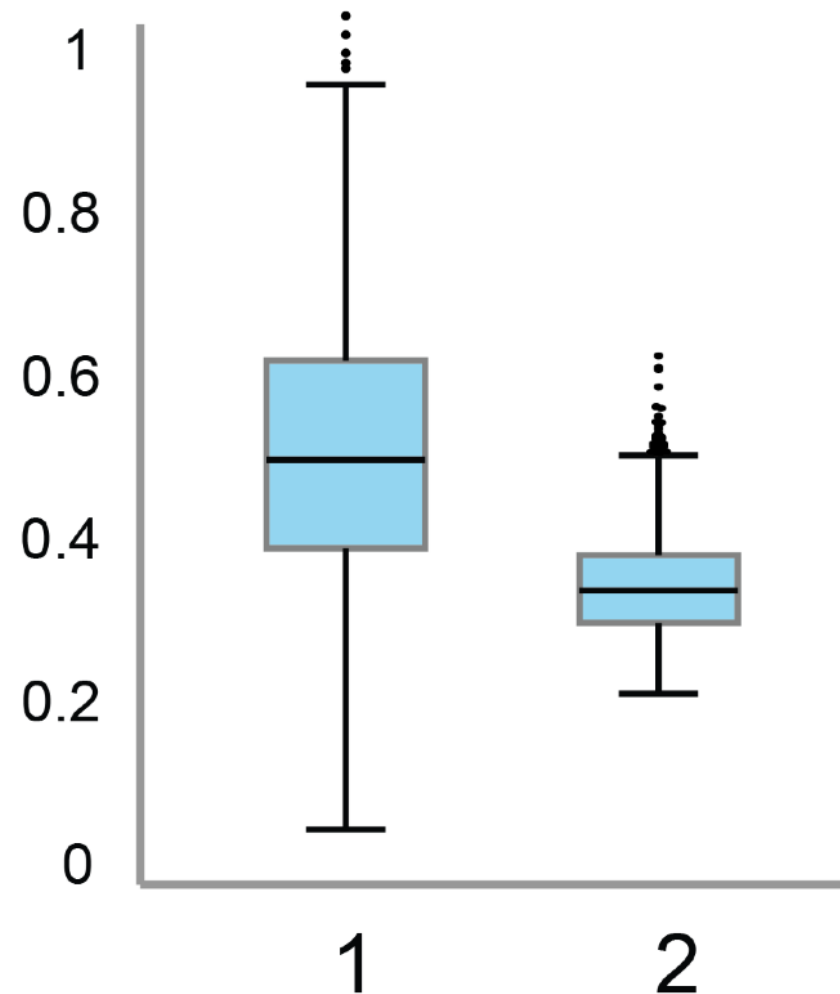


Comparison

Relationship / Comparison / Composition / Distribution

3

Choosing a plot

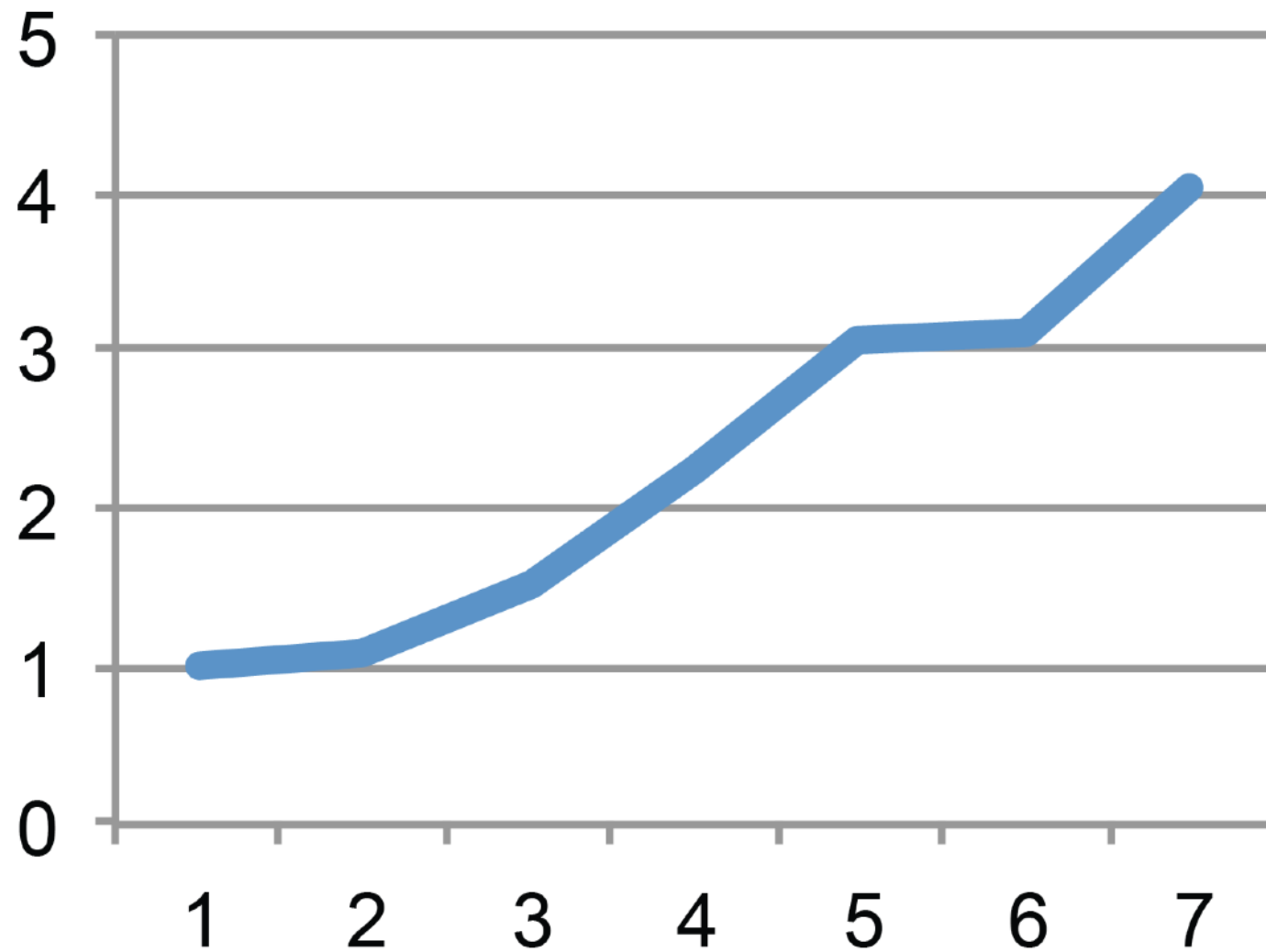


Distribution

Relationship / Comparison / Composition / Distribution

3

Choosing a plot

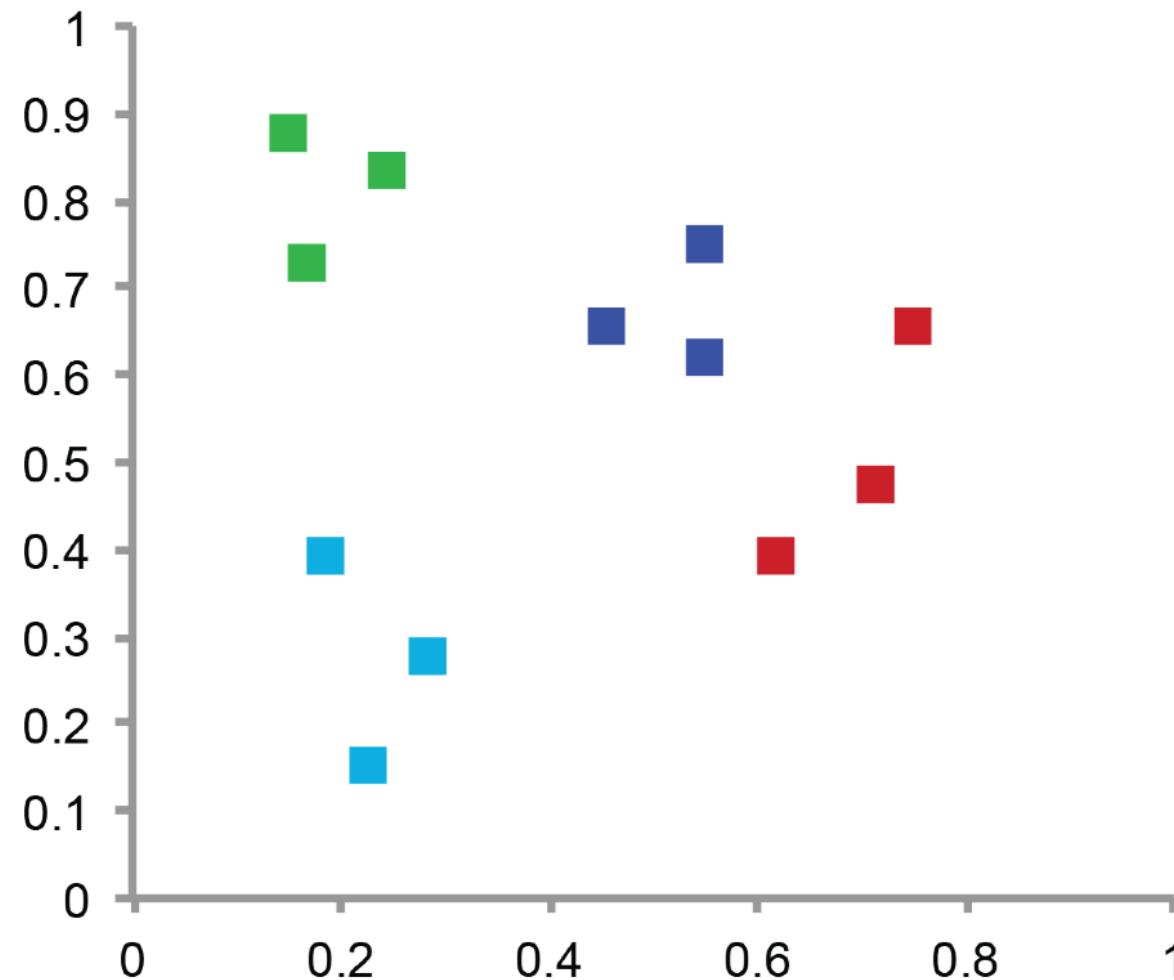


Relationship

Relationship / Comparison / Composition / Distribution

3

Choosing a plot

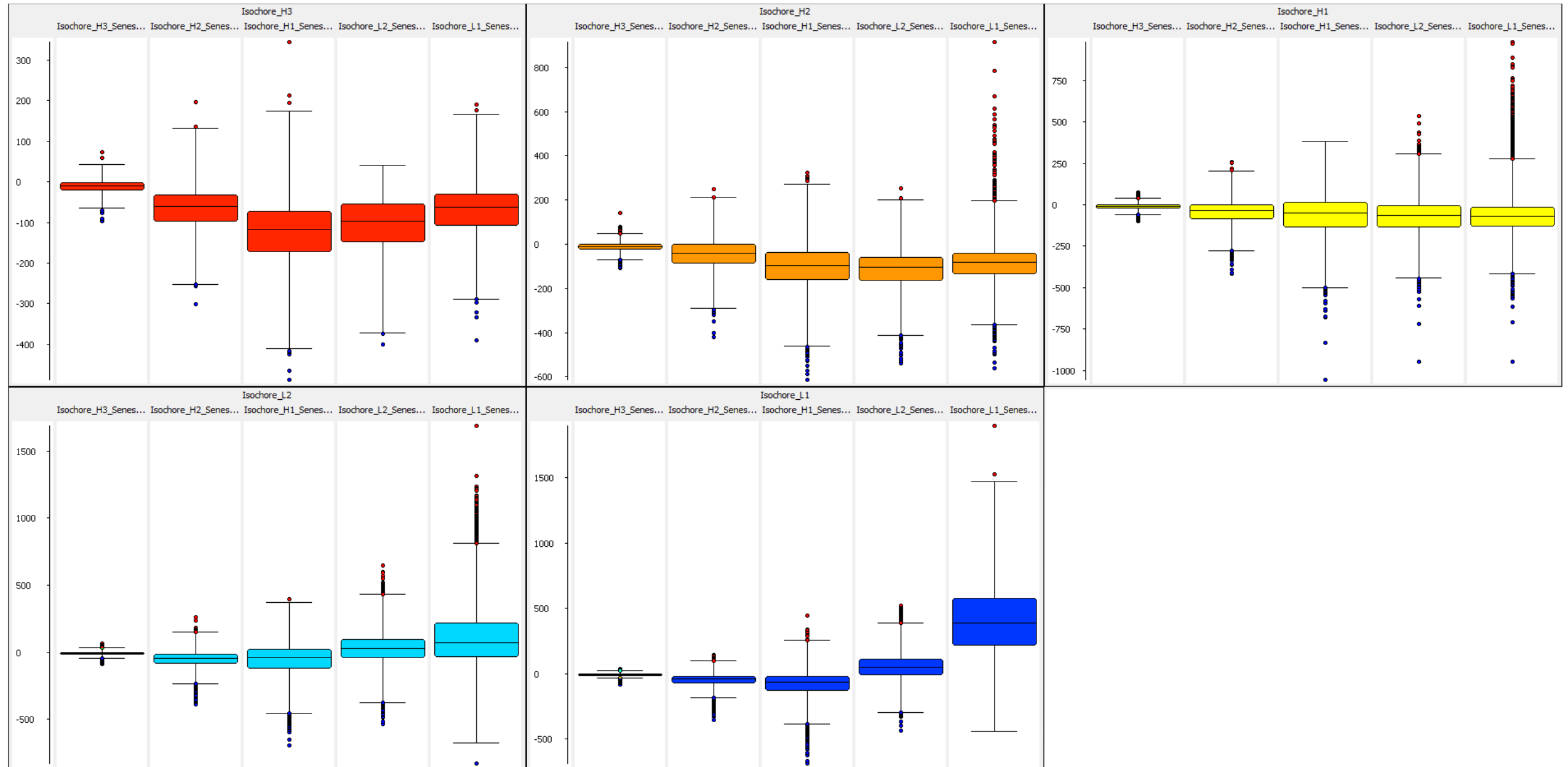


