

# Methods for Reliable, Transparent, and Open Science

Jeff Rouder & Joachim Vandekerckhove

## Methods for Reliable, Transparent, and Open Science

### Week 1: Overview (Rouder)

- **In class** — Jeff Rouder, *Teaching Open Science*. Available [here](#).
- **In class** — Brene Brown, *The power of vulnerability*. Available [here](#).
- **Watch after class** — Brene Brown, *Why your critics aren't the ones who count*. Available [here](#).
- **Write** (due next week) — *Reflections on vulnerability and self-compassion*. — This is for you. You can write as much or as little as you want. It is your chance to reflect as you wish. This assignment is not graded; it is not even evaluated. I am grateful for your consideration.

### Week 2: What Went Wrong: Learning From other people's Mistakes (Vandekerckhove)

Mistakes. Mistakes. We review how people fool themselves, and addressing these mistakes motivates much of the rest of the course!

- **Read** — Stephanie Lee (on Brian Wansink), Here's how a controversial study about kids and cookies turned out to be wrong — and wrong again. *Buzzfeed*. Available [here](#).
- **Read** — Victoria Stern (on Brad Bushman), Dispute over shooter video games may kill recent paper. *Retraction Watch*. Available [here](#). Updated: Ohio State revokes PhD of co-author of now-retracted paper on shooter video games. *Retraction Watch*. Available [here](#).
- **Read** — Yudhijit Bhattacharjee (on Diederik Stapel), The mind of a con man. *New York Times*. Available [here](#).

- **Read** — Wicherts, J., Borsboom, D., Kats, J., & Molenaar, D. (2006). The poor availability of psychological research data for reanalysis. *American Psychologist*, 61(7), 726-728. Available [here](#).
- **Read** — Sutcliffe, K. M. (2011). High reliability organizations. *Best Practice & Research Clinical Anaesthesiology*, 25(2), 133-144. Available [here](#).
- **Write** (due next week) — *My high reliability lab*. — Each lab has practices that fall under the umbrella “highly reliable organizations.” Write a well-organized and formatted document about how some of the practices in your lab meet the principles and how they do not. 500 words max.

### Week 3. Preregistration and Open Science (Vandekerckhove)

There are many little decisions that people must make in performing research. These decisions are often made quickly, sometimes without much thought, and sometimes without awareness that a decision has been made. To the extent that these little decisions tend to go in a preferred direction, they may be thought of as subtle biases. Preregistration helps bring these decisions into the light where they may be critically examined. In-class discussion will focus on the limitations of preregistration. Is it ever not useful? Is it ever not possible? Is it ever damaging?

- **Bring** — Details of your next experiment (or of a past one; IRB applications encouraged!).
- **Discuss** — Chambers, C., Munafò, M., et al. (2013). Trust in science would be improved by study pre-registration. *The Guardian*. Available [here](#).
- **Discuss** — Wagenmakers, E.-J., Wetzels, R., Borsboom, D., van der Maas, H.L.J., & Kievit, R.A. (2012). An agenda for purely confirmatory research. *Perspectives on Psychological Science* 7(6), 632–638. Available [here](#).
- **Discuss** — Vandekerckhove, J., & Wagenmakers, E.-J. (2016). C. S. Peirce on the Crisis of Confidence and the “No More Bets” Heuristic. *The Winnower*, 4843. Available [here](#).
- **Discuss** — Nosek, B. A., Ebersole, C. R., DeHaven, A. C., & Mellor, D. T. (2017). *The Preregistration Revolution*. Available [here](#).
- **Read** — Corker, K. (2016). *So you want to pre-register a study*. Available [here](#).
- **Read** — *The Preregistration Challenge*. Available [here](#).
- **Read** — Soderberg, C. K. (2018), Using OSF to share data: A step-by-step guide. *Advances in Methods and Practices in Psychological Science*. Available [here](#).

- **Write** (due next week) — *Look I did a thing.* — Prepare a preregistration on OSF and share it with the class (you don't need to make it public or lock it down).

#### Week 4. Expanding The Document (Vandekerckhove)

The traditional document has been thought of as output. We find that sometimes people do not write what they do. Here we stress the concept of a document as a process. Documents are executed much like a program, and when they are, data are pulled, analyses are performed, graphs are drawn, tables are tabulated, and equations are typeset. The process of all these things is encoded in the document.

- **Write** — *Powered by the cloud.* — Place some data on OSF. Write an Rmd, Swv, or similar document that pulls data from OSF and produces some output for them that is integrated into a text. The exact analysis or text are not important.

#### Week 5. Versioning: git push (Rouder)

Every lab encounters the clutter of having multiple, evolving versions of work products. How do you deal with versioning? We present different version strategies including the gold standard — git.

#### Week 6. Working With Collaborators (Vandekerckhove)

Working with collaborators is hard because they change our awesome text. How do you work constructively, productively, and mistake free with people you kind of resent having to talk to? What makes an interesting collaboration?

- **Read** — Watts, D. (2017). Should social science be more solution-oriented? *Nature Human Behavior*, 1, 15. Available [here](#).
- **Write** — *The latest in automation.* — Place your paper (from Week 4) on Overleaf. Write a git script to make changes to text and figures. Place your analysis on CodeOcean and run it.

#### Week 7. Computational Lab Skills: Linux/SQL/Python/Bash (Vandekerckhove)

Computers don't make mistakes; people do. So never ask a person to do a dumb, repetitive task when a computer can do it better! This lecture is about working with scripts to automate tasks.

- **Write** — *GUIs? We don't need no stinkin' GUIs!* — Write a script to pull your paper off Overleaf, add the current time and date, render it to PDF, and upload the finished file to OSF and back to Overleaf.

### **Weeks 8–9. Relational Databases (Rouder)**

In these two weeks, we study perhaps the most useful technology for organizing a lab, relational databases.

### **Week 10: Hack a Lab! (Rouder)**