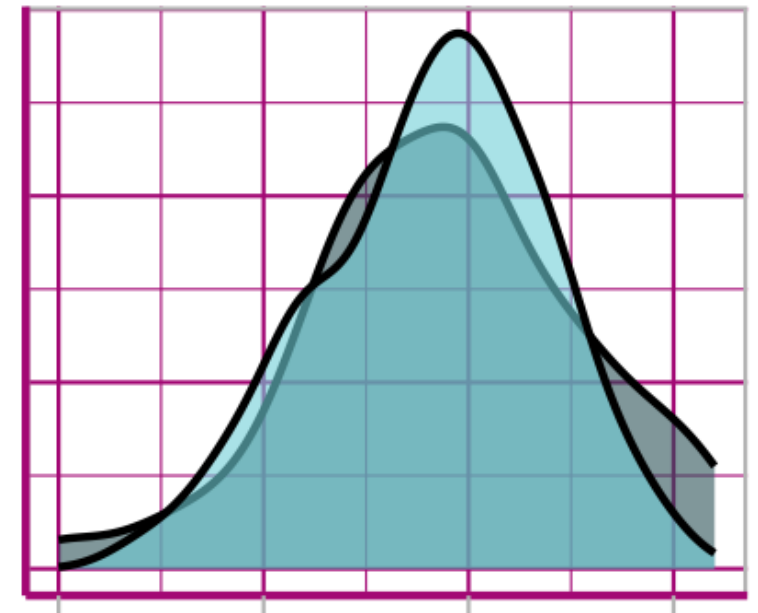
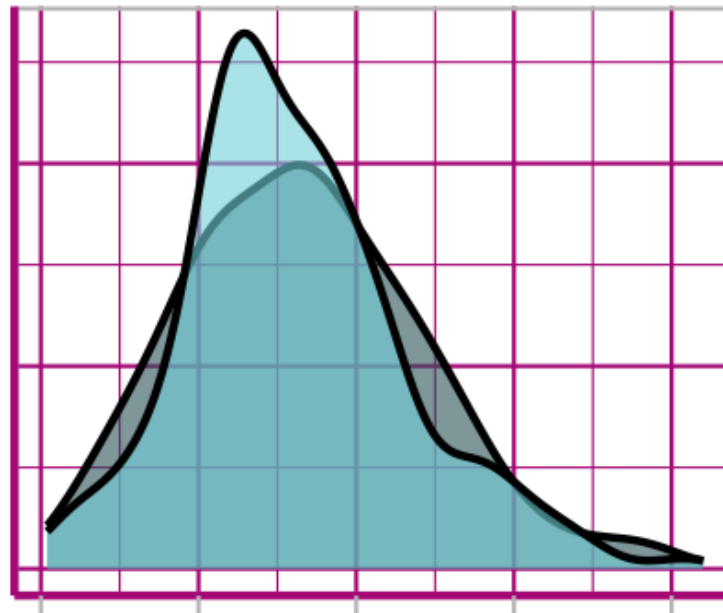
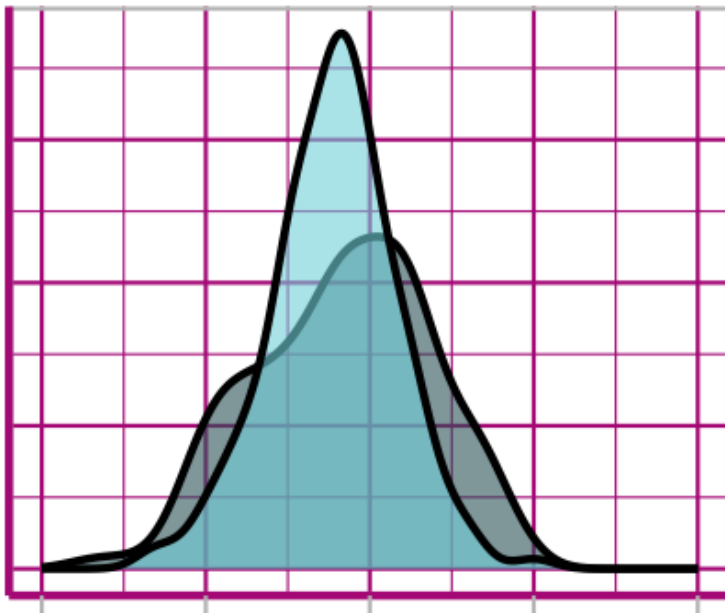


# Data visualisation with ggplot2

Dr. Ryssa Moffat

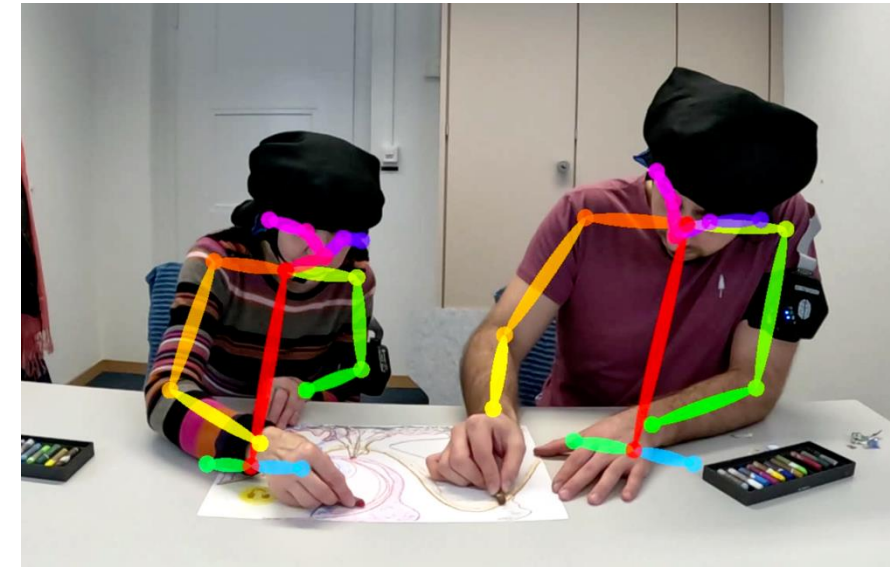
R-Ladies Zurich

14.11.2024



# About me

- Postdoctoral Researcher at ETH Zurich
- PhD in Cognitive Science
- R devotee since 2016



# Plan

## 1. Basics

- Syntax, Colors, Theme, Combining, Saving

## 2. Important steps

- Pinning down relevant comparisons
- Reducing redundancy

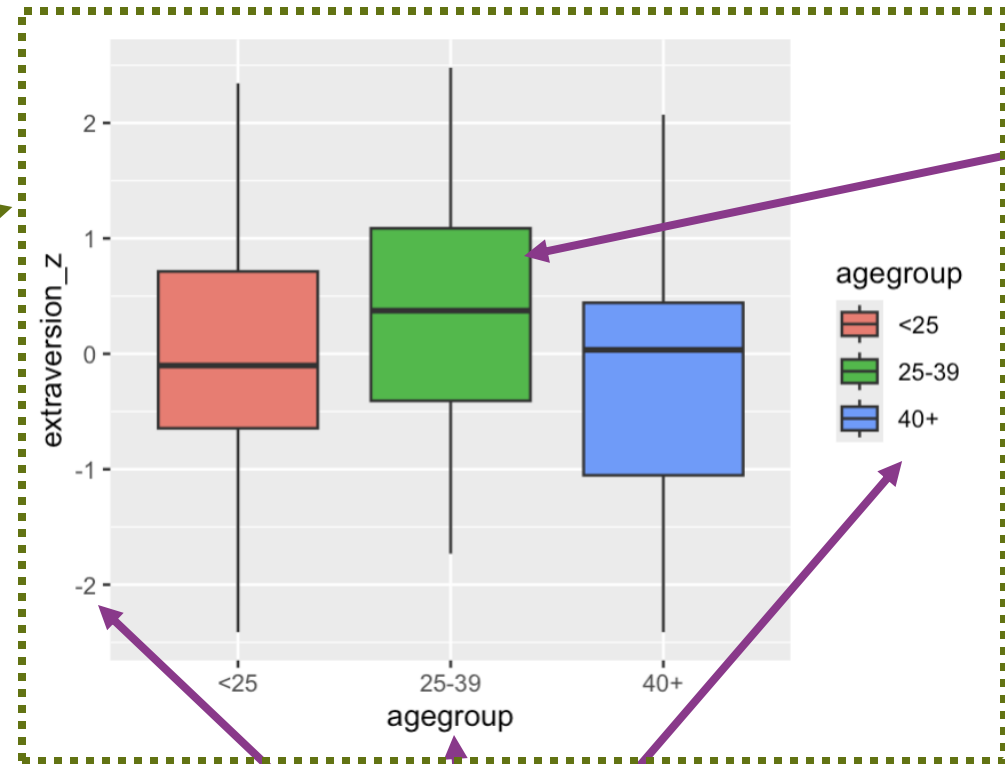
## 3. Cool things

- Models into plots
- 3D plots

# BASICS

# Syntax basics

theme()



geom\_x()