Composition

Relationship / Comparison / Composition / Distribution

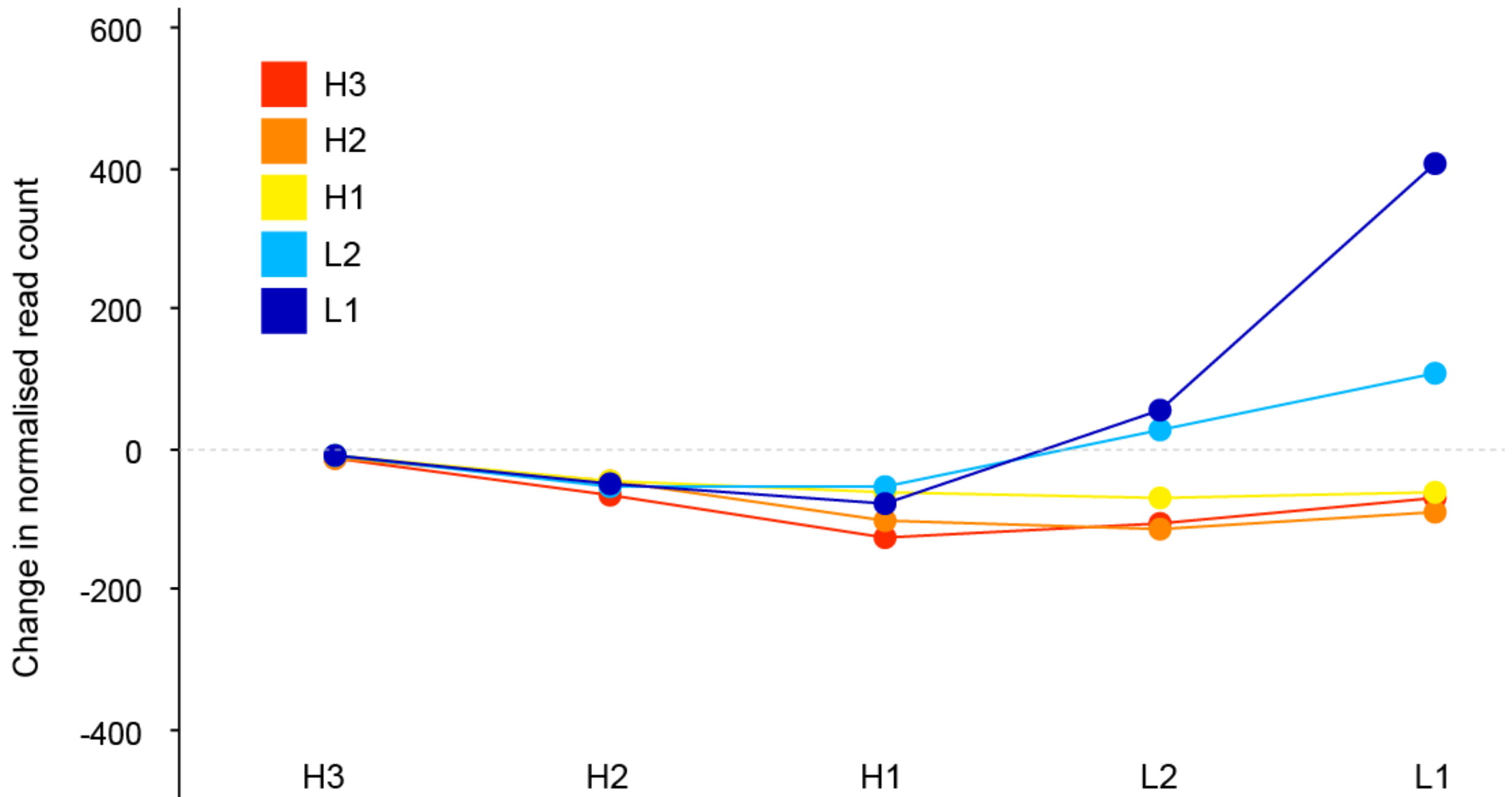
3

Choosing a plot



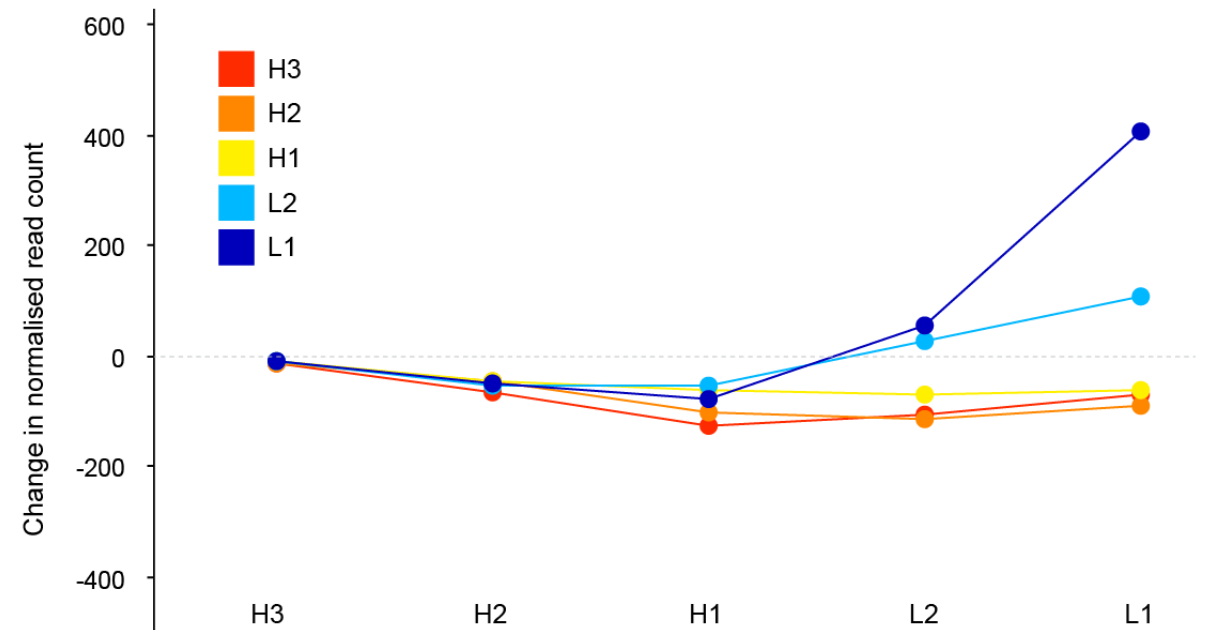
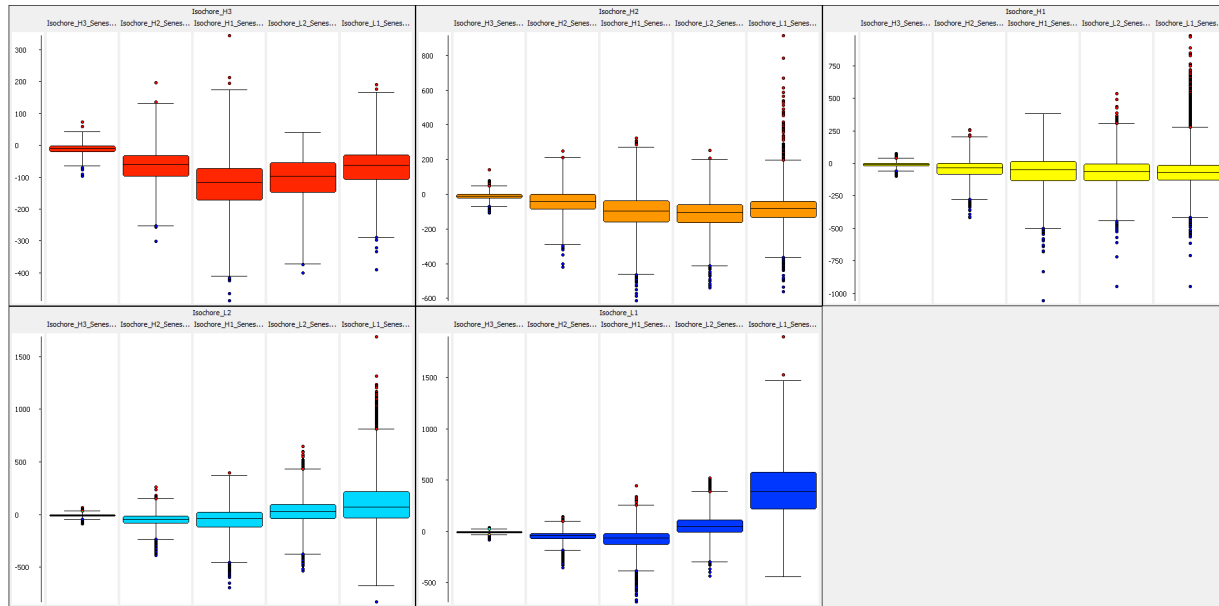
3

Choosing a plot



3

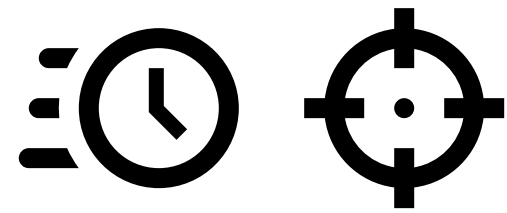
Choosing a plot



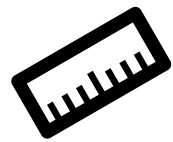
- Distributions are not relevant
- Trends difficult to compare

