EJN European Journal of Neuroscience

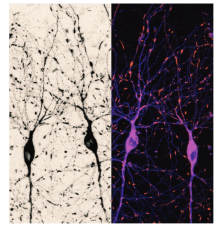
FENS Federation of European Neuroscience Societies

Graphical representations and statistical inferences

Guillaume Rousselet

Section editor, European Journal of Neuroscience

University of Glasgow, UK



FENS Friday EJN European Journal of Neuroscience

@robustgar

https://garstats.wordpress.com

EJN European Journal of Neuroscience

FENS Federation of European Neuroscience Societies

Accessibility?

(contrast, resolution, colourblind friendly)

http://www.cookbook-r.com/Graphs/Colors_(ggplot2)/

https://cran.r-project.org/web/packages/viridis/vignettes/intro-to-viridis.html

Understandability?

https://garstats.wordpress.com/2016/03/09/one-simple-step-to-improve-statistical-inferences/

EJN European Journal of Neuroscience

FENS Federation of European Neuroscience Societies

EJN European Journal of Neuroscience

FENS Federation of European Neuroscience Societies

European Journal of Neuroscience, pp. 1–5, 2016

doi:10.1111/ejn.13400

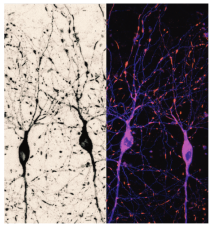
EDITORIAL
A few simple steps to improve the description of group results in neuroscience

Guillaume A. Rousselet,[1] **John J. Foxe**[2] and **J. Paul Bolam**[3]

[1]Institute of Neuroscience and Psychology, College of Medical, Veterinary and Life Sciences, University of Glasgow, 58 Hillhead Street, Glasgow G12 8QB, UK

[2]Department of Neuroscience,The Ernest J. Del Monte Institute for Neuroscience, University of Rochester School of Medicine and Dentistry, Rochester, NY, USA

[3]MRC Brain Network Dynamics Unit, Department of Pharmacology, University of Oxford, Oxford, UK