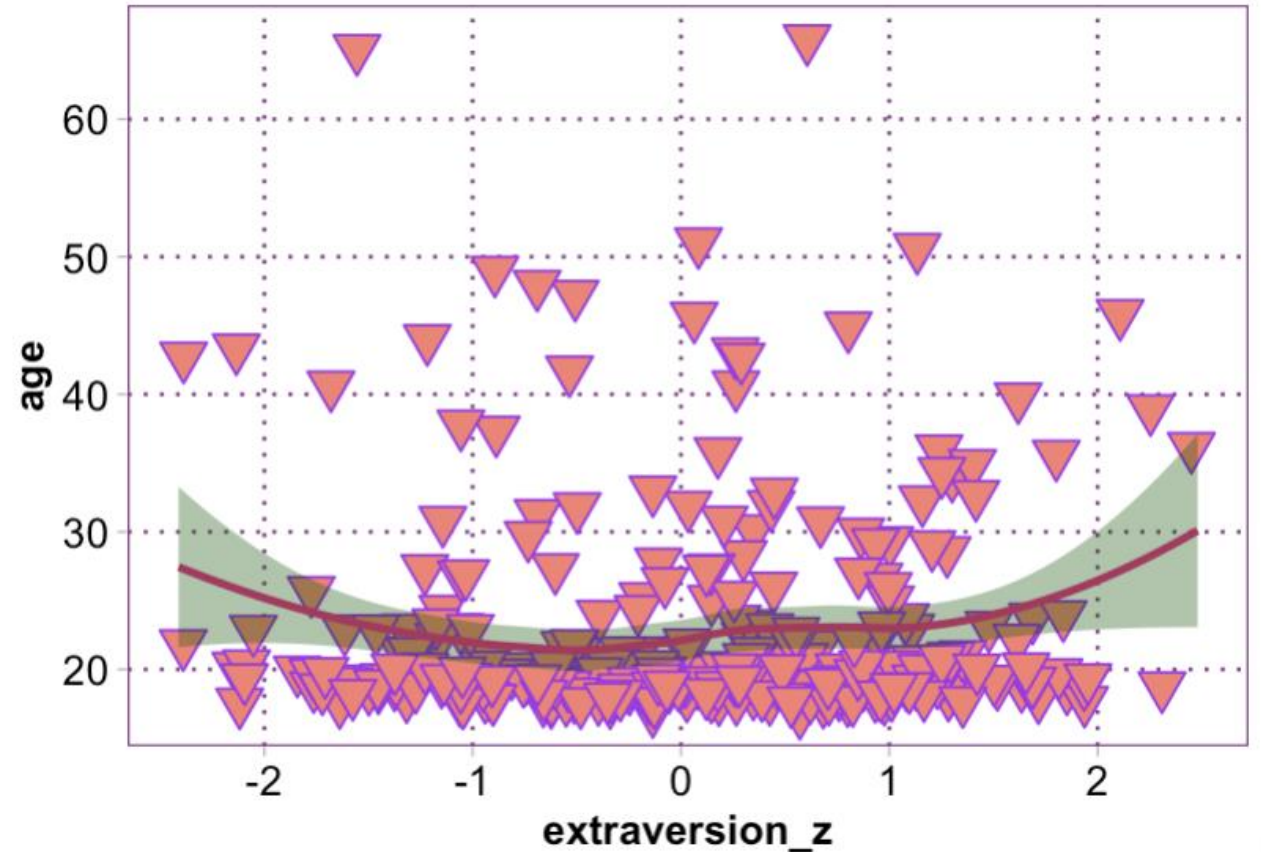
aes()

```
# boxplots (group with continuous, base ggplot colors)
personality_traits1 %>%
  ggplot(aes(x = agegroup, y = extraversion_z, fill = agegroup))+
  geom_boxplot()
```

# Syntax basics

## Familiarization with syntax:

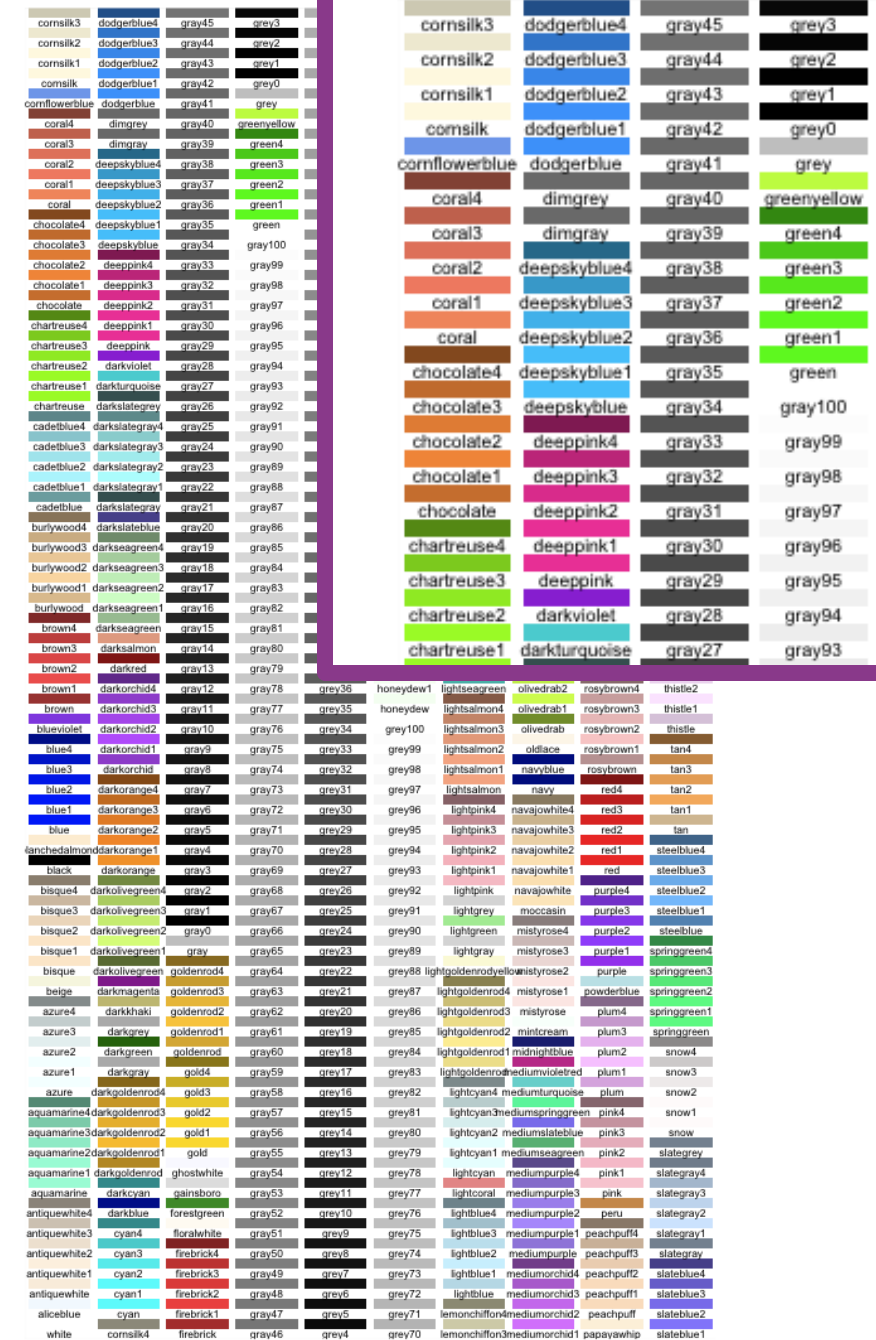
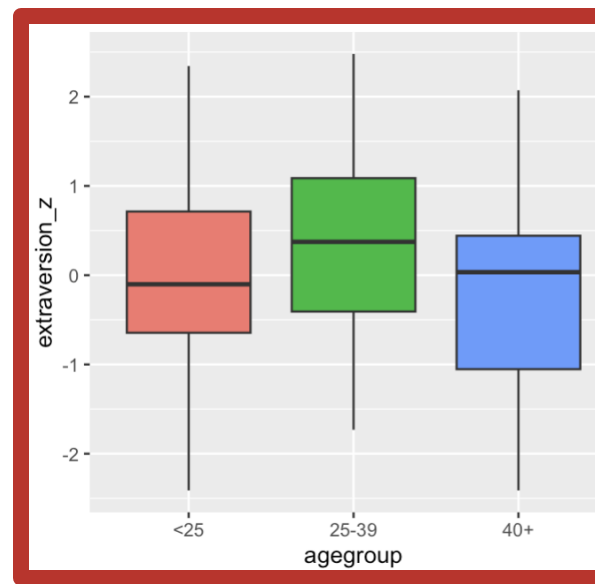
1. `aes()`
2. `geom_x()`
3. `theme()`



```
# scatter plot with trend line
# try changing color, fill, method (loess, lm)
personality_traits %>%
  ggplot(aes(x = extraversion_z, y = age)) +
  geom_jitter(color = "purple", fill = "salmon", shape = 25, size = 4) +
  geom_smooth(method = "loess", color = "maroon", fill = "darkgreen")
```