- Only the median value is needed
- Direct comparison

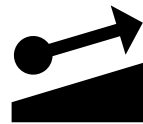
3 Making Comparisons



Fast, accurate judgement

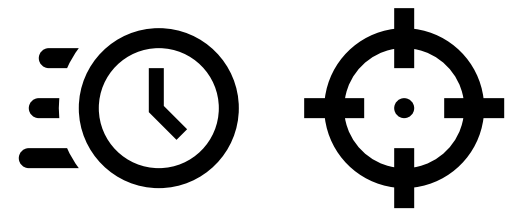


Length



Slope

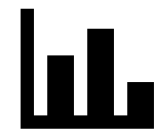
3 Making Comparisons



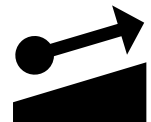
Fast, accurate judgement



Length



Bar graphs

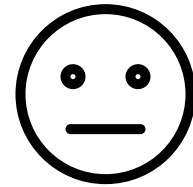


Slope

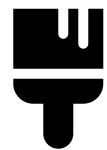


Line graphs

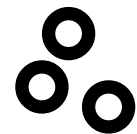
3 Making Comparisons



Medium judgement

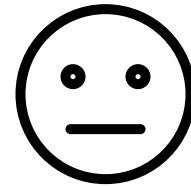


Colour

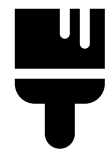


Patterns

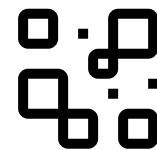
3 Making Comparisons



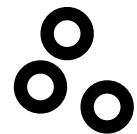
Medium judgement



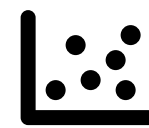
Colour



Heat maps

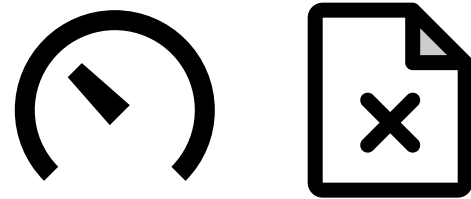


Patterns



Scatter graphs

3 Making Comparisons



Slow, inaccurate judgement

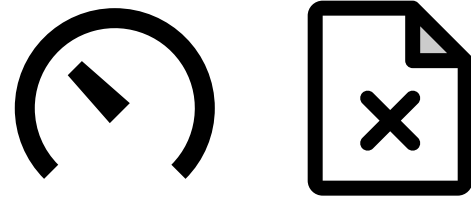
 Angle

 Area

 Text

3

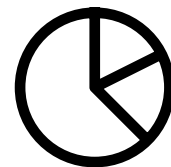
Making Comparisons



Slow, inaccurate judgement



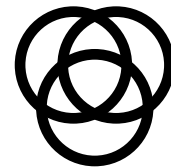
Angle



Pie charts



Area



Venn diagrams

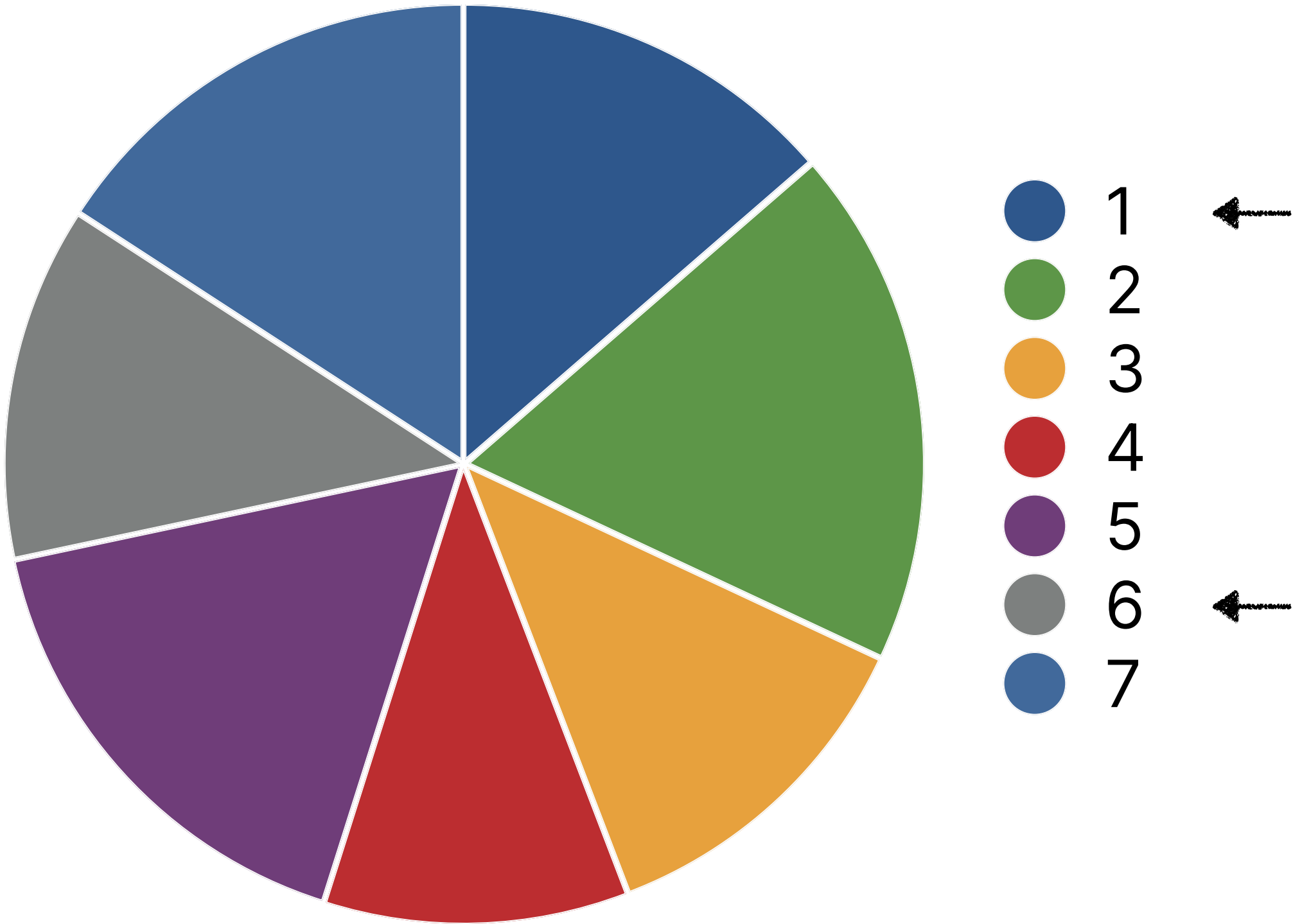


Text

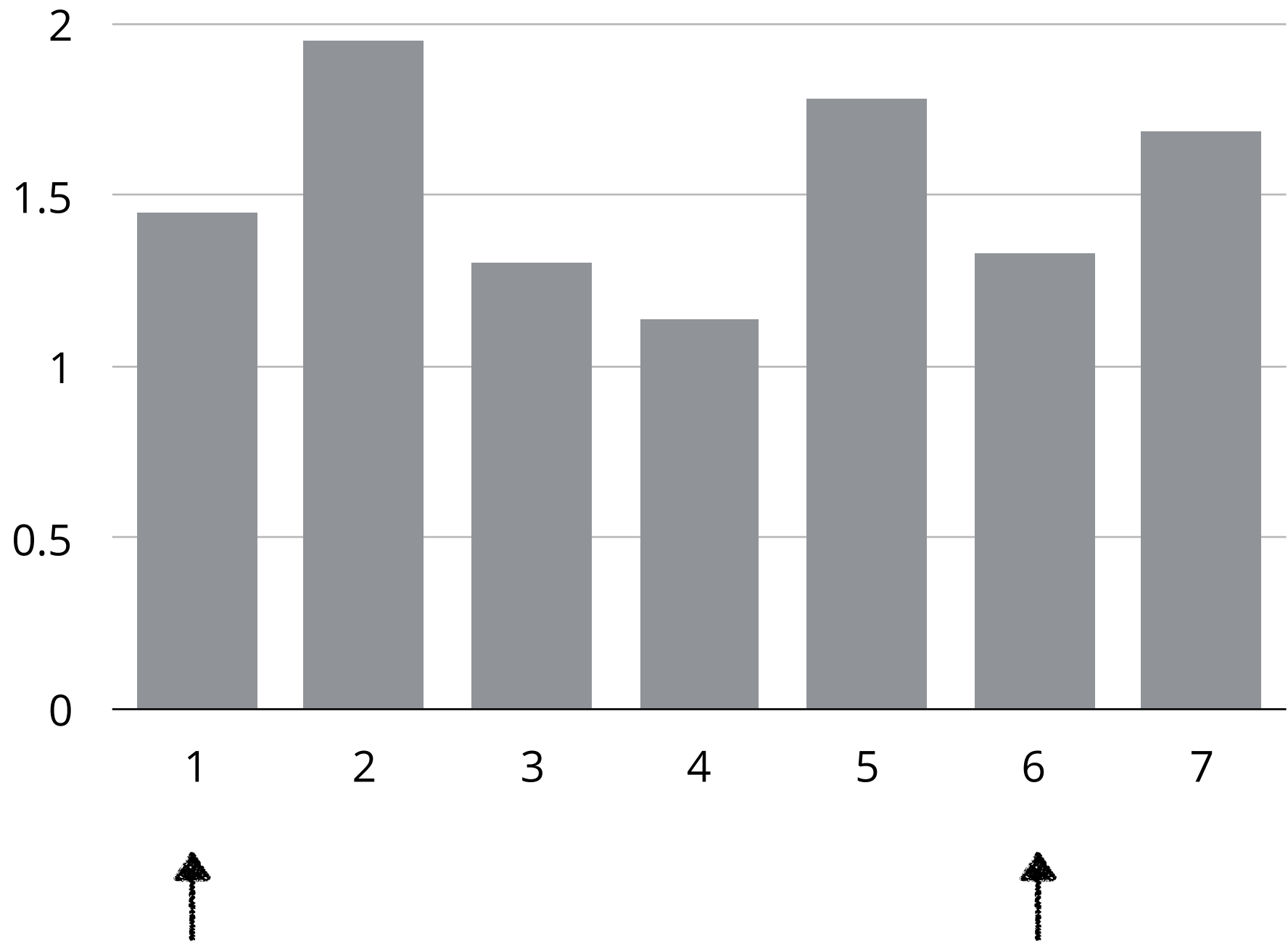
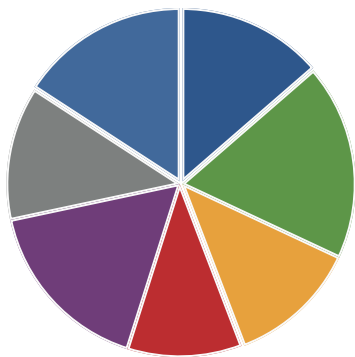


Plot labels

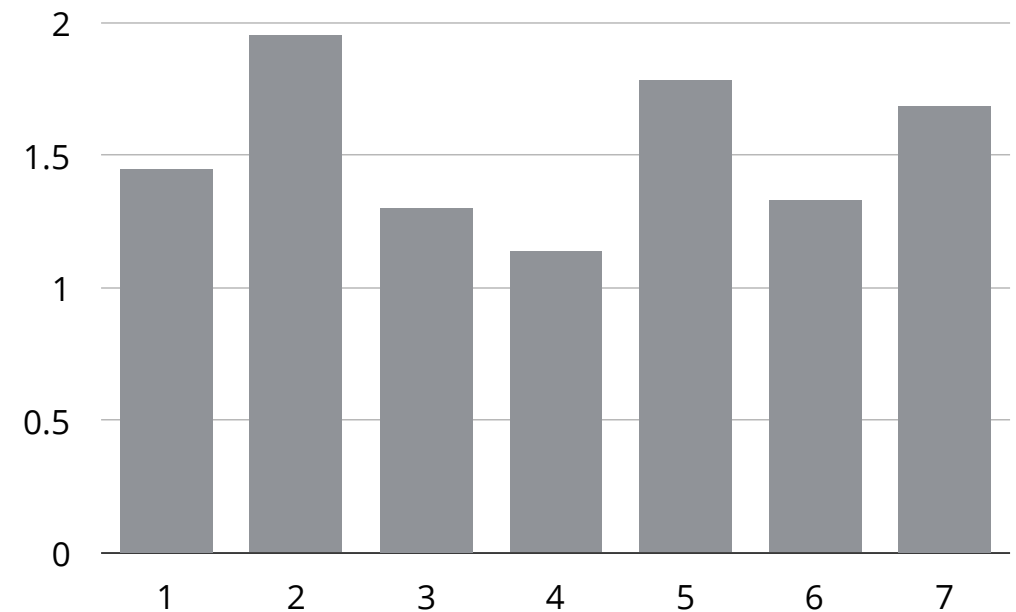
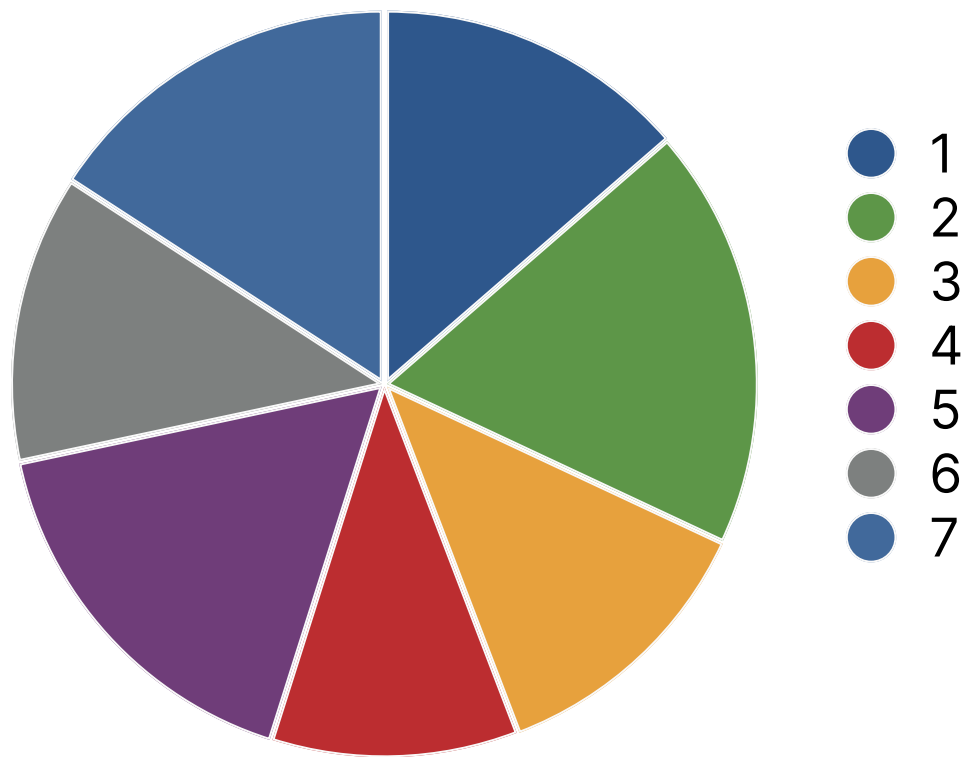
3 Making Comparisons