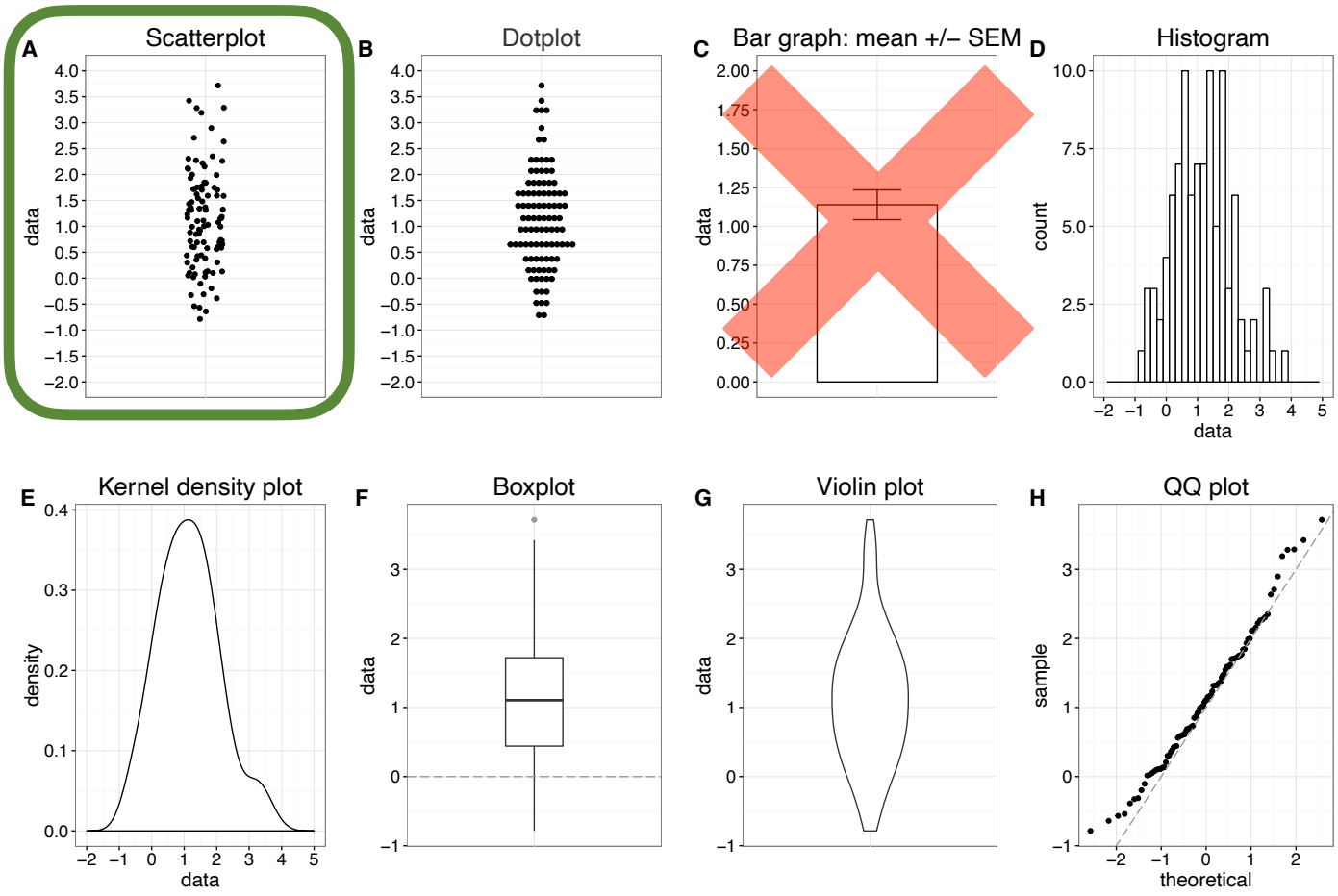


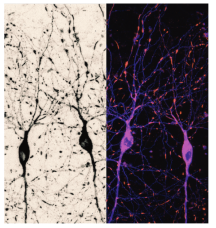
FENS Friday EJN European Journal of Neuroscience