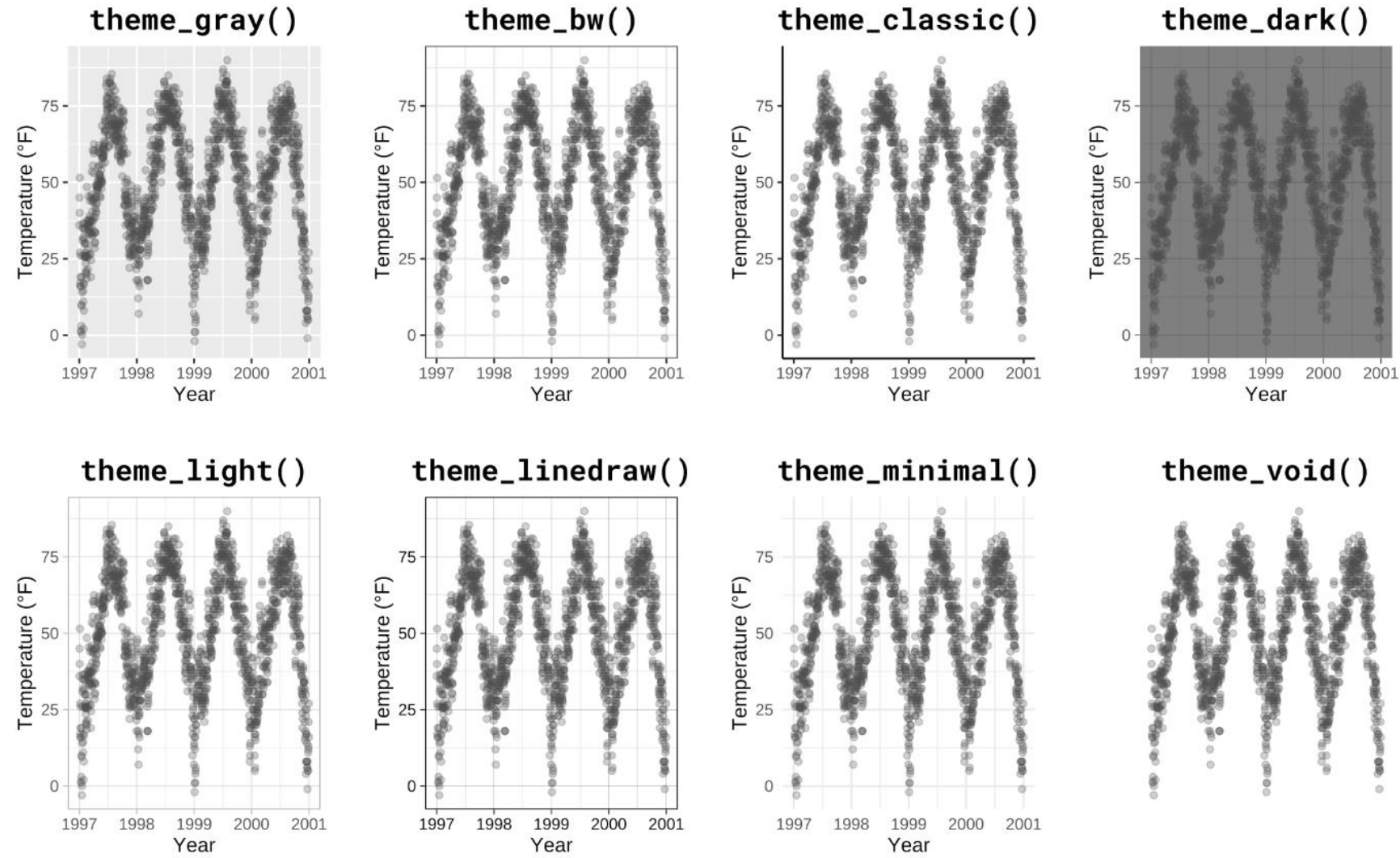
# Colors

1. [Color inspiration](#)
2. [Match existing colors](#)
3. [Coblis — Color Blindness Simulator](#)