3 Making Comparisons

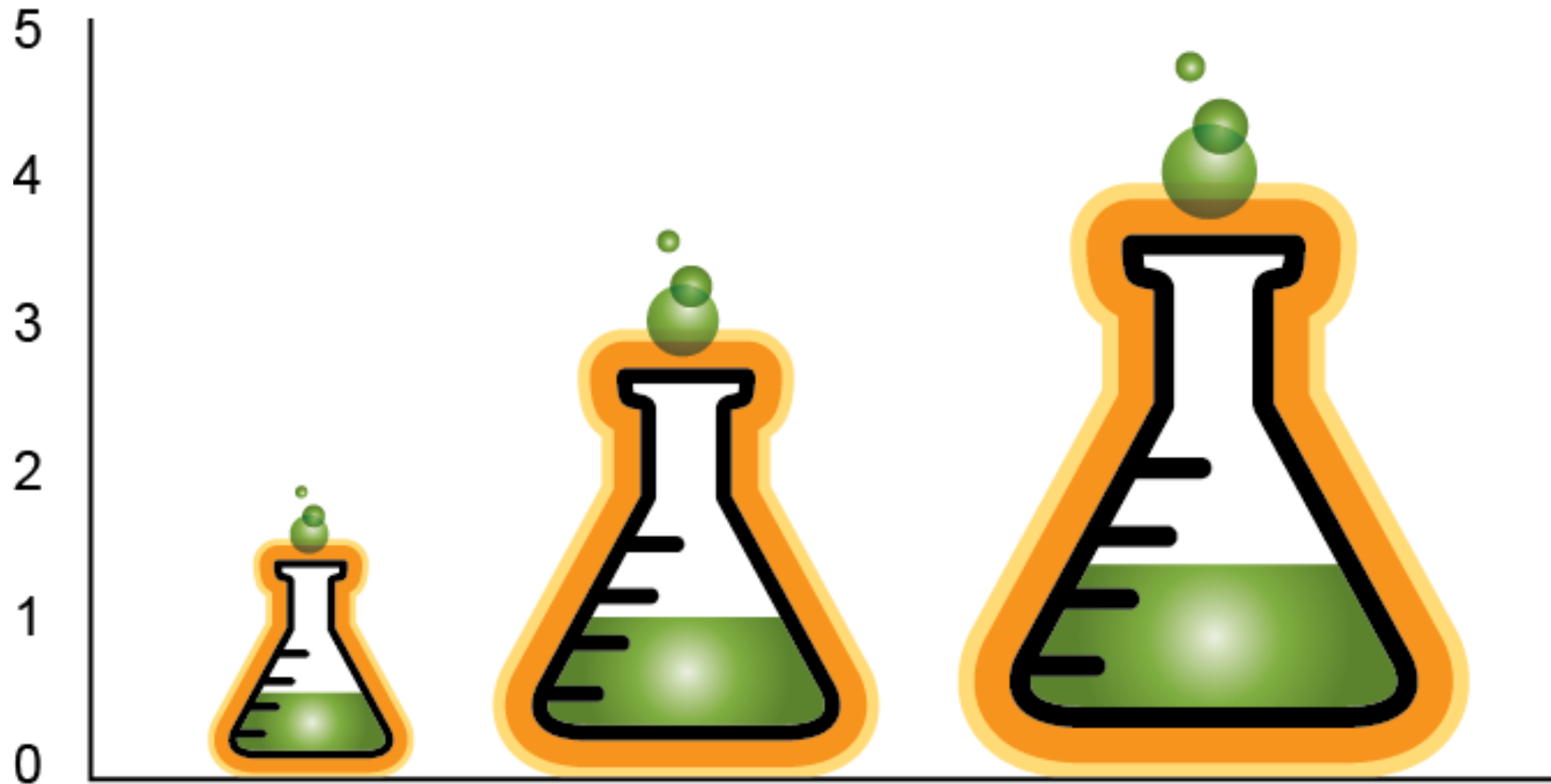


3 Making Comparisons



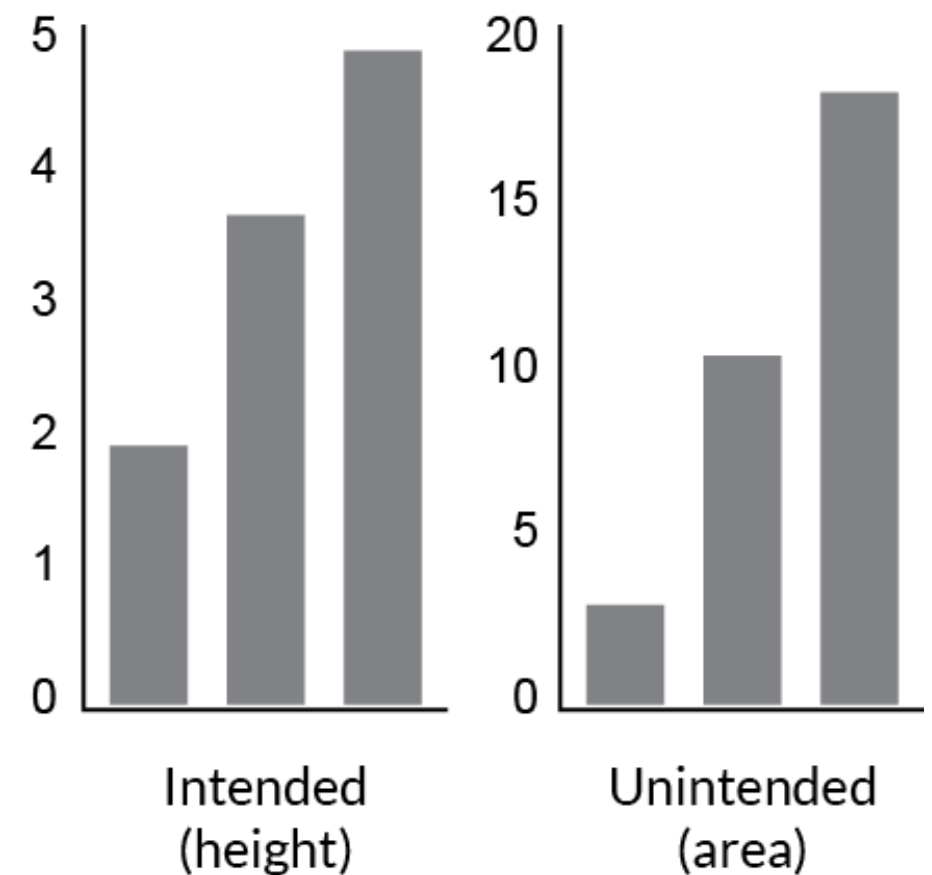
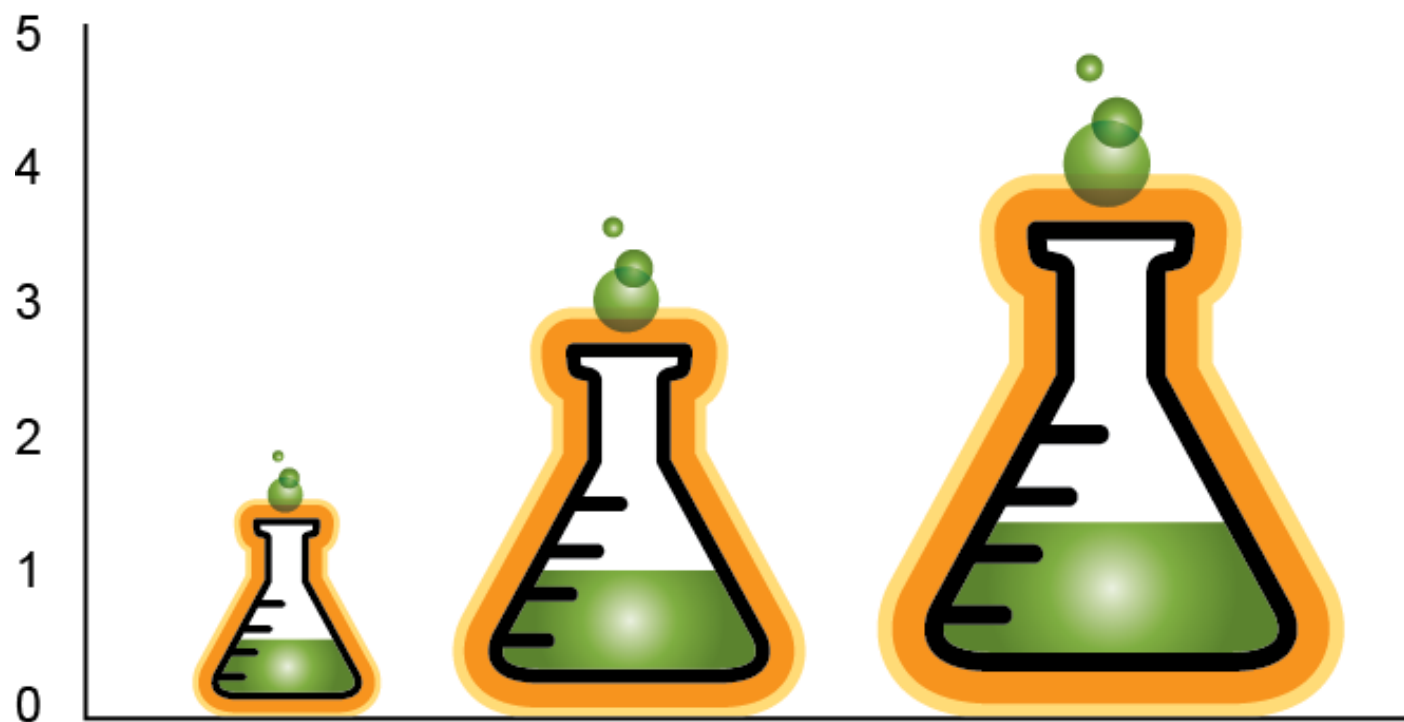
- Angles are bad for comparison
- Legend is disassociated from plot
- Requires colour link for series identification

3 Making Comparisons

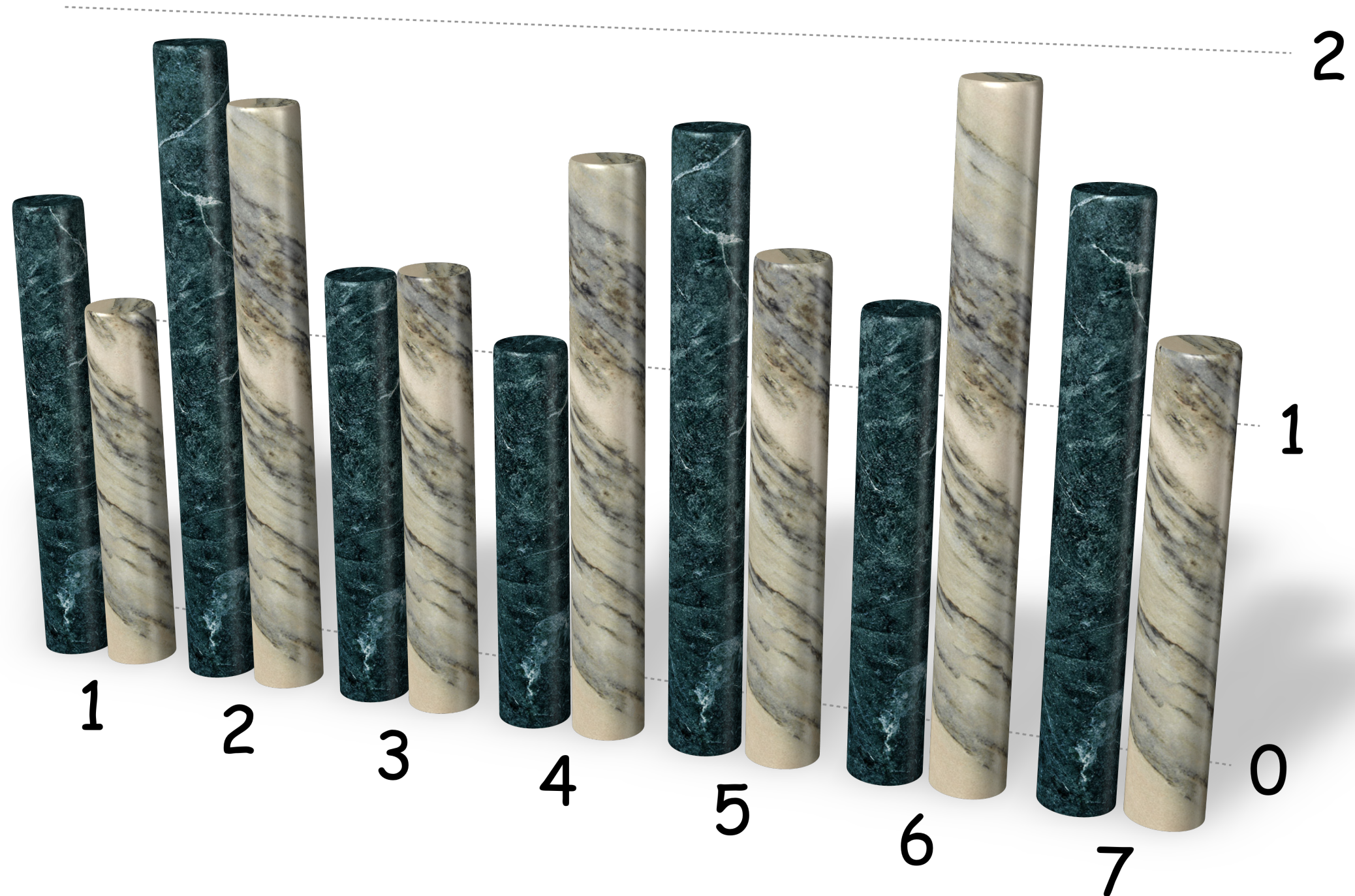


3

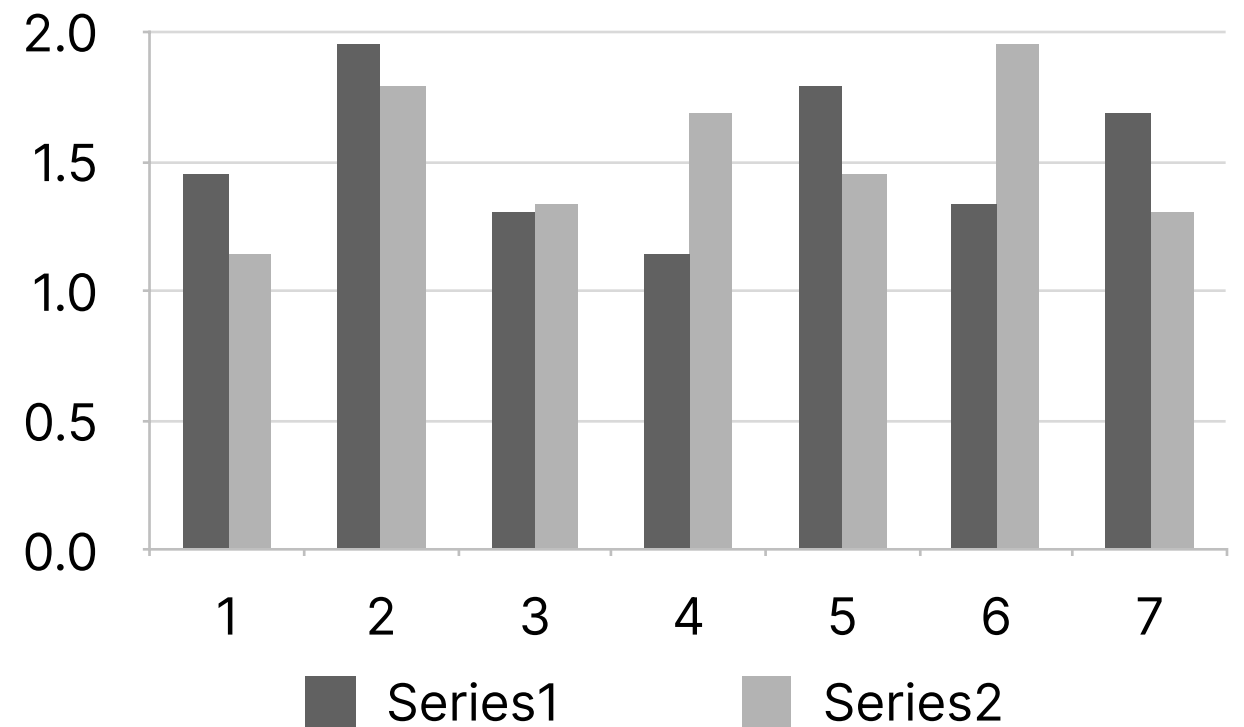
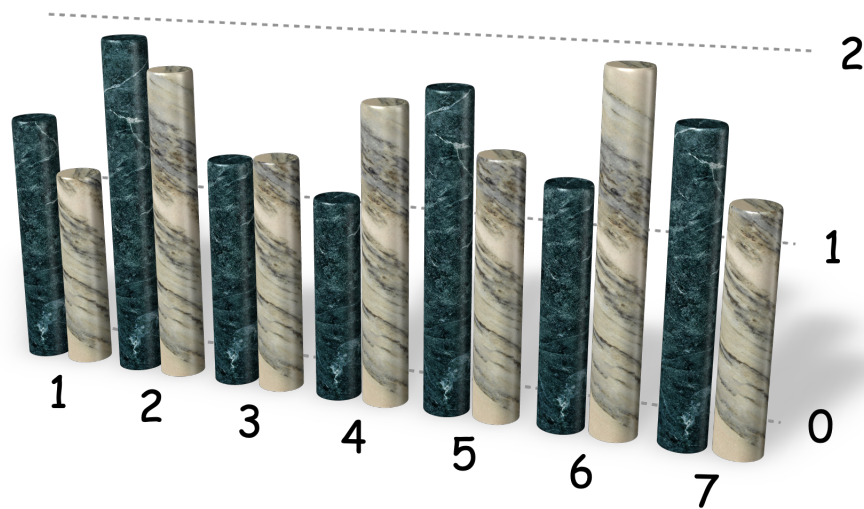
Making Comparisons