https://onlinelibrary.wiley.com/doi/full/10.1111/ejn.13400

EJN European Journal of Neuroscience

FENS Federation of European Neuroscience Societies



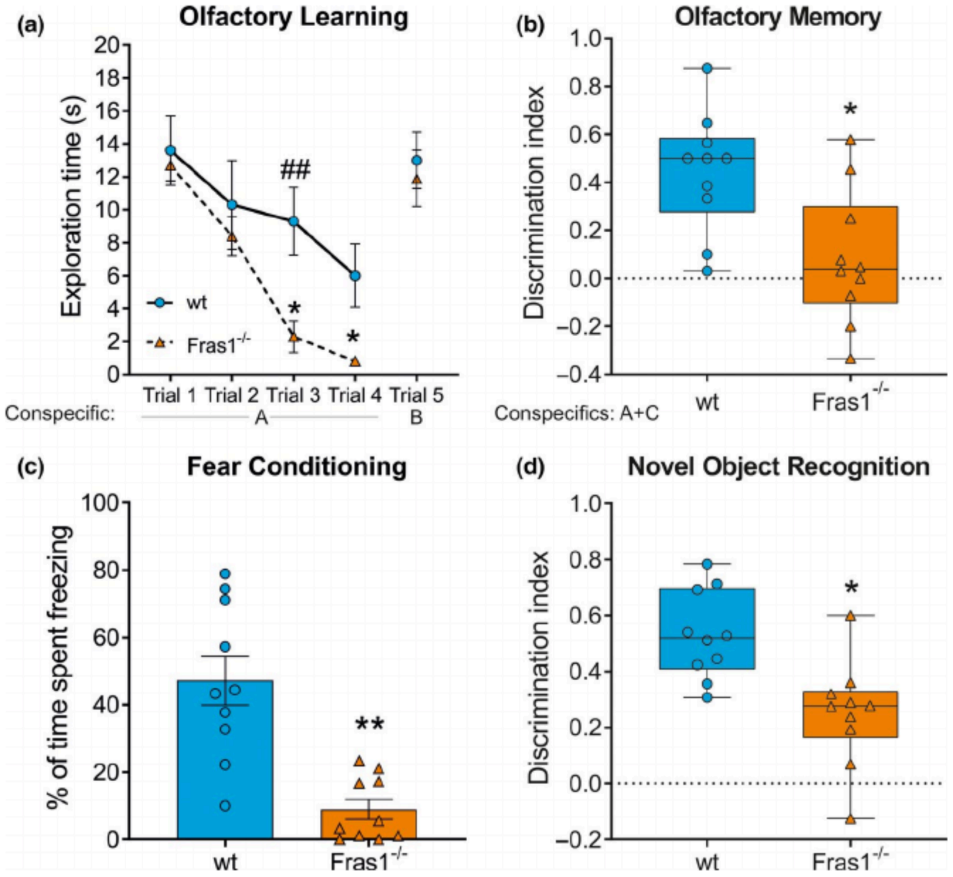


FENS Friday EJN European Journal of Neuroscience

EJN European Journal of Neuroscience

FENS Federation of European Neuroscience Societies

Use consistent formatting

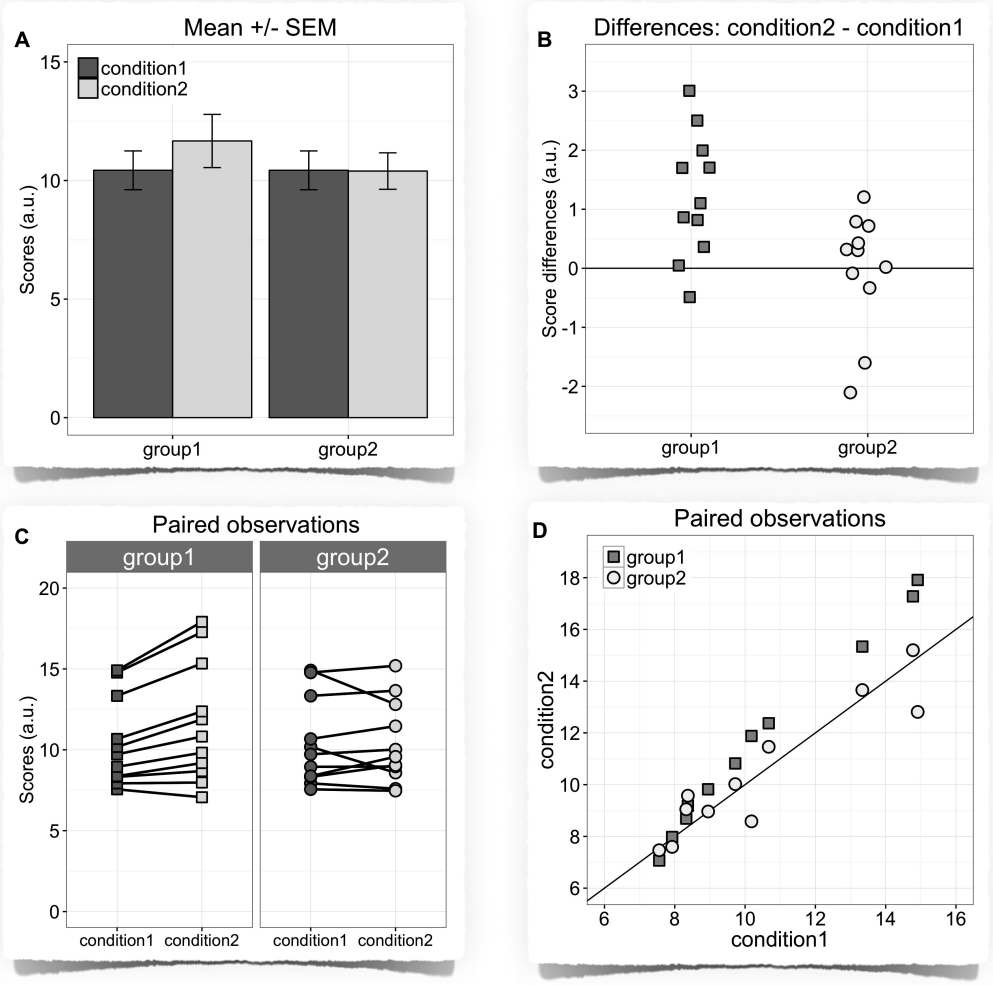


Match figures to analyses

Kalpachidou et al. *Eur J Neurosci*. 2021; 53: 3905– 3919. https://doi.org/10.1111/ejn.14759

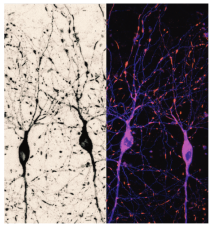
EJN European Journal of Neuroscience

FENS Federation of European Neuroscience Societies



More than one figure to make sense of the data

Beyond differences in means: robust graphical methods to compare two groups in neuroscience
Rousselet et al. 2017 (https://onlinelibrary.wiley.com/doi/10.1111/ejn.13610)