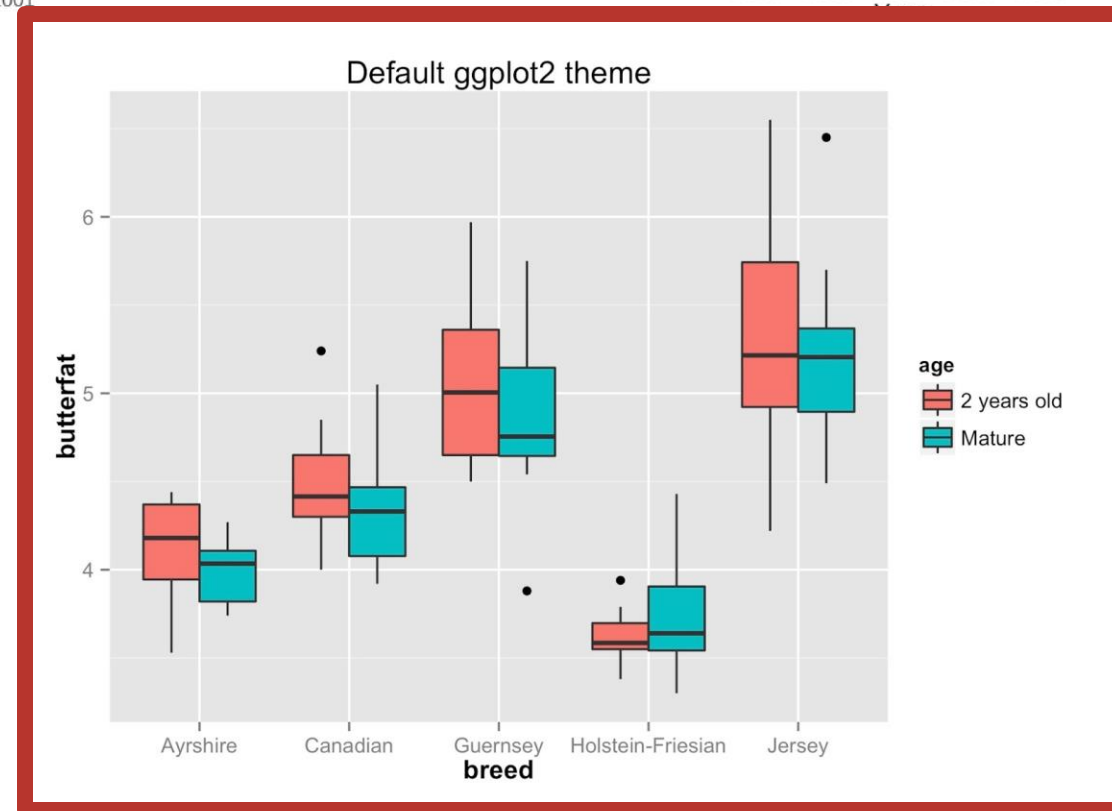
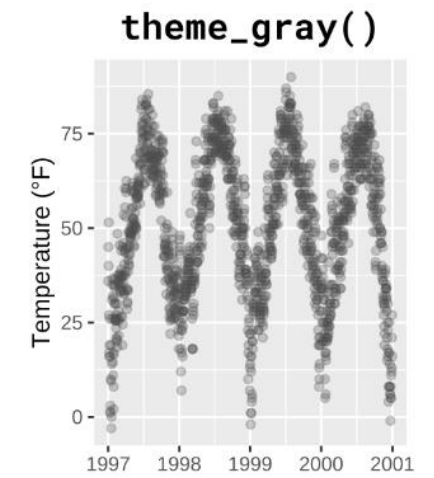
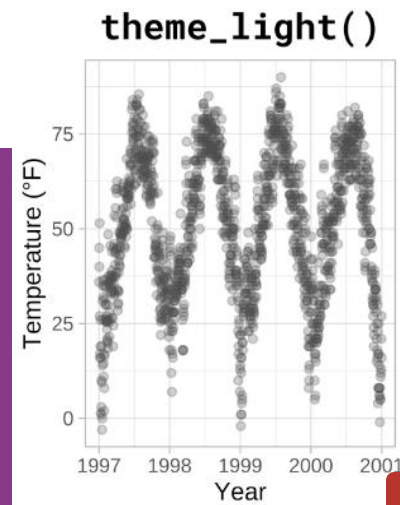
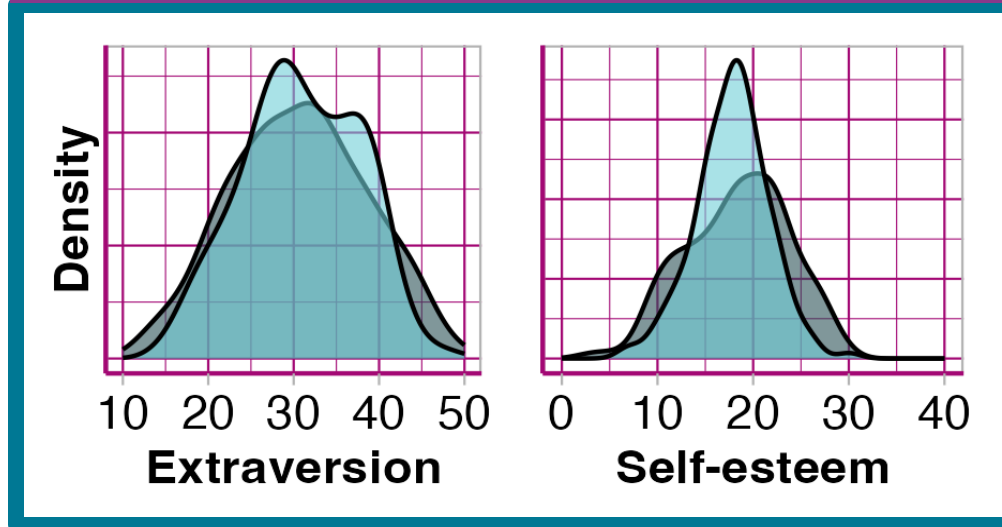
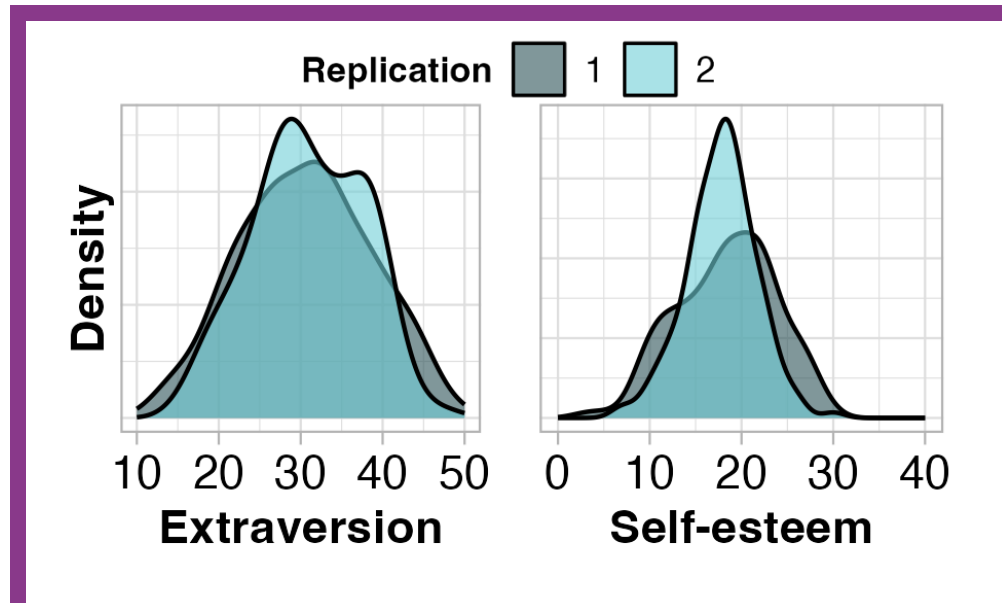


# Setting your theme





# Setting your theme



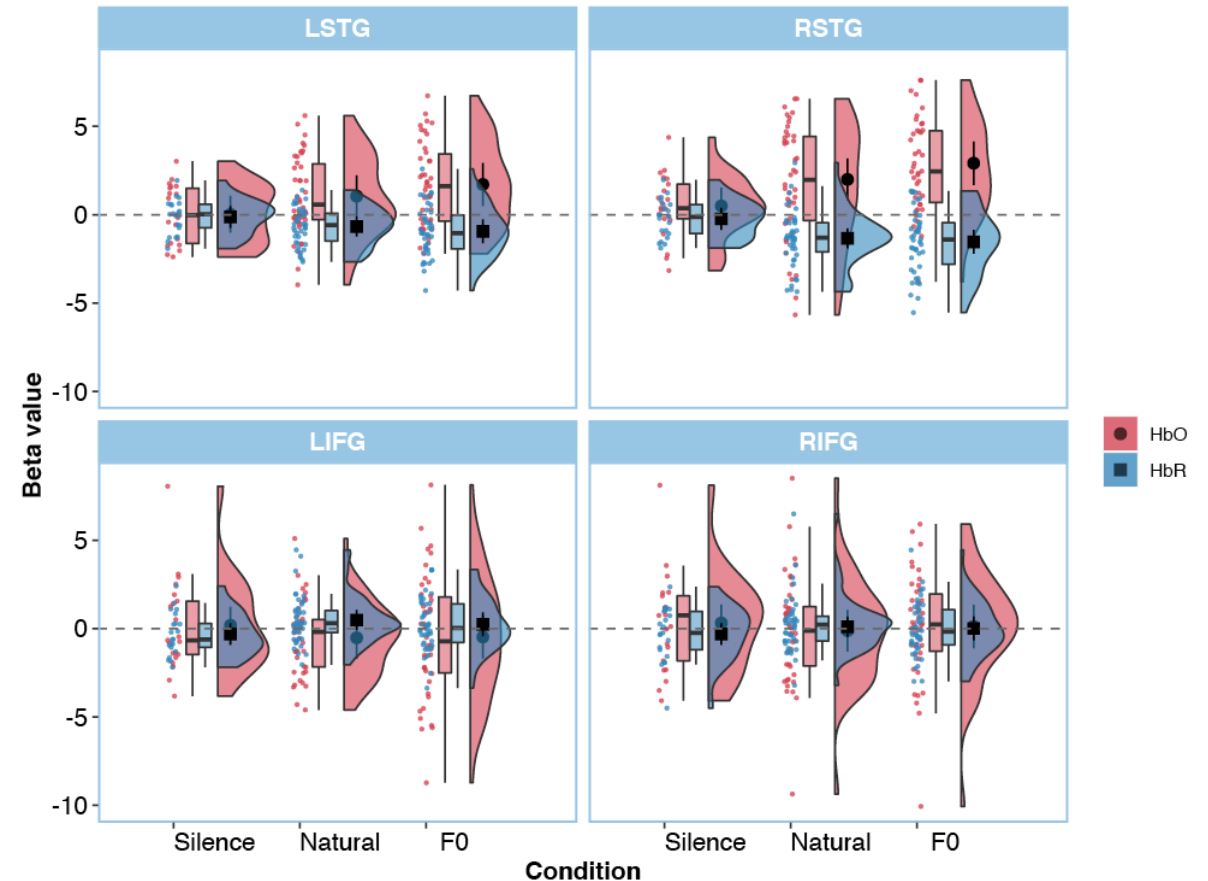
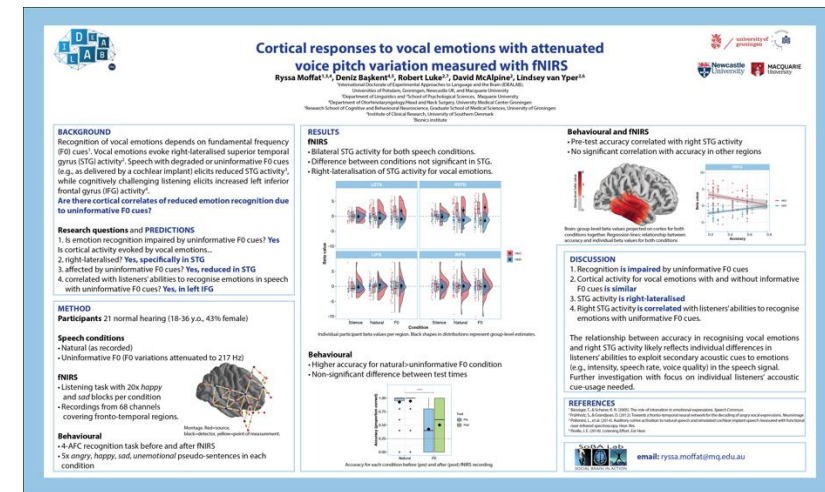
# Setting your theme