Making Comparisons



3 Making Comparisons



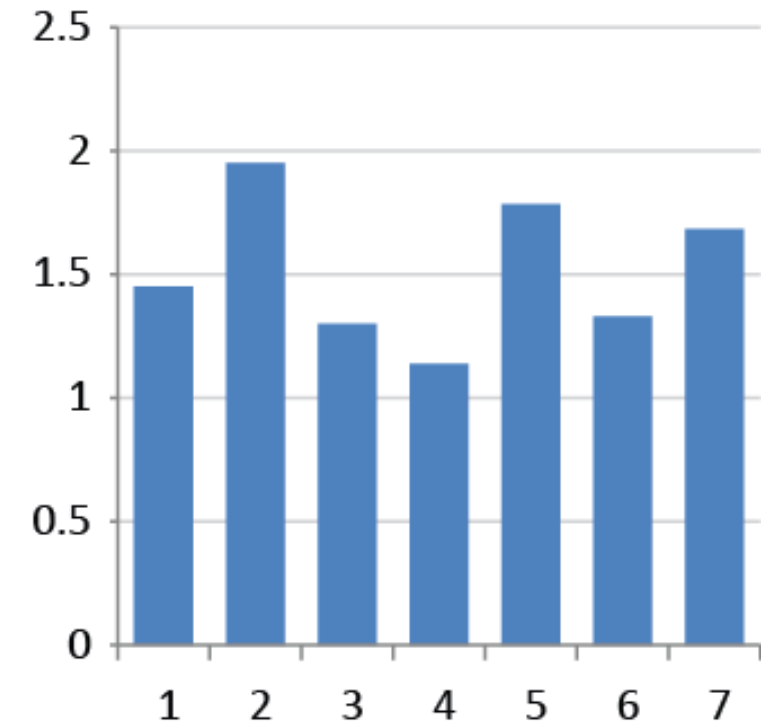
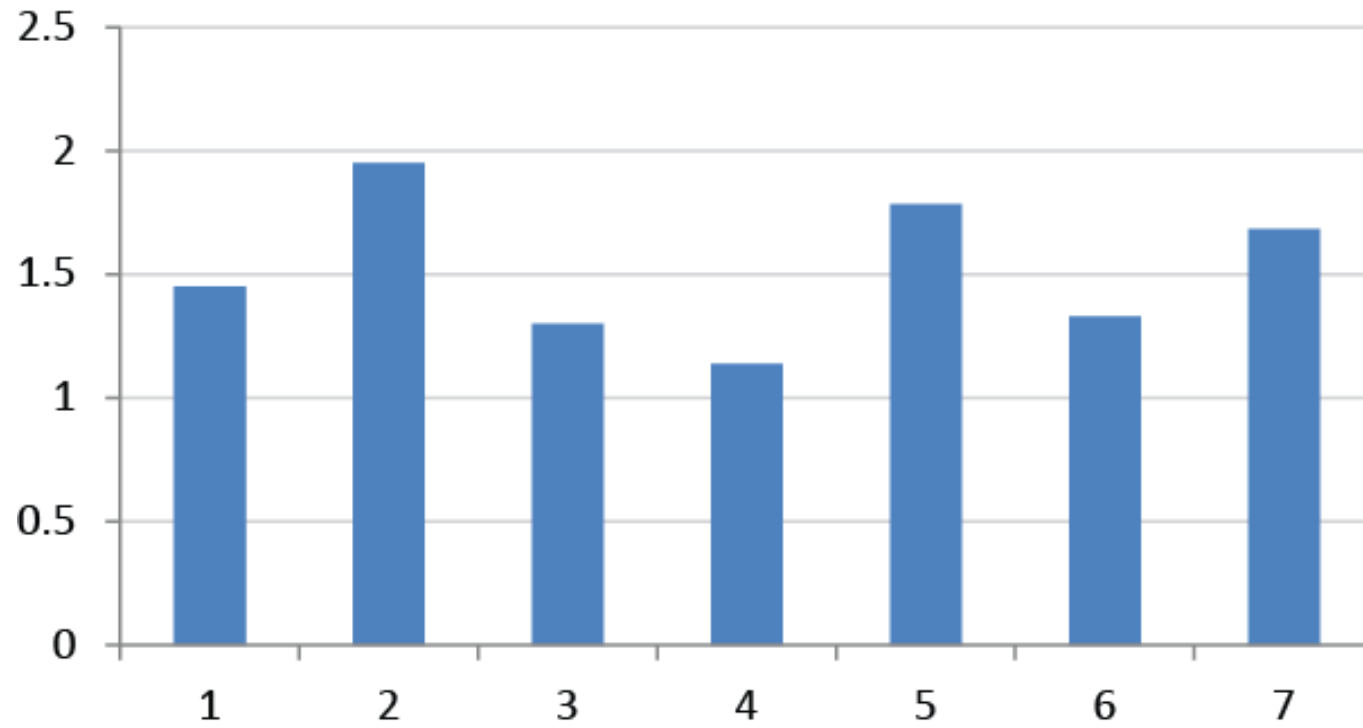
- Use of 3D was arbitrary
- No need for colour and texture

Aspect Ratio

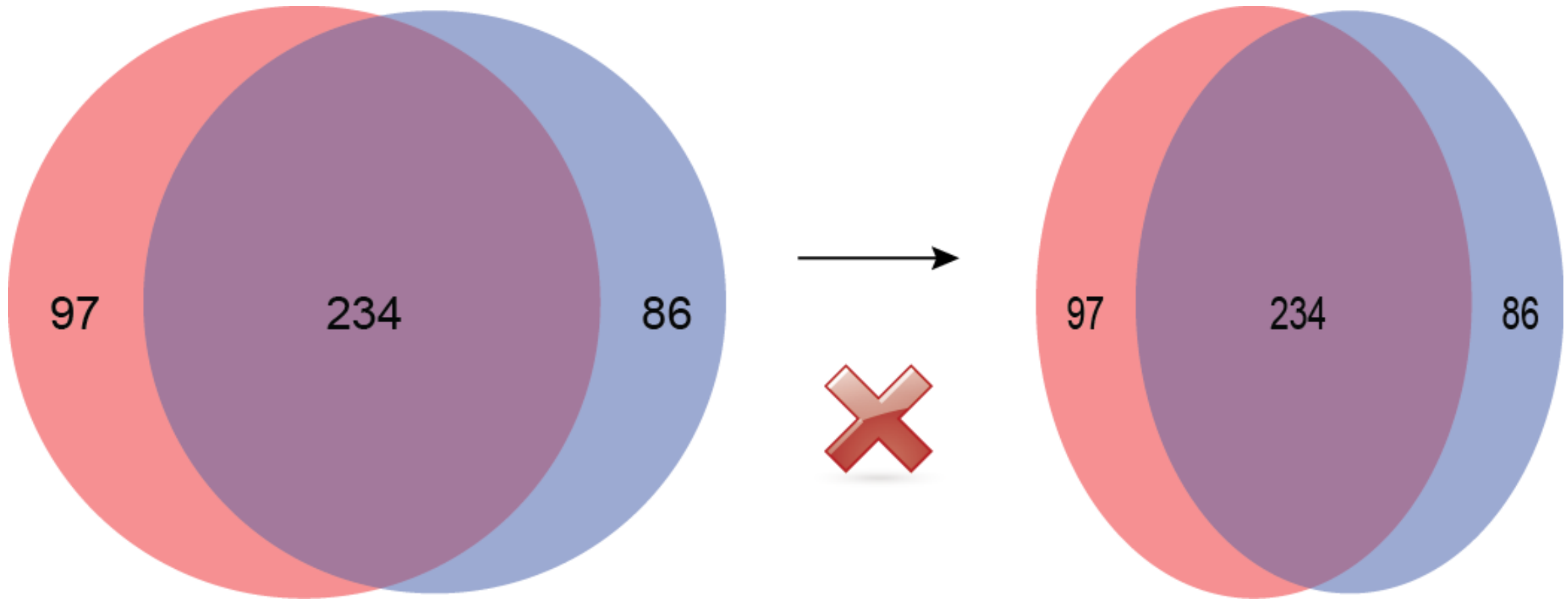
- Elements that need accurate aspect ratios:
 - » Images
 - » Text
 - » Circles
 - » Axes with the same units



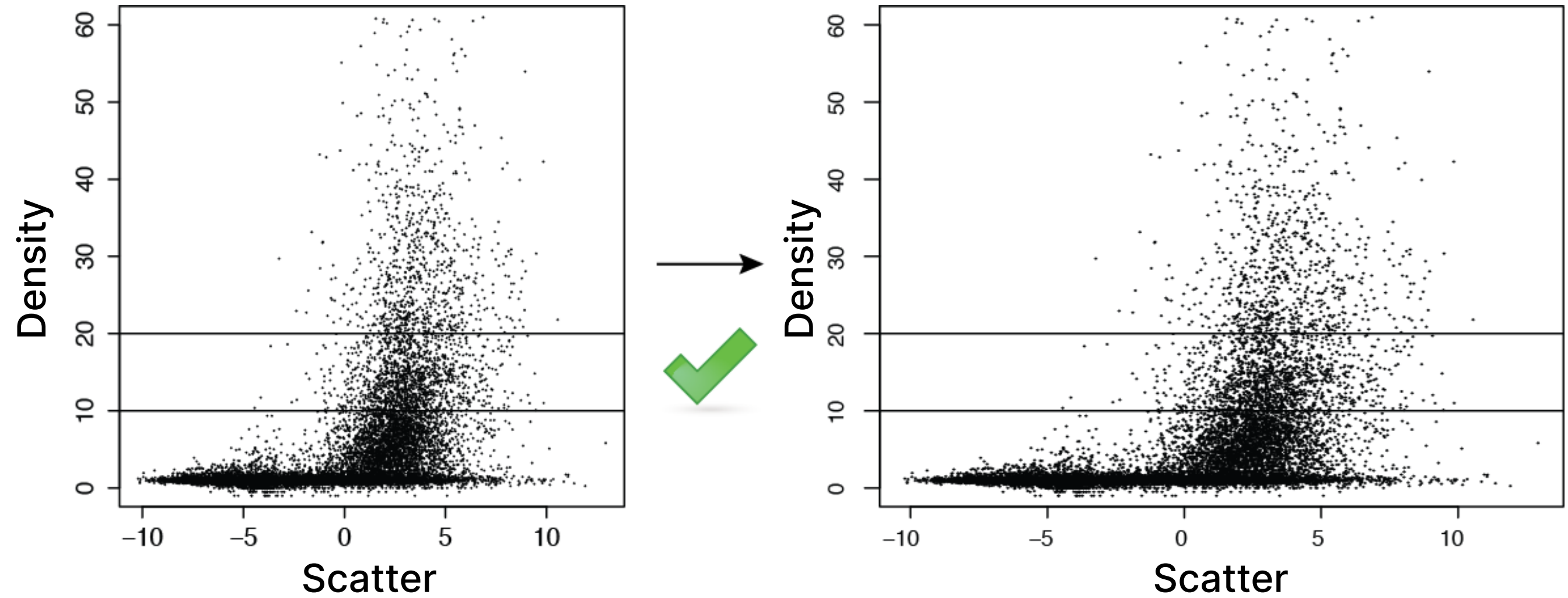
3 Aspect Ratio



3 Aspect Ratio

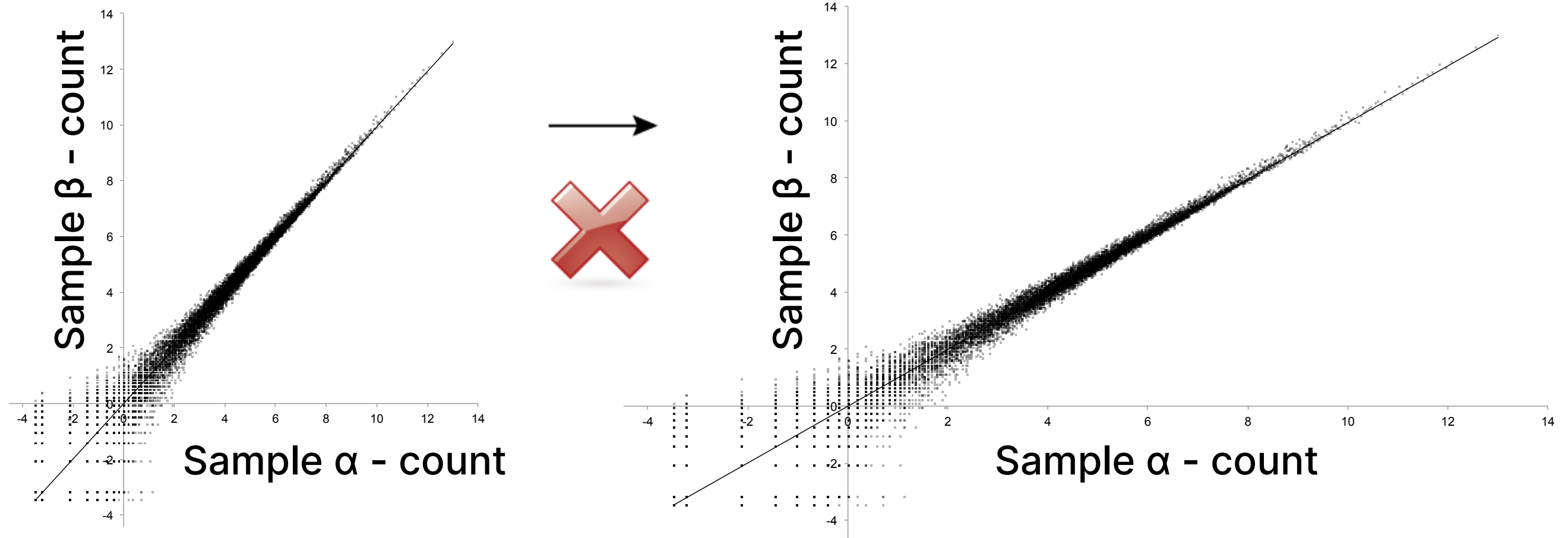


3 Aspect Ratio



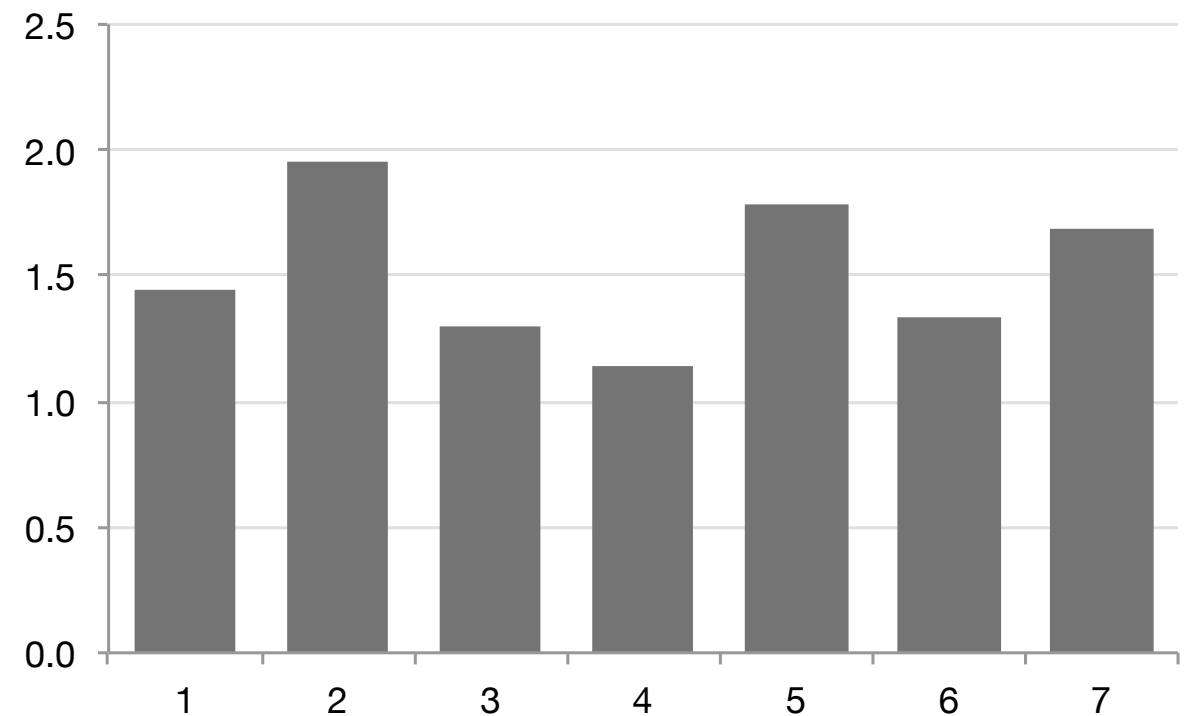
3

Aspect Ratio



3 Plotting principles

- Minimalistic
- Suitable plot type
- Big and clear
- Attractive (avoid defaults)
- The test - can you draw it from memory?