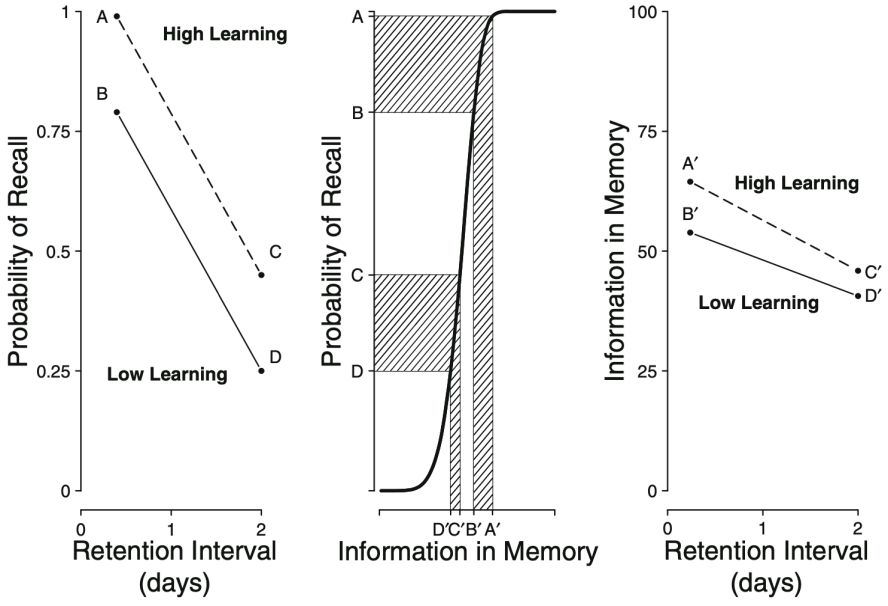
FENS Friday EJN European Journal of Neuroscience

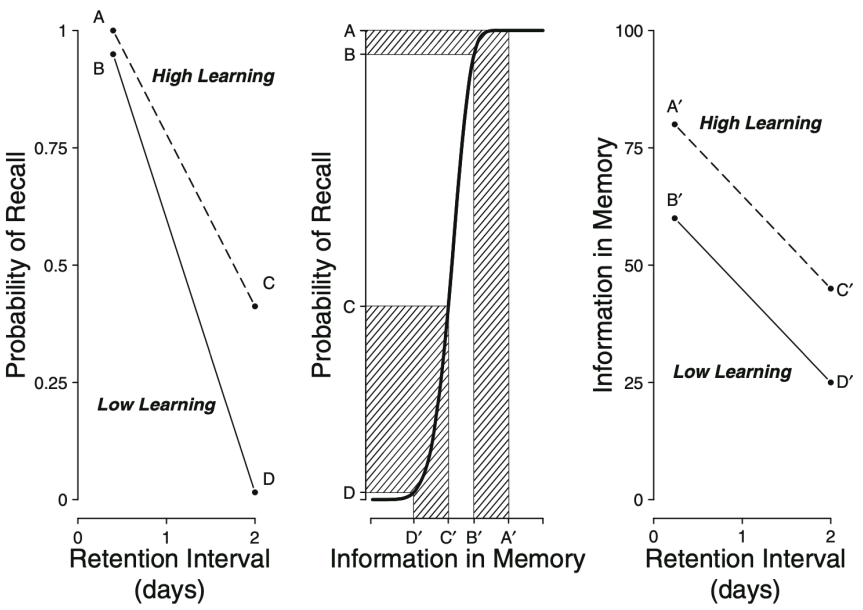
Rousselet, Foxe & Bolam *EJN* 2016

EJN European Journal of Neuroscience
FENS Federation of European Neuroscience Societies

Removable interaction?

Loftus, Geffrey R. 1978. On interpretation of interactions. *Memory & Cognition* 6(3). 312-319.