## Why?

- Aesthetically pleasing posters
- A unique "fingerprint"

## What kinds of components?

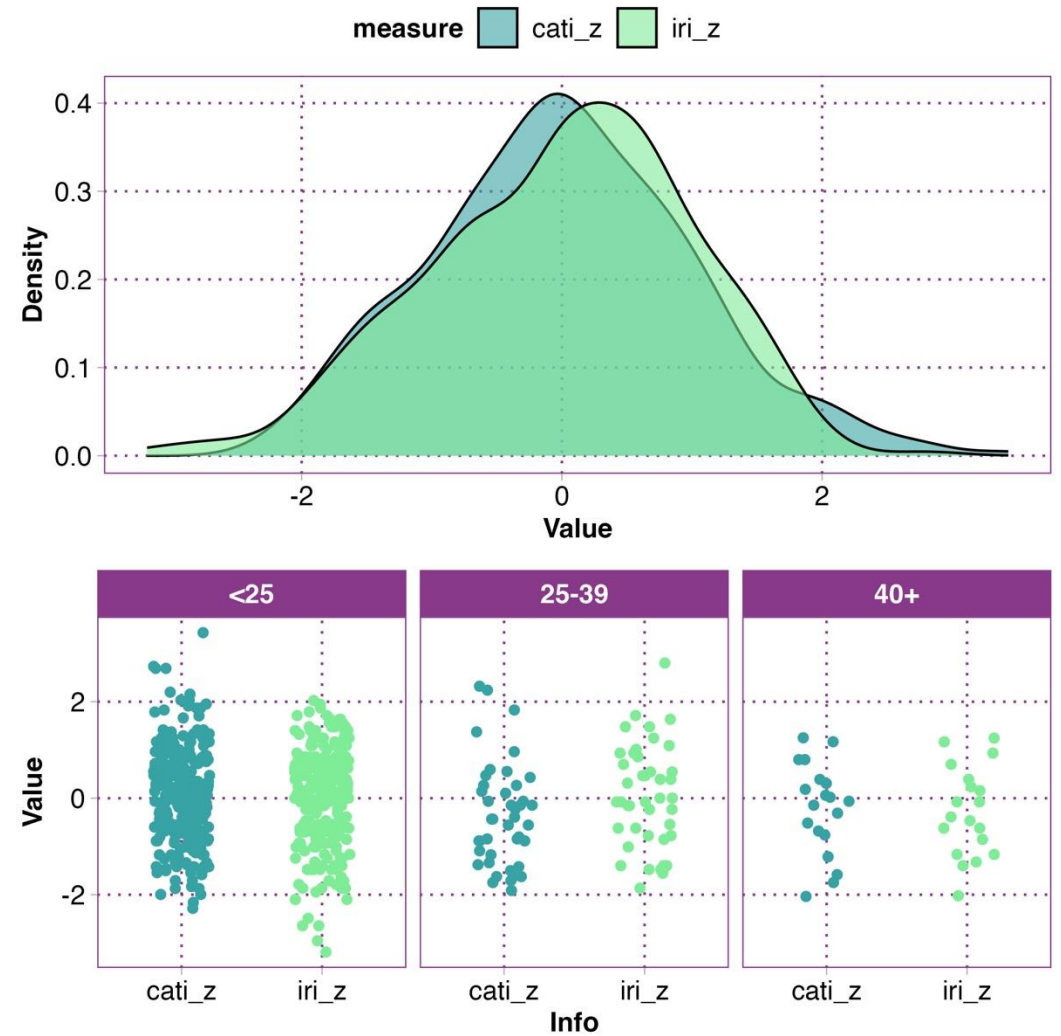
1. Font (face, size, color)
2. Background, panels
3. Axis labels + ticks
4. So much more!