Using plots in talks

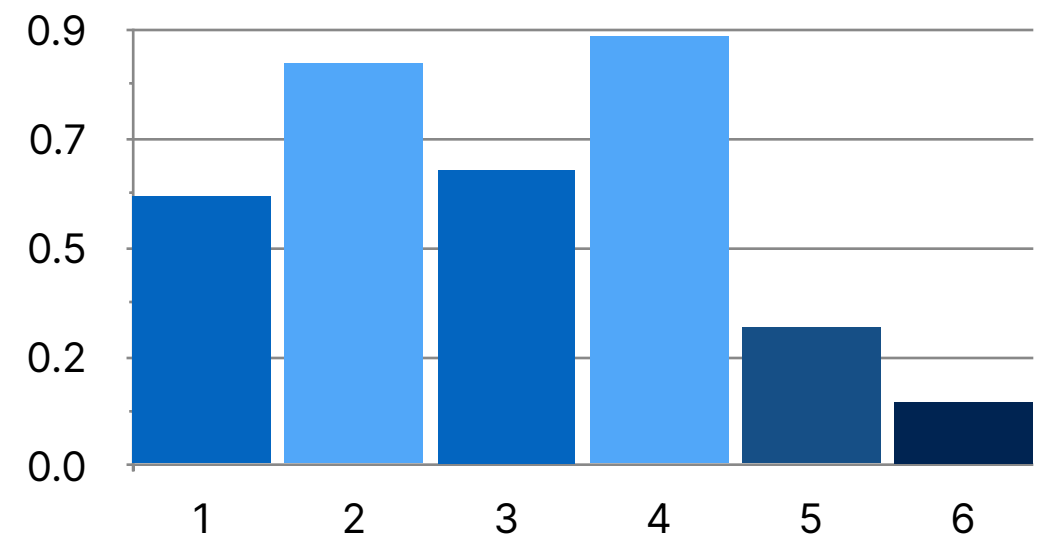
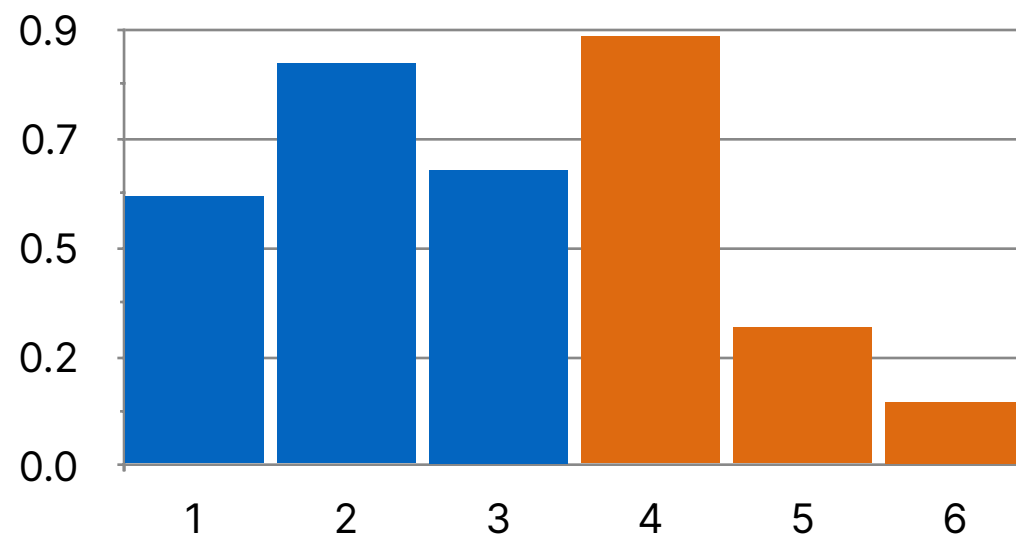
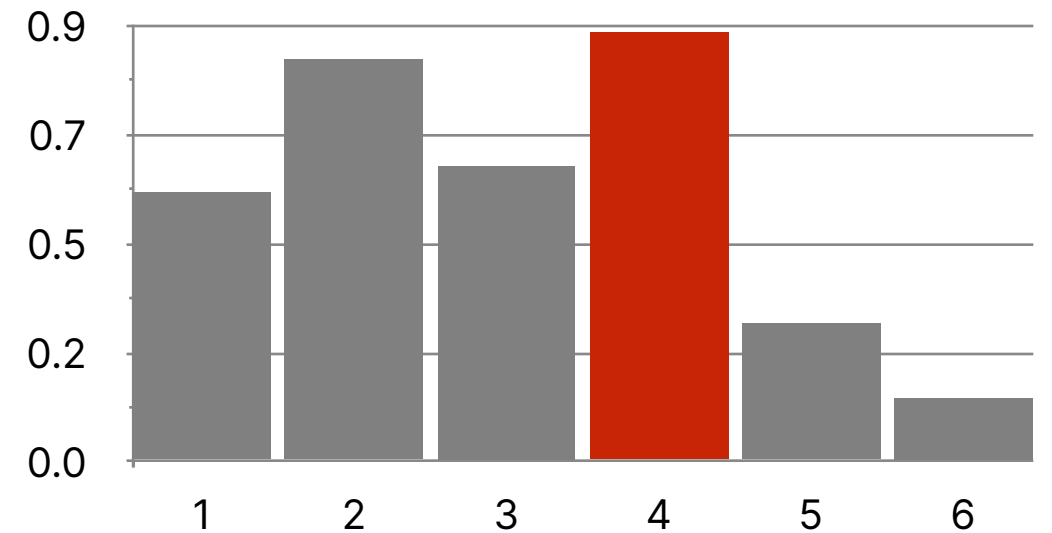
- Hold audience focus
 - » Talk through your data
 - » Don't show everything at once
- Use layering for complex plots
 - » Progressively add data

Colour

4

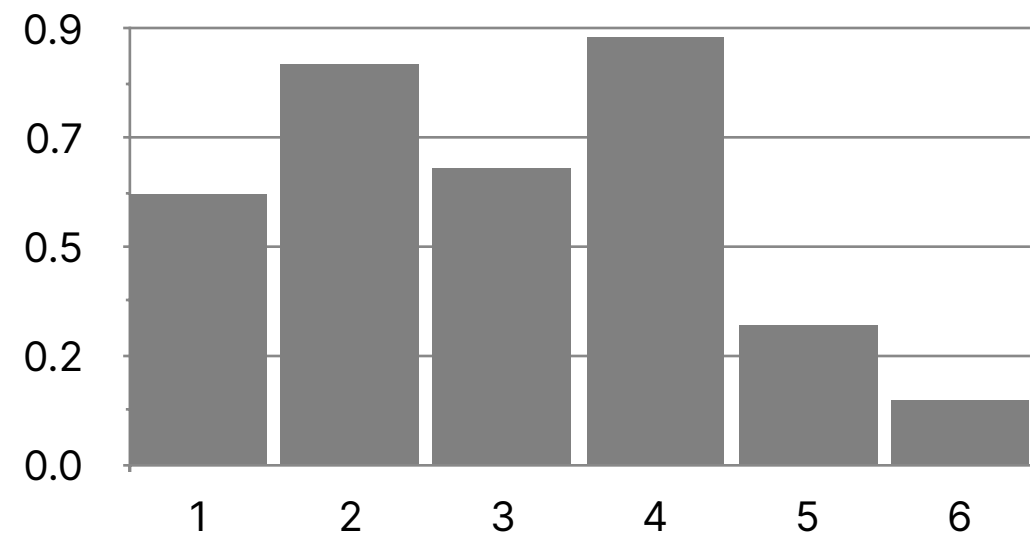
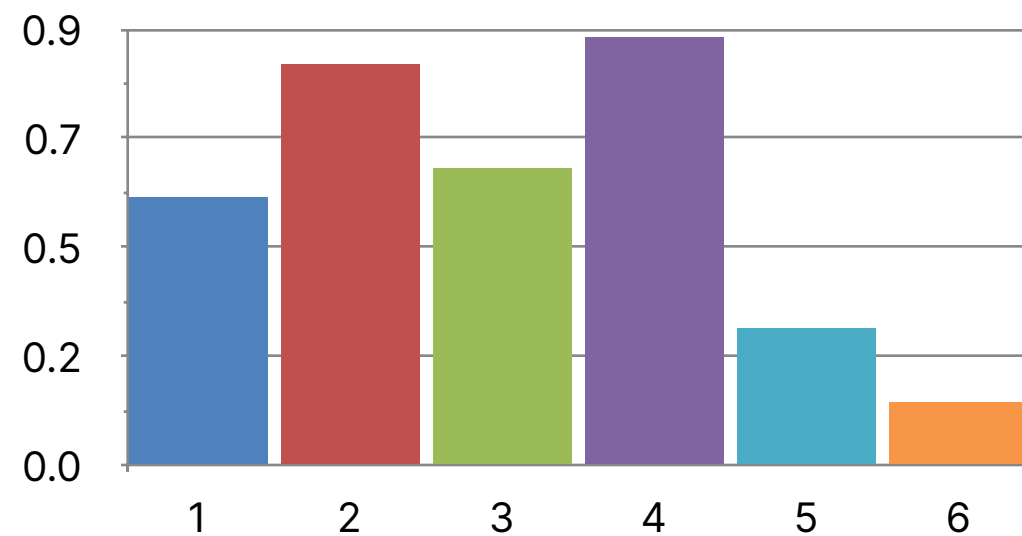
Colour

- Colour can be used to:
 - » Highlight specific data
 - » Group categories of data
 - » Encode quantitative values