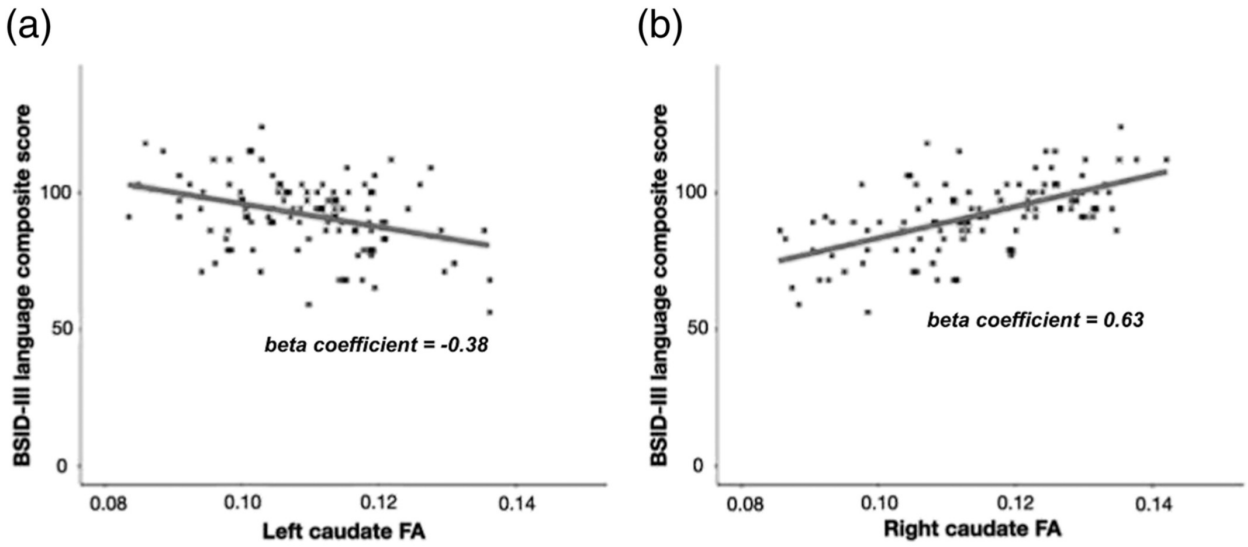
Wagenmakers *et al. Mem Cogn* **40,** 145–160 (2012). https://doi.org/10.3758/s13421-011-0158-0
Blog post: https://janhove.github.io/analysis/2019/08/07/interactions-logistic

EJN European Journal of Neuroscience

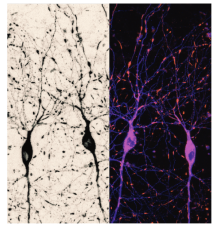
FENS Federation of European Neuroscience Societies

Interaction fallacy

Erroneous analyses of interactions in neuroscience: a problem of significance.
Nieuwenhuis et al. 2011 (https://www.nature.com/articles/nn.2886)



Interaction implied but not tested



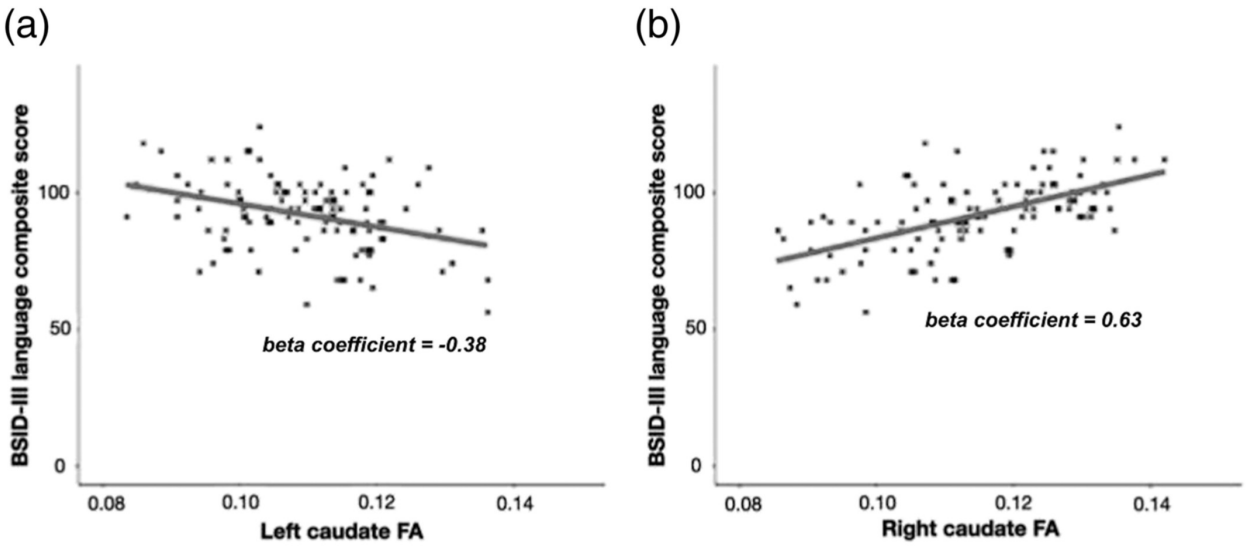
FENS Friday EJN European Journal of Neuroscience