# Composite figures

## ggarrange()

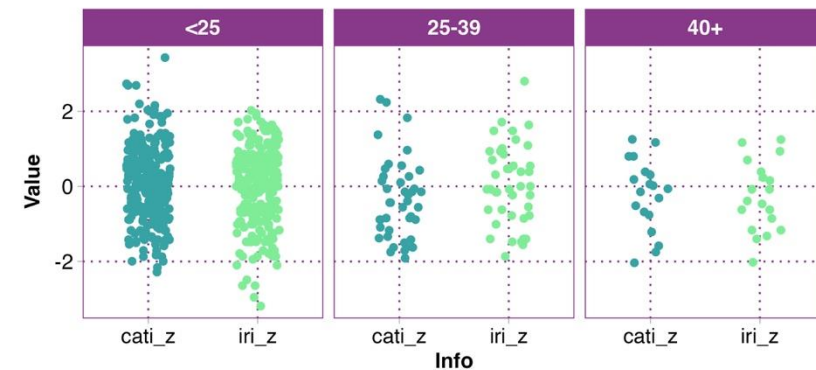
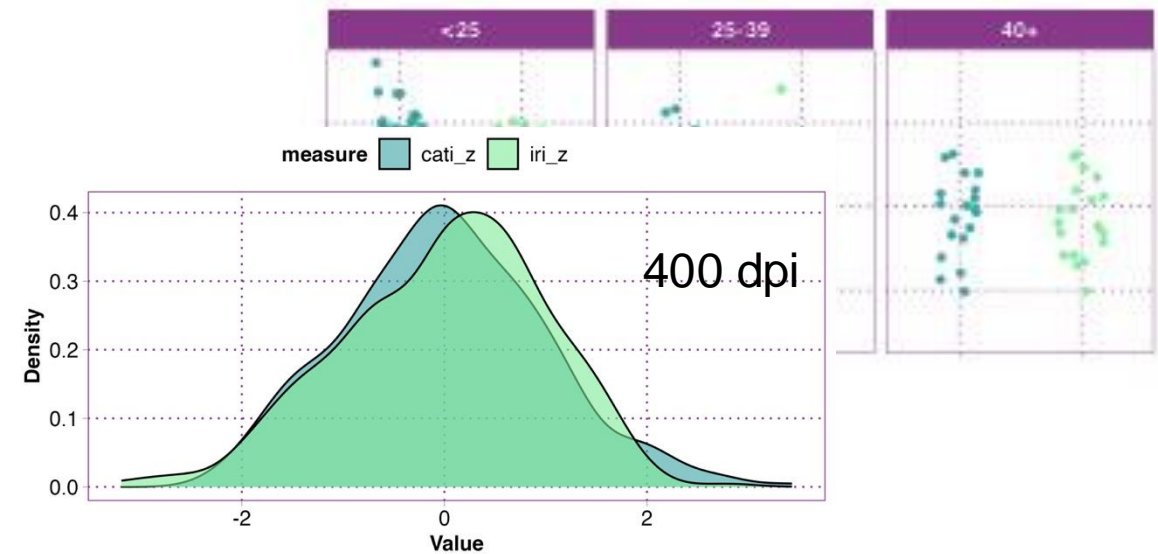
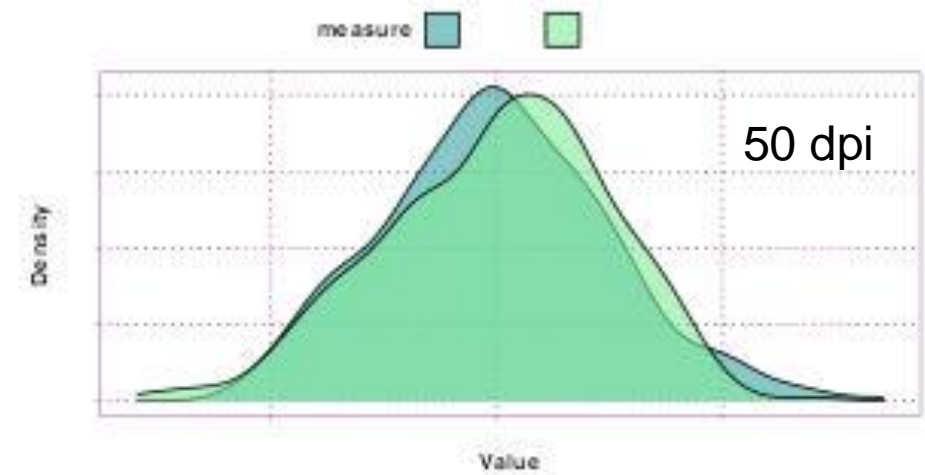
1. nrow/ncol
2. widths/heights
3. common legends



# Saving figures

## ggsave()

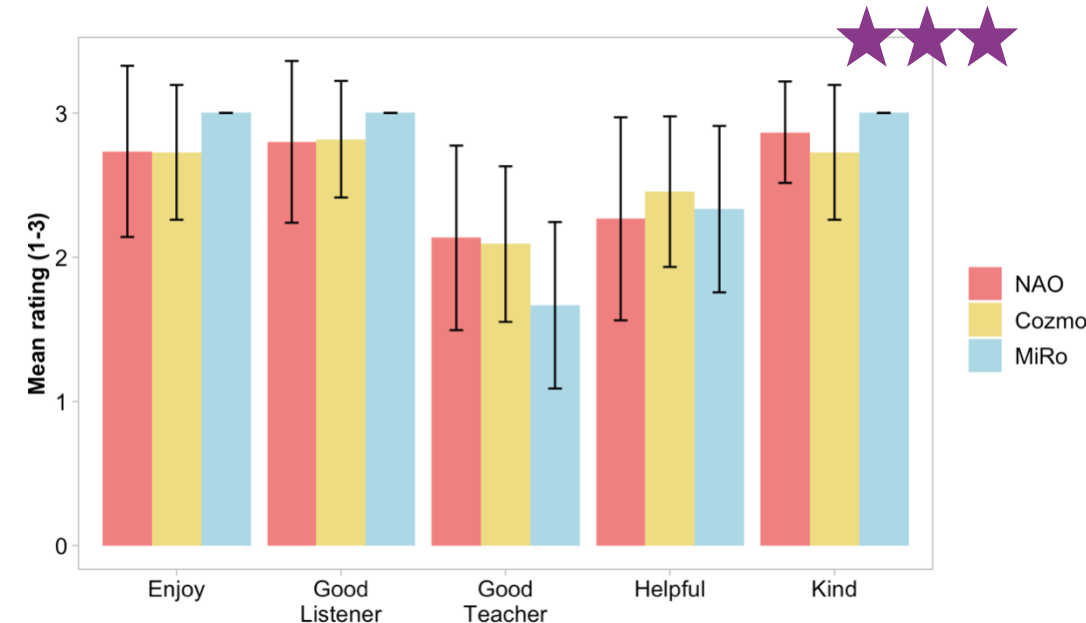
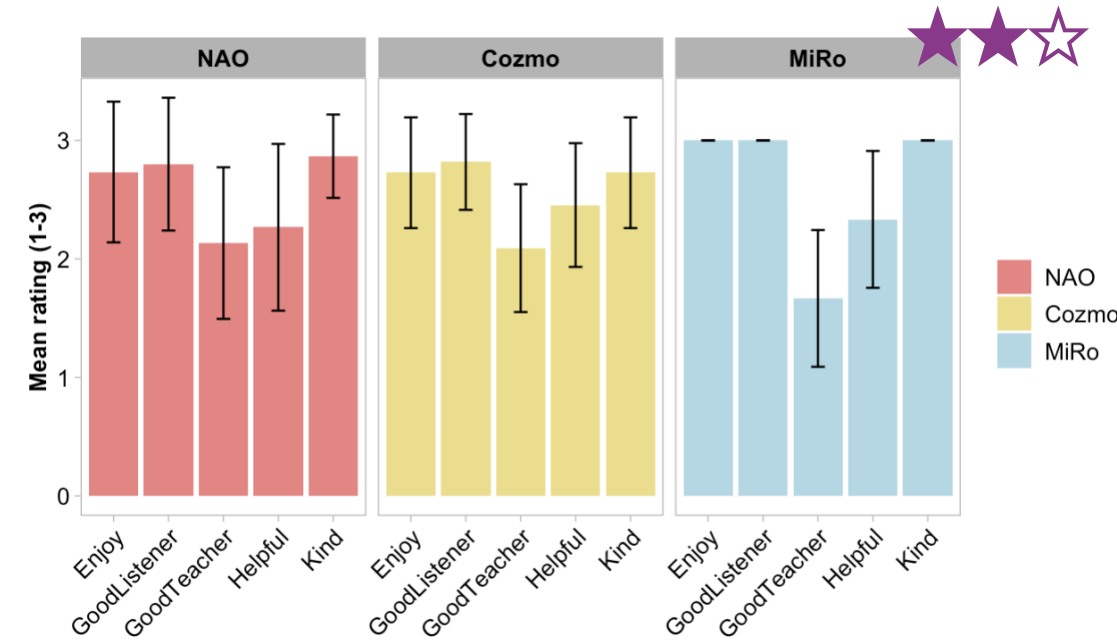
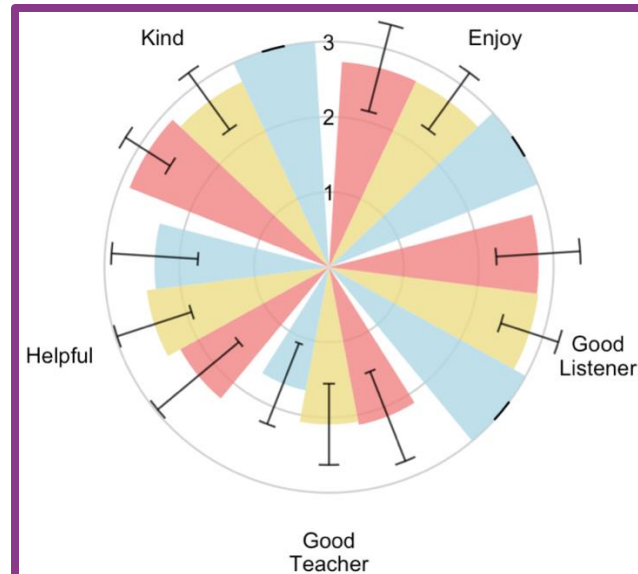
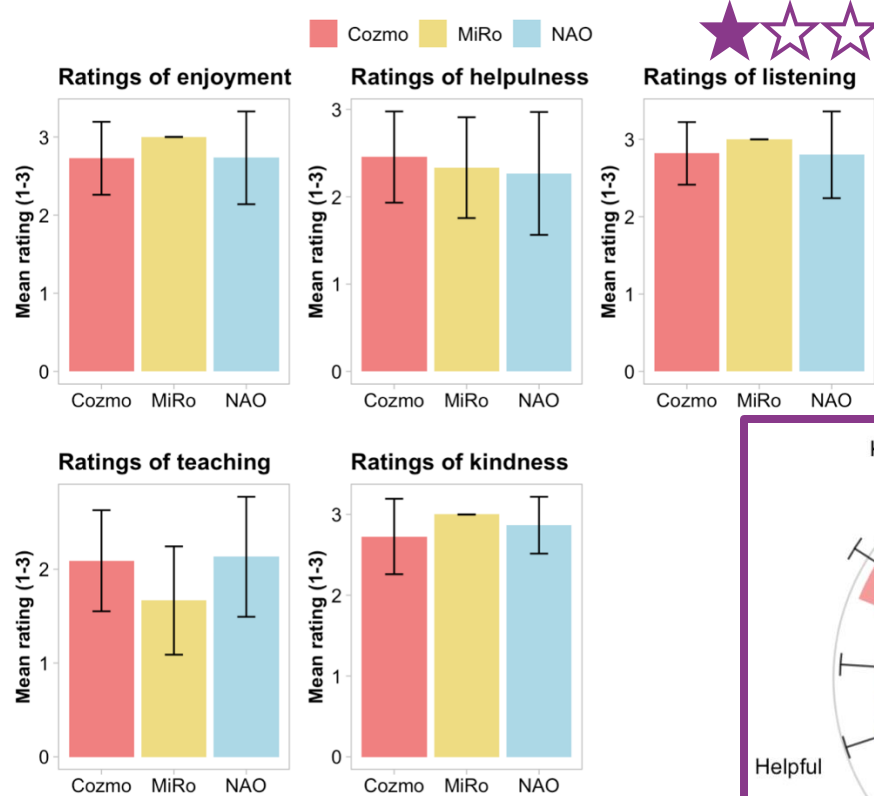
- Saves the last figure you ran
- Set resolution in DPI (dots per inch)
  - 300 minimum for print, more = better