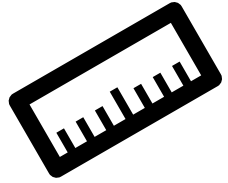
4 Colour

- The more selective you are with colour, the greater its effect



4

Colour Scales



Represent quantitative data



Sequential



Divergent



Categorical



4

Colour Sensitivity



4 Luminescence

Jet



Luminescence



afmhot



Luminescence



YIOrRd



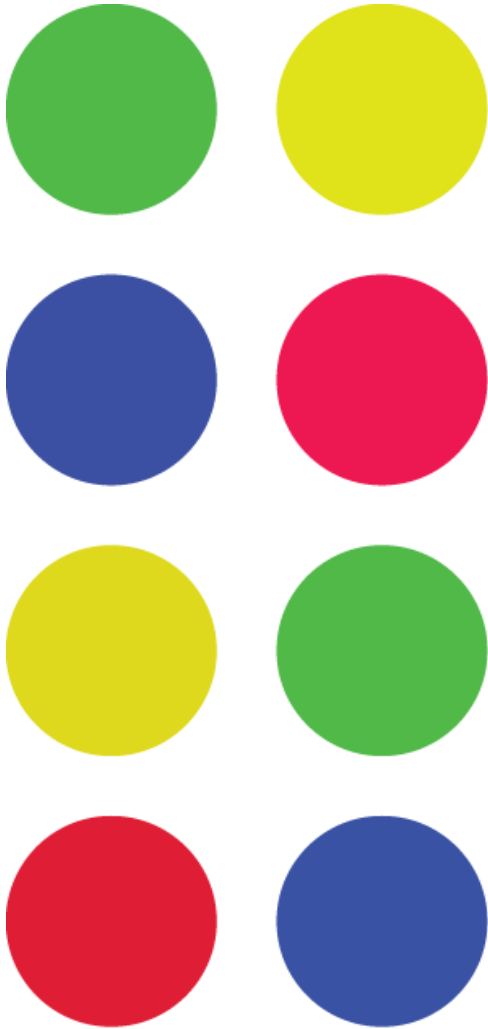
Luminescence



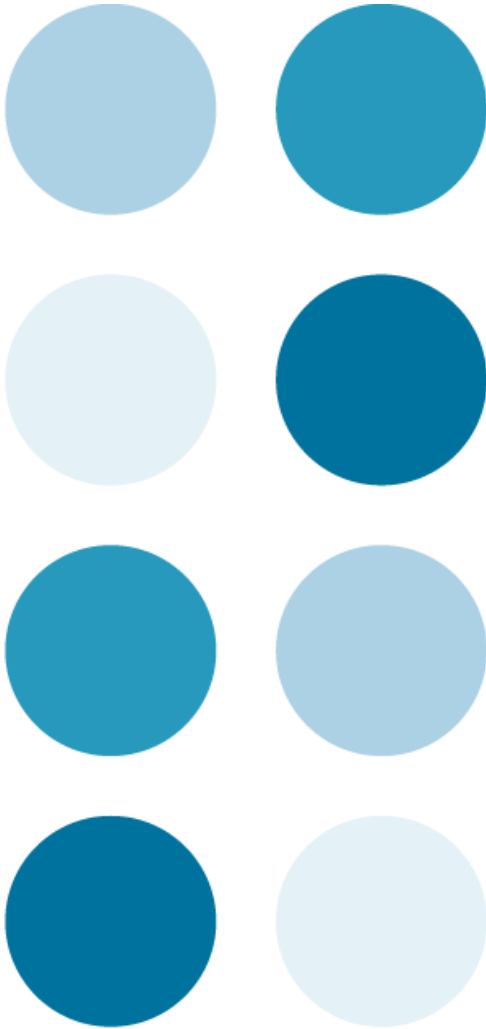
4

Scale types

Categorical



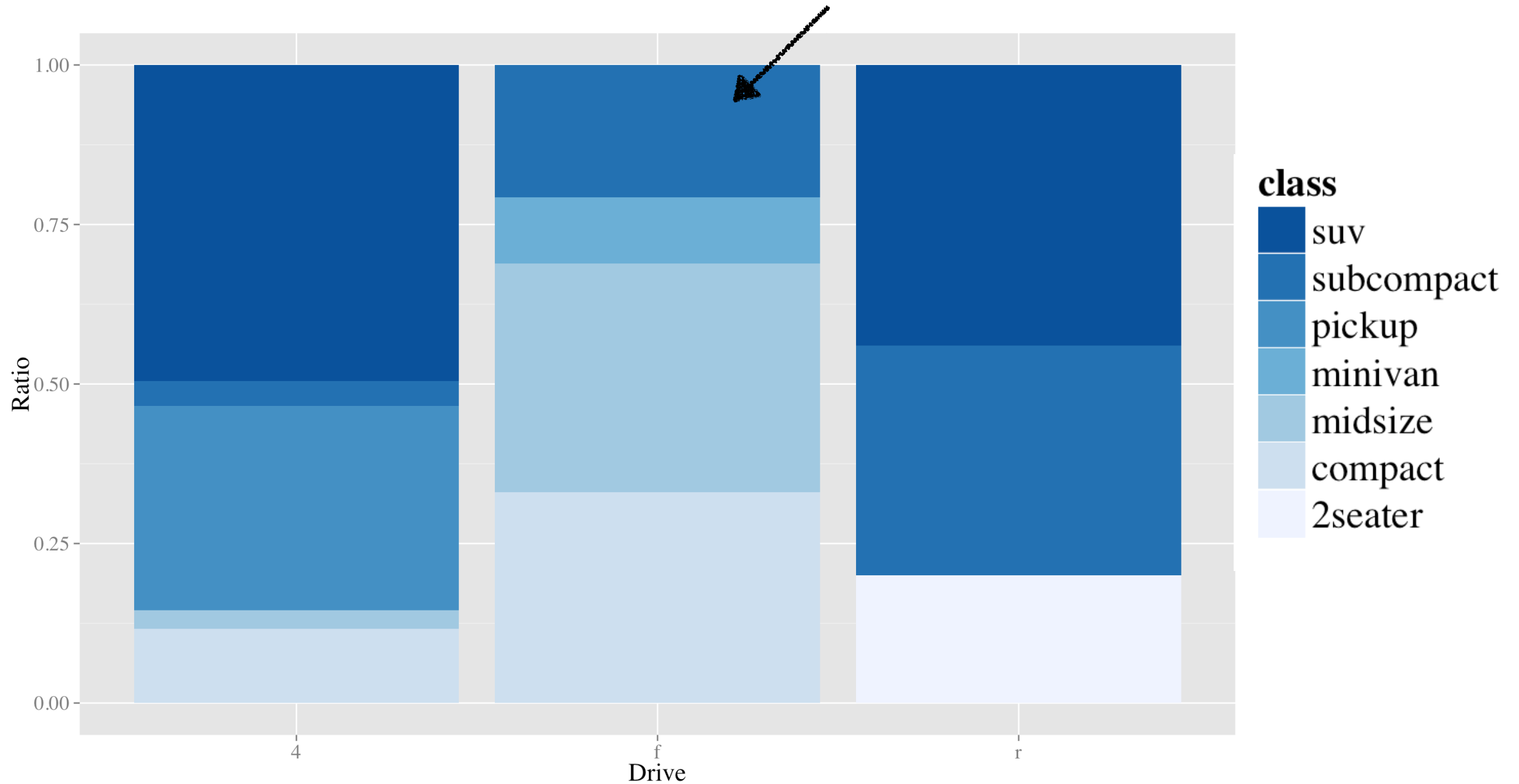
Sequential



4

Scale types

Which class is this?



4

Colour Blindness

- Common in Northern European men

3 NE male
reviewers

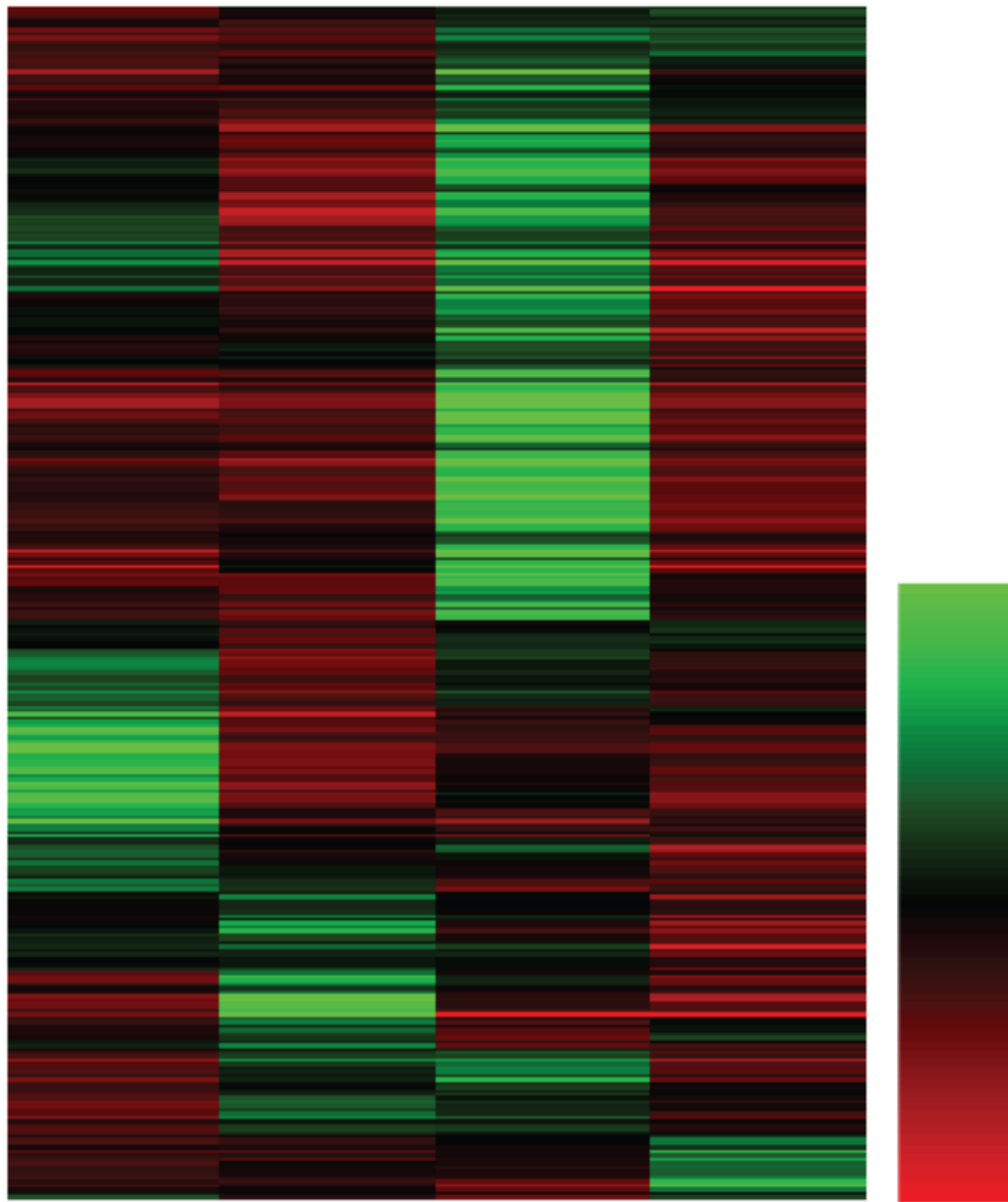


22% chance at least one colour blind

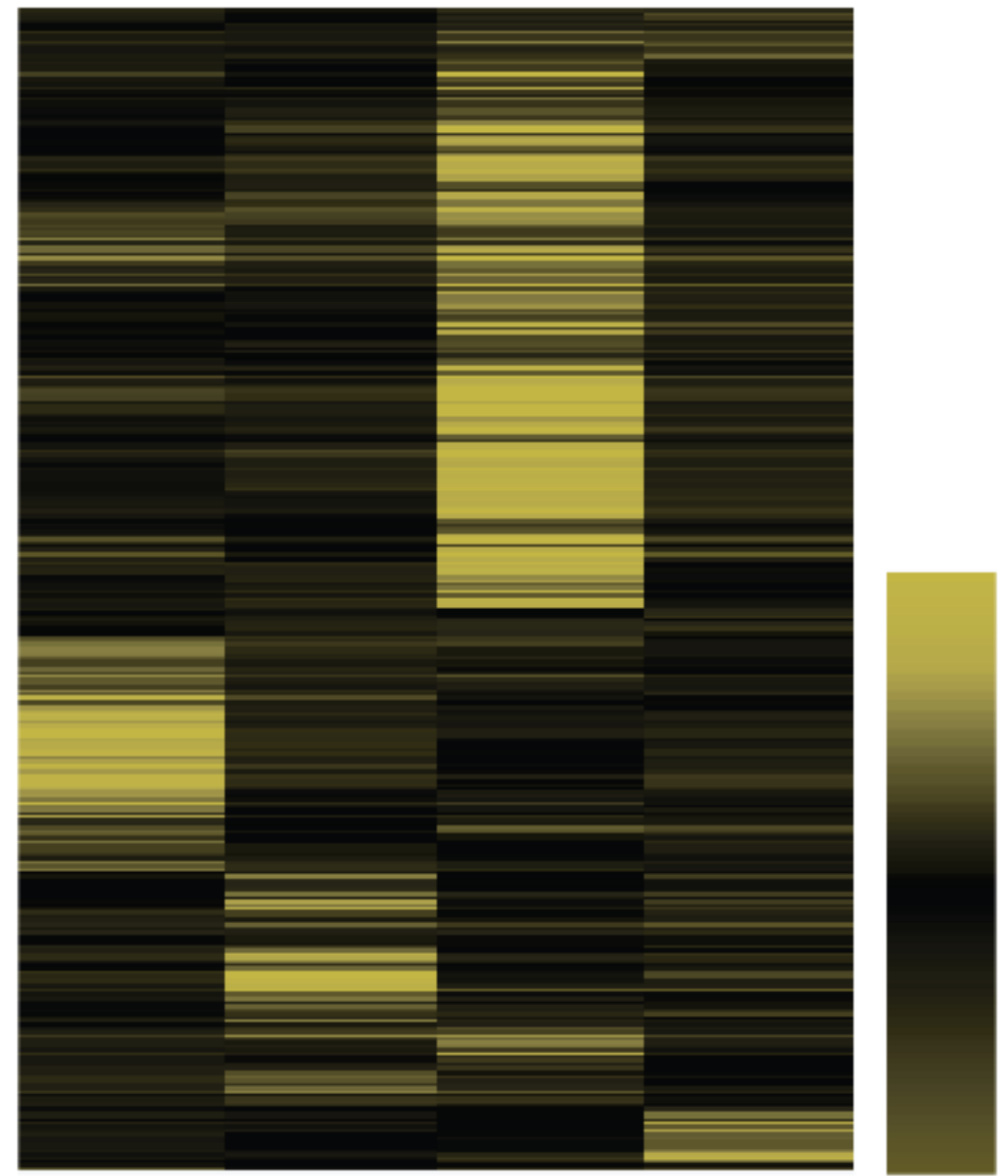
- Colour schemes such as Magenta – Green designed to be colour blind friendly