Tan et al. *Eur J Neurosci.* 2021; 54: 4621– 4637. https://doi.org/10.1111/ejn.15347

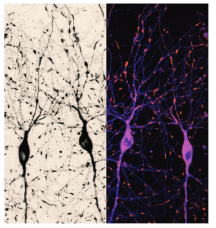
EJN European Journal of Neuroscience

FENS Federation of European Neuroscience Societies

Illustrate all results, whatever the p value



9 correlations reported; only 2 illustrated!



Tan et al. *Eur J Neurosci.* 2021; 54: 4621– 4637. https://doi.org/10.1111/ejn.15347

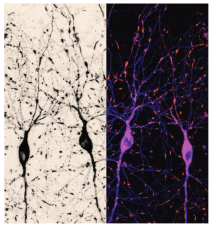
FENS Friday EJN European Journal of Neuroscience

EJN European Journal of Neuroscience

FENS Federation of European Neuroscience Societies

TABLE 1. Participant information

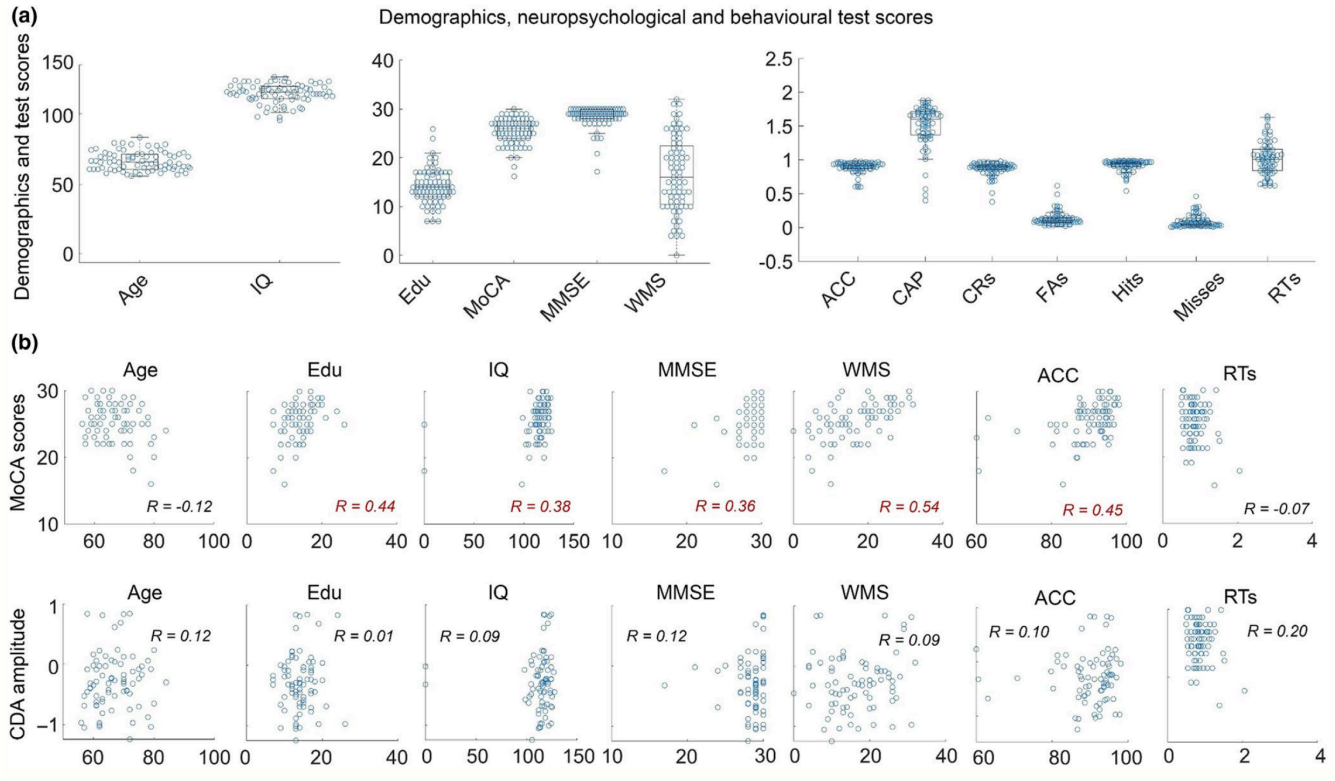
Particulars	ASD mean (range)	TD mean (range)
Gender ratio (male:female)	14:6	11:10
Age in years	22.40 (16–33)	21.09 (16–32)
VIQ	110.70 (70–140)	118.85 (100–136)
PIQ	104.5 (87–122)	110.33 (80–131)
FSIQ	111.15 (76–134)	118.48 (93–130)
STAI		
State anxiety	45.20 (31–72)	39.29 (23–56)
Trait anxiety	57.00 (39–75)	42.95 (6–61)