# IMPORTANT STEPS

# Relevant comparisons & Redundancy

- Put things to be compared side by side
- Try to only have each label once





# Relevant comparisons & Redundancy

- Put things to be compared side by side
- Try to only have each label once

## QUESTIONS TO CONSIDER:

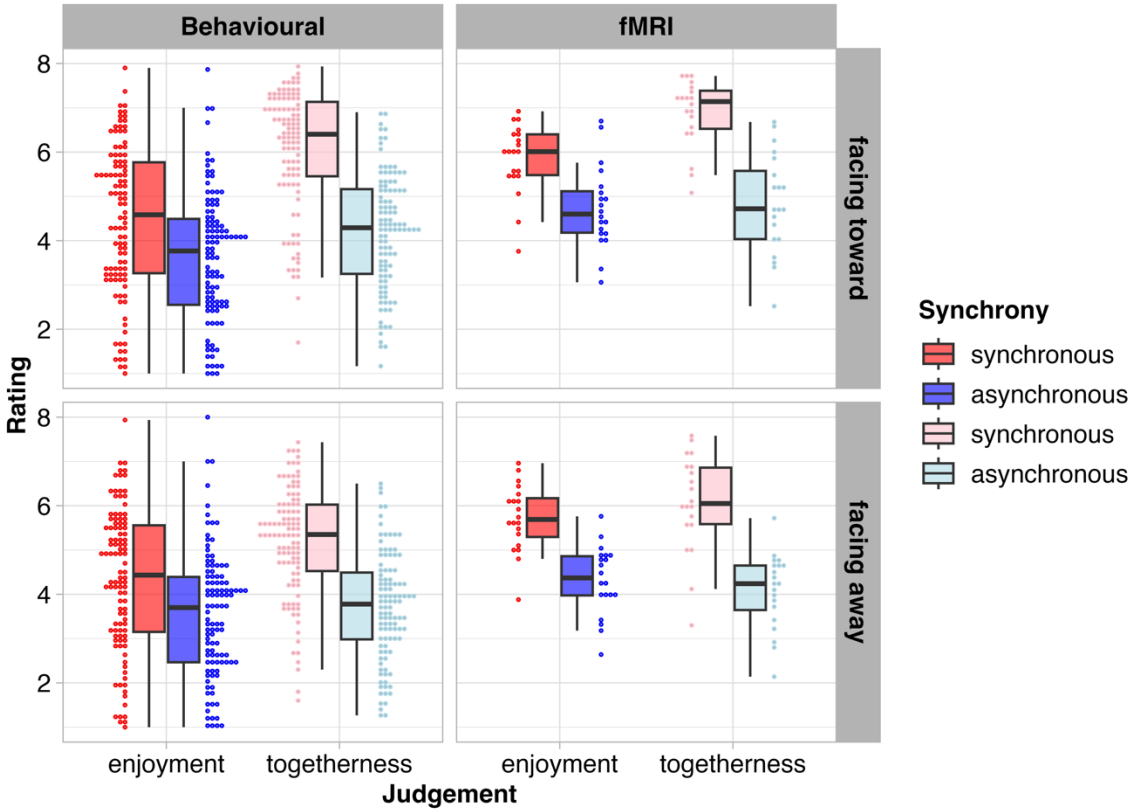
- Are the conditions/items to be compared described in one column?
- Do any columns have enough in common to be combined and described in a new column?
- Should the numeric information be simplified and shared as a table elsewhere?

# Relevant comparisons & Redundancy

- We have ratings on scale of 1-4 and ratings on scale of 1-8. How can we plot them together?

ID	synchrony	judgement	rating	experiment
Beh1	synchronous	enjoyment	4	behavioural
Beh2	asynchronous	togetherness	8	behavioural

ID	synchrony	judgement	rating	experiment
Fmri1	synchronous	enjoyment	1	fMRI
Fmri2	asynchronous	togetherness	2	fMRI

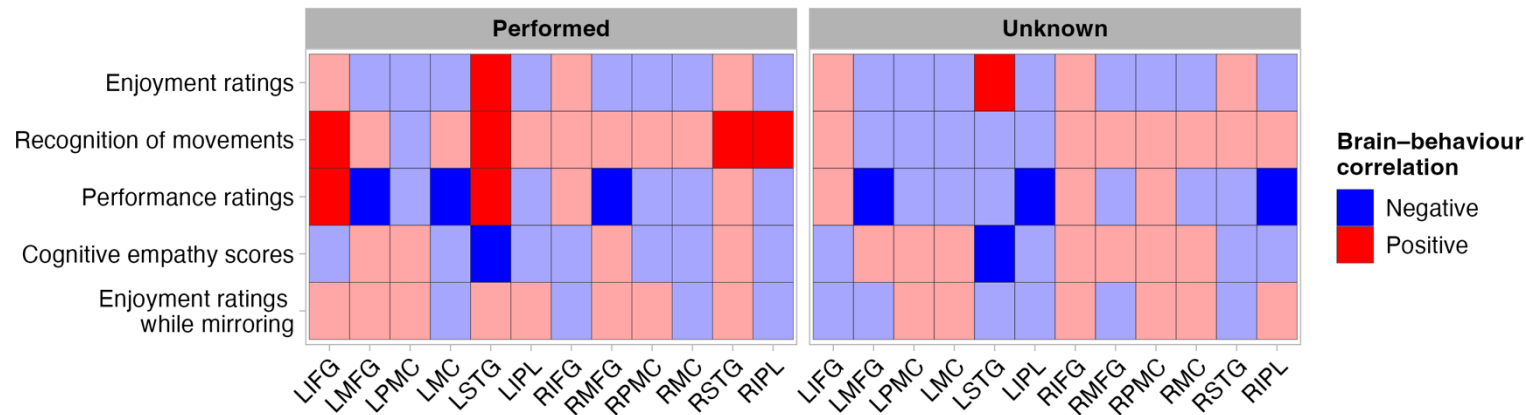


ID	experiment	synchrony	judgement	rating
Beh1	behavioural	synchronous	enjoyment	4
Beh2	behavioural	asynchronous	togetherness	8
Fmri1	fMRI	synchronous	enjoyment	2
Fmri2	fMRI	asynchronous	togetherness	4

# Relevant comparisons & Redundancy



- Simple heat maps can really help present multi-dimensional data.