4

Colour Blindness



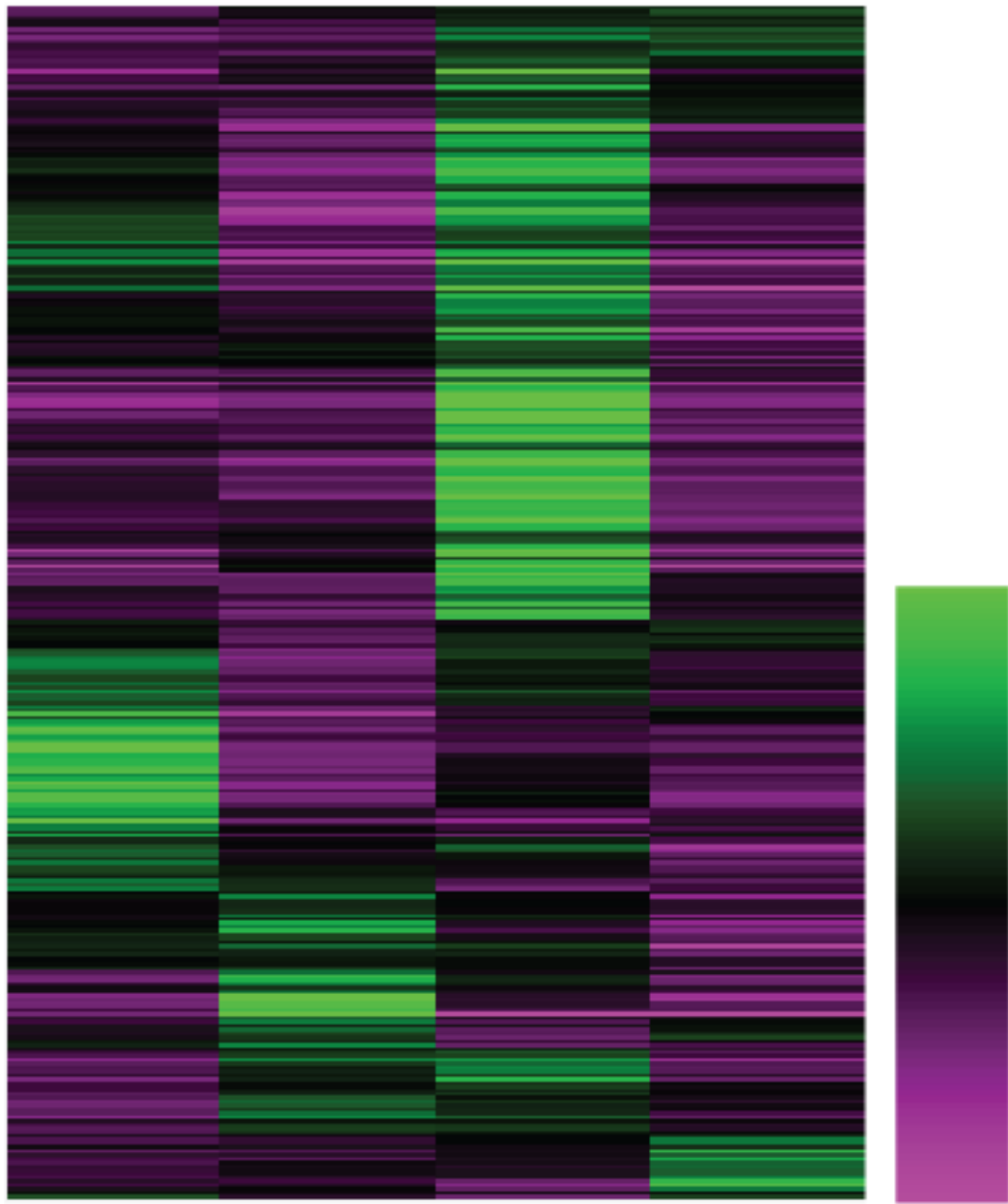
Normal Vision



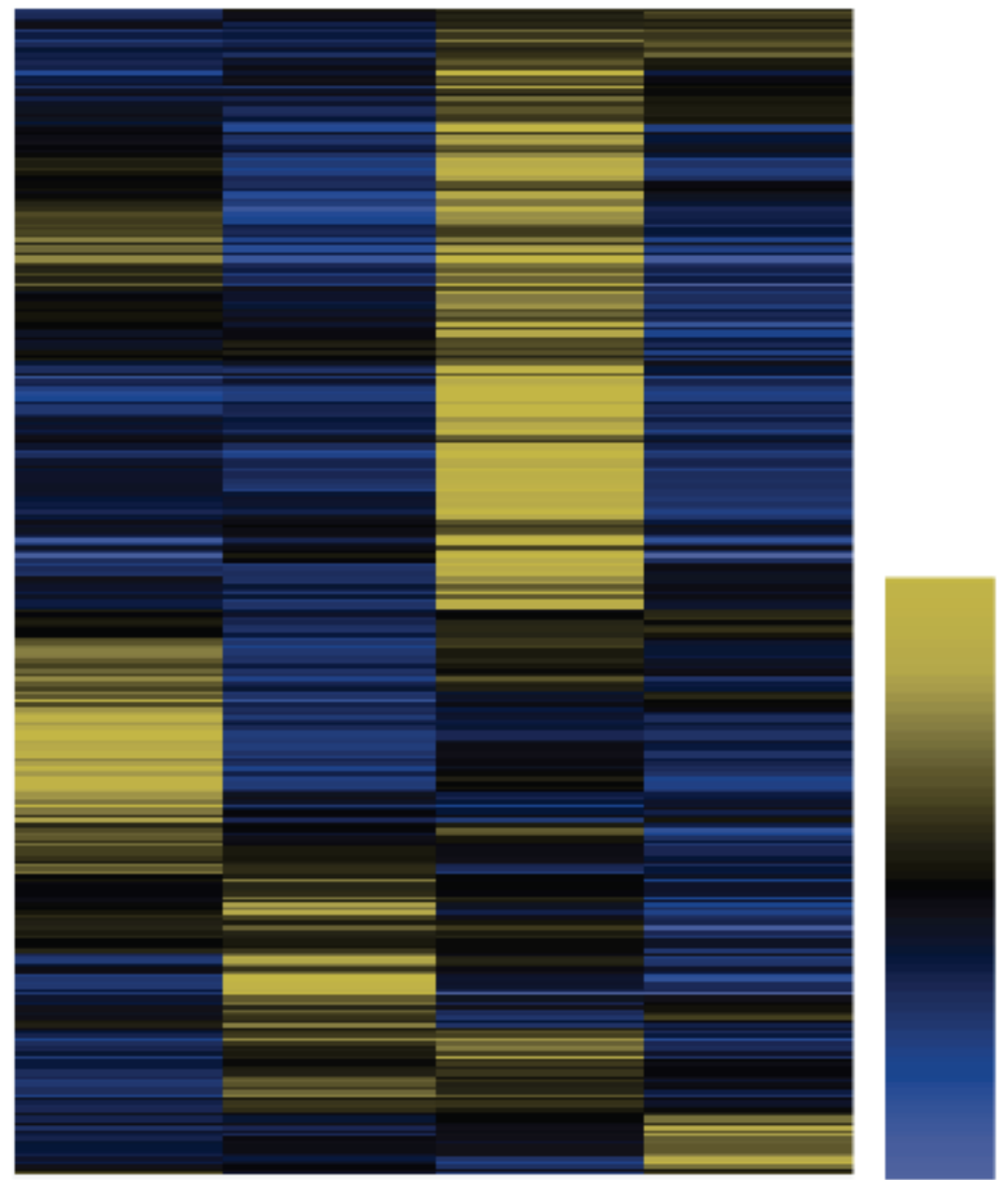
Protanopia

4

Colour Blindness



Normal Vision



Protanopia

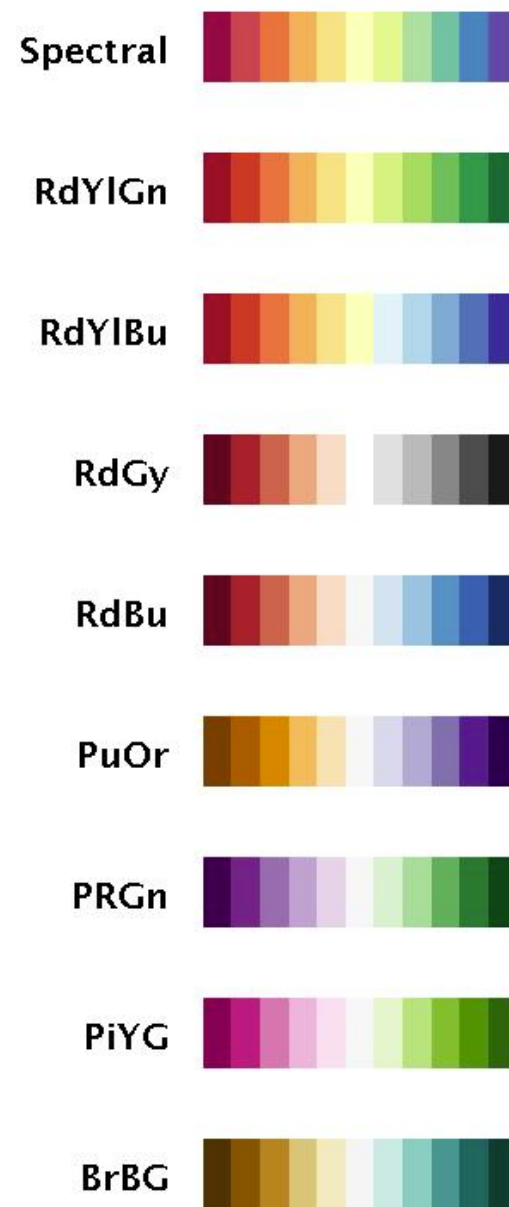
4

Color Brewer

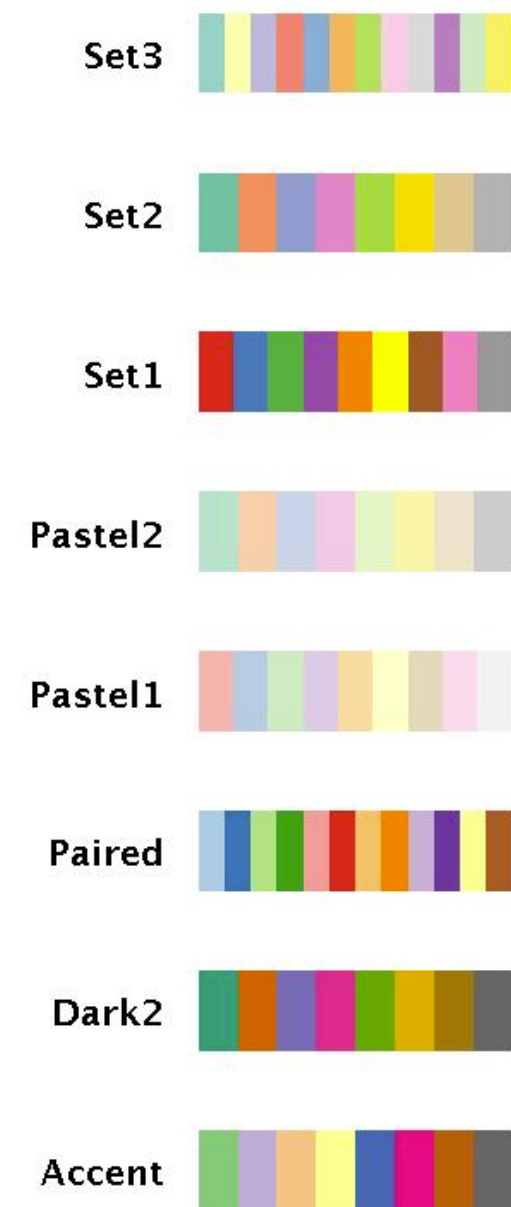
Sequential



Divergent



Categorical



<http://colorbrewer2.org>

Tools

- Fonts - **Google Fonts** (<https://fonts.google.com>)
- Colours - **Coolors** (<https://colors.co>)
- Icons - **Iconify** (<https://iconify.design>)
- Images - **Unsplash** (<https://unsplash.com>)
- Editor - **Inkscape** (<https://inkscape.org>)

5

Google Fonts



Fonts

Icons

Knowledge

FAQ

:



Search fonts

Sentence ▼ Type something

40px ▼



Sans Serif ▼

Language ▼

Number of styles ▼

☐ Show only variable fonts ⓘ

☐ Show only color fonts ⓘ

571 of 1531 families

About these results ⓘ

Sort by: Most popular ▼



Roboto

12 styles

Open Sans

Variable (2 axes)

fonts.google.com

Noto Sans Japanese

Google

Variable (1 axis)

Montserrat

Julieta Ulanovsky, Sol Matas, Juan Pablo del Peral, Jacques Le Bailly

Variable (1 axis)

人類社会のすべての構成員

Whereas recognition of

colors^{co}

GENERATOR

BROWSER



LOGIN

colors.co

#119DA4

#0C7489

#13505B

#040404

#D7D9CE

5

Iconify



Thousands of icons, one unified framework.

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party|



Search Icons

[Show all available icon sets](#)

BoxIcons

BoxIcons Solid

Game Icons

Material Symbols

Google Material Icons

Arcticons

Material Design Icons

Lucide

OpenMoji

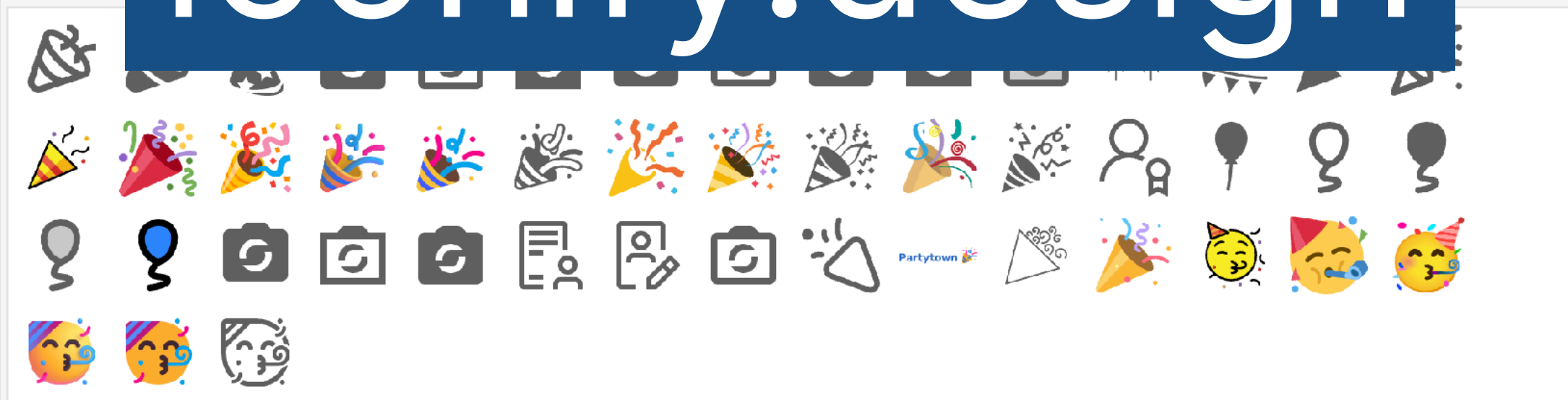
Twitter Emojis

Monotone)

Emoji One (v14)

Box OS Emoji

Displaying



1

2





northern lights



Explore

Advertise

Unsplash+

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Submit a photo



Photos 10k Collections 7.2k Users 13

Filters

Northern lights

- Wallpaper
- Light
- Outdoor
- Northern
- Nature
- Background
- Auro >

unsplash.com



Iceland Aurora Borealis Aurora Polaris



Hd Sky Wallpapers Hd Wallpapers Hd Backgrounds

5

Inkscape

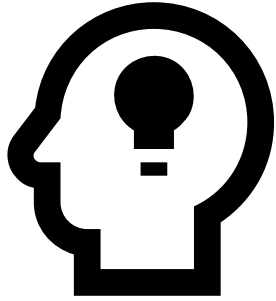


INKSCAPE

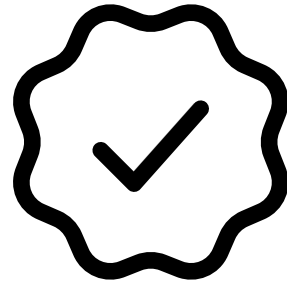
Draw Freely.

inkscape.org

Summary



Help to explain



Memorable



Interesting



Important



Easy