FENS Friday EJN European Journal of Neuroscience

EJN European Journal of Neuroscience
FENS Federation of European Neuroscience Societies

A graphical alternative to table 1…

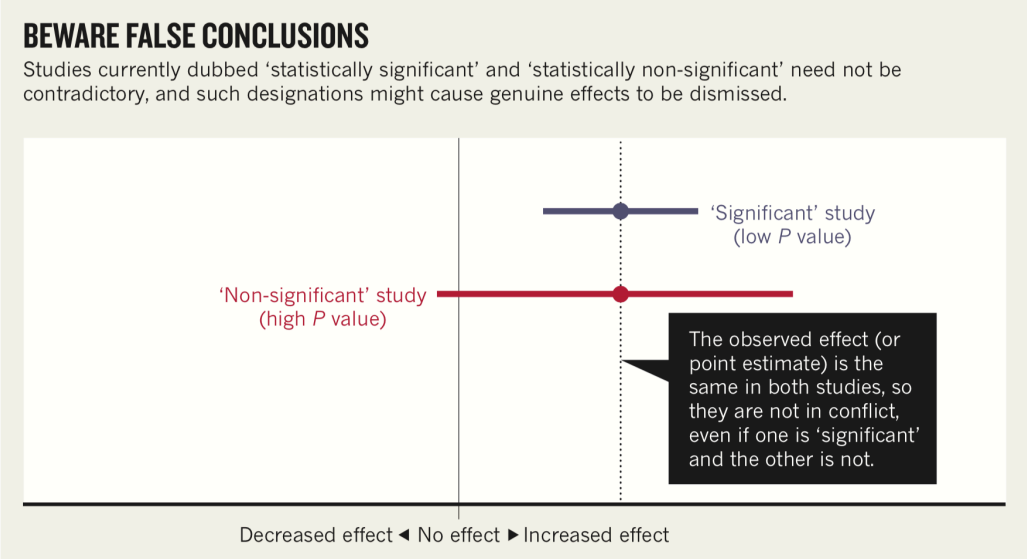


Farina et al. *Eur J Neurosci*. 2020; 51: 2367– 2375. https://doi.org/10.1111/ejn.14652

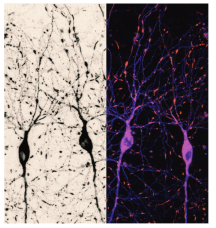
EJN European Journal of Neuroscience

FENS Federation of European Neuroscience Societies

"Our effect is (in)consistent with previous results"



Amrhein, Greenland, and McShane (2019) **Scientists Rise up against Statistical Significance**. *Nature*



FENS Friday EJN European Journal of Neuroscience

EJN European Journal of Neuroscience

FENS Federation of European Neuroscience Societies

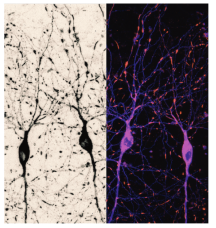
Make a lot of figures!

Share your data and your code!

- informed reviewing process

- increased impact and trustworthiness

figshare



FENS Friday EJN European Journal of Neuroscience

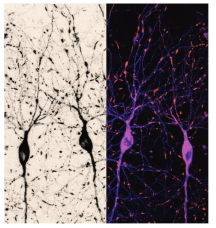
EJN European Journal of Neuroscience

FENS Federation of European Neuroscience Societies

NEXT: **Alberto Antonietti**

[Blue Brain Project/EPFL in Geneva, Switzerland]

Bioimages: common problems and pitfalls in publications



FENS Friday EJN European Journal of Neuroscience