Judgement/Measure	Condition	Brain area	Value	Significant	Direction
Enjoyment	Performed	LIFG	0.04	no	positive
Recognition	Performed	LIFG	0.6	yes	positive
Performance	Performed	LIFG	0.4	yes	positive
Empathy	Performed	LIFG	-0.01	no	negative
Mirroring enjoyment	Performed	LIFG	0.03	no	positive

# Relevant comparisons & Redundancy

- Pivoting longer and wider are almost always the solution.
- Typically long data is more useful for plotting.
- But sometimes, the data must get wider before it gets longer.

ID	Item	Value
S1	Group	A
S1	Pic1	0.5
S1	Pic2	0.2
S1	Pic3	0.1
S2	Group	B
S2	Pic1	0.8
S2	Pic2	0.3
S2	Pic3	0.1

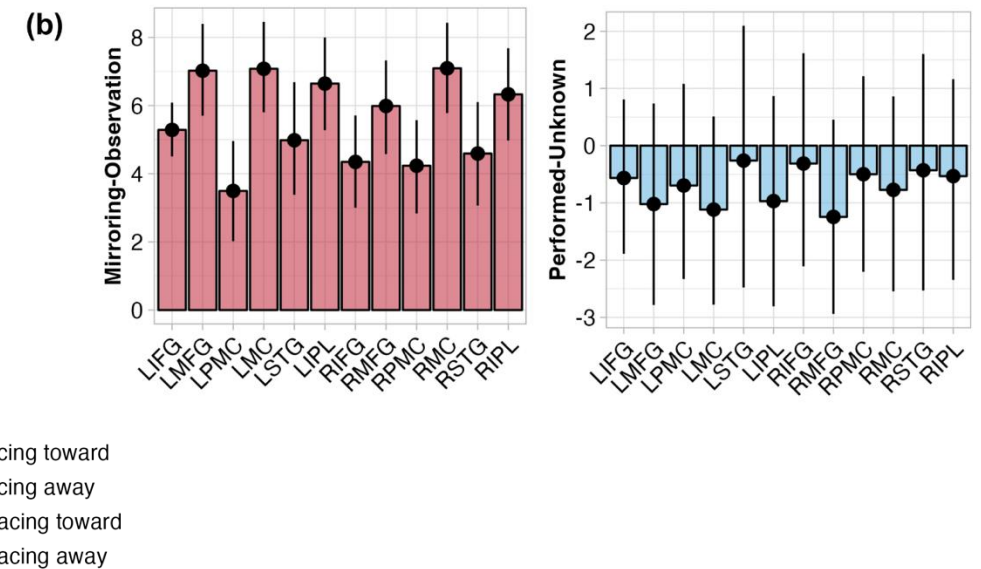
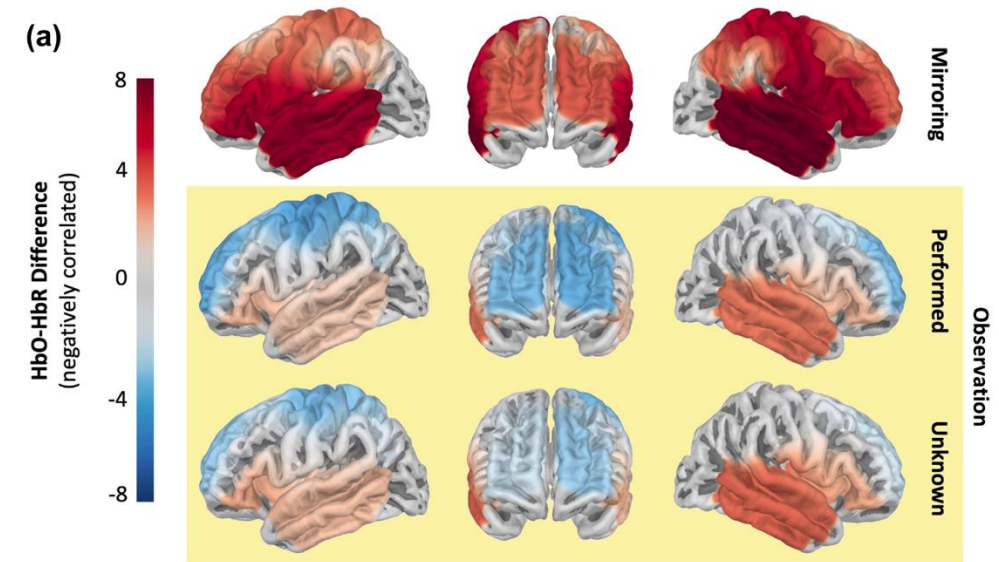
ID	Group	Pic1	Pic2	Pic3
S1	A	0.5	0.2	0.4
S2	B	0.8	0.3	0.1

ID	Group	Picture	Rating	Animate
S1	A	Pic1	0.5	animate
S1	A	Pic2	0.2	animate
S1	A	Pic3	0.3	inanimate
S2	B	Pic1	0.8	animate
S2	B	Pic2	0.3	animate
S2	B	Pic3	0.1	inanimate

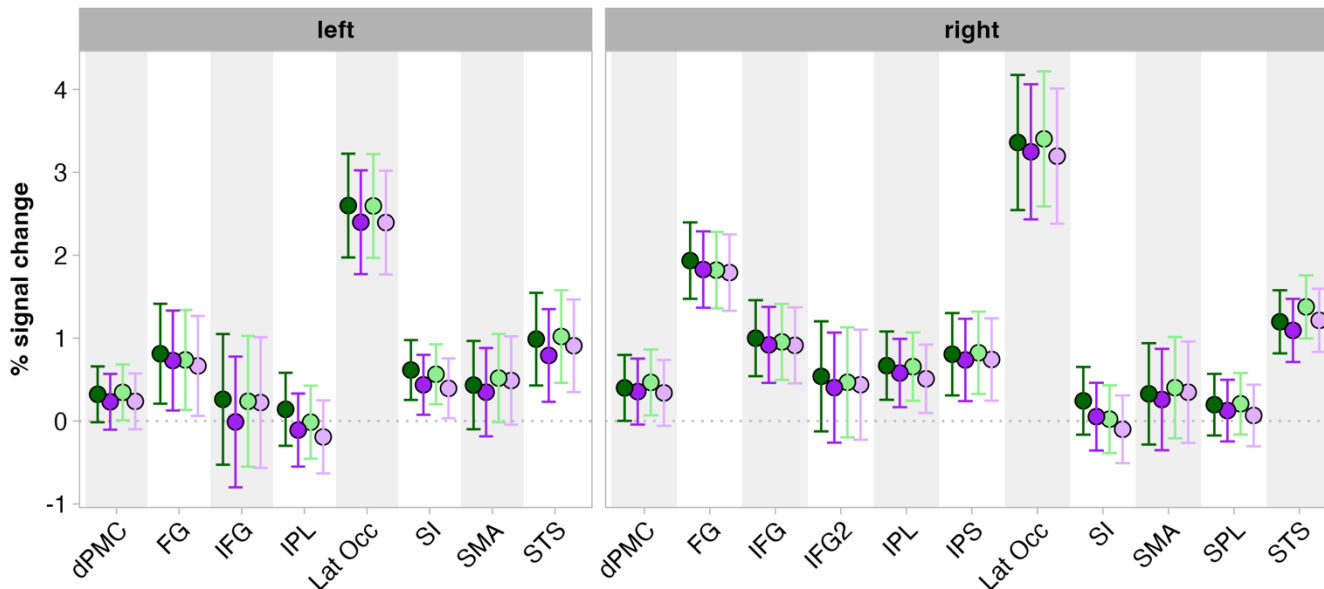
# EXCITING THINGS

# From models to plots

- Plotting raw data is **ALWAYS** the first step.
- Showing model parameter estimates and contrast estimates can also be helpful.



Action Observation Network (AON)





# 3D plots

## Plotly 3D plots!

