

# Open Research Practices

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## Story Time!

Bargh, J. A., Chen, M., & Burrows, L. (1996). Automaticity of social behavior: Direct effects of trait construct and stereotype activation on action. *Journal of Personality and Social Psychology*, 71(2), 230 – 244.

DOI: <https://doi.org/10.1037/0022-3514.71.2.230>

Florida, bingo, forgetful, lonely, retired

What went wrong???

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## The Reproducibility

# CRISIS

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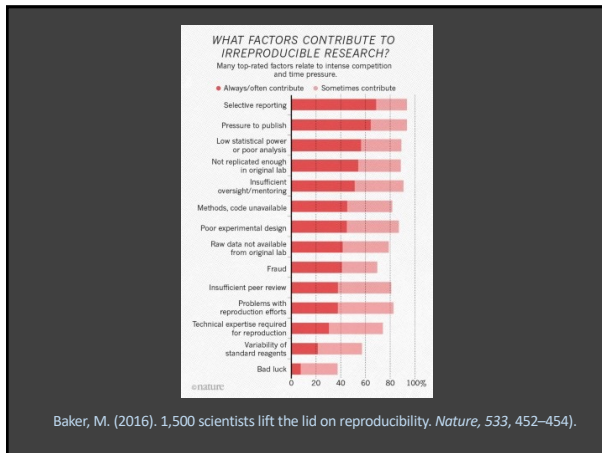
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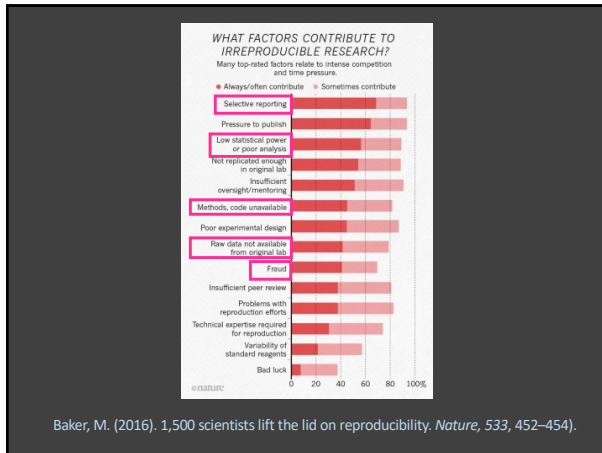
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## Open Research Practices

- What is Open Research?
- Why Open Research?
- Open materials
- Open data
- Open access
- Preregistration and registered reports
- Using the Open Science Framework (OSF)
- Transparency statements
- Discussion: Ethical issues in open research
- Discussion: Why *not* open research?

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### What is Open Research?

- Carrying out research in a transparent manner. This can include:
  - Making research materials and data readily available
  - Archiving data in a way that allows others to reuse it
  - Providing scripts to allow data analyses to be replicated
  - Publicly committing to research hypotheses and recording them before data is collected
  - Carrying out and reporting statistical power calculations

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### What is Open Research?

- Accountability to public
- Accountability to other researchers
- Accountability to *yourself*

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### What is Open Research?

- Promotes collaboration across research groups
- Facilitates revisiting data collected at an earlier time, or by other people
- Systematically and publicly archive your research materials
- Facilitates dissemination of your research

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## Why Open Research?

- Compliance with funders
  - Since 2008 (CIHR) and 2015 (NSERC and SSHRC) the tri-agency has required researchers to make articles reporting research funded by a tri-agency grant freely available
  - As of 2023, universities that accept tri-agency funding are required to have a Research Data Management strategy
    - Researchers are required to archive research data so that it can be accessed by other researchers when such access is legitimately sought
    - An exception is carved out for data collected by or with Indigenous peoples, who can decide for themselves whether and how to archive data

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## Open Materials

- In many research areas, it is possible to allow online access to various research materials
  - Computer code
  - Images/video and audio recordings
  - Document scans or scans of books
  - Training sets
  - Procedure manuals
  - Anything else that can be shared digitally
- This reduces replication error and allows other researchers to critically evaluate choice of materials
- It also makes the best use of materials that may have been expensive to produce

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## Open Data

- Researchers have always been ethically-bound to share their data with other researchers, where not precluded by patents, confidentiality agreements, etc.
- Sharing data ensures that others can check the accuracy of published results
- It also prevents more resources from being expended to collect data that has already been collected to answer a research question

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## Open Data

- The Dr. John Archer library is responsible for identifying and educating researchers on options available for U of R researchers to share data
- Researchers at the U of R can share their data through the Borealis Dataverse or, for larger data sets, the Federated Research Data Repository
- Or, researchers can archive their data in another manner consistent with FAIR principles (**F**indable, **A**ccessible, **I**nteroperable, **R**eusable)

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## Open Data

- **Findable:** Data are accompanied by metadata that allows them to be found using keywords
- **Accessible:** Instructions are provided about what kind of permissions/authorization is required to actually be allowed to retrieve the data
- **Interoperable:** The data that are retrieved are in a representation system ("language") that is common enough that they can be integrated with other data
- **Reusable:** To be reusable, it needs to be clear how and why the data were obtained/generated in the first place

Source: <https://www.go-fair.org/fair-principles/>

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## Open Access

- Researchers funded by tri-agency grants are required to make preprints of their publications freely available
- This can be done in one of two ways:
  - 1) Publish in an open access journal (usually costs \$\$\$)
  - 2) Archive the final, accepted *unpublished* version of the manuscript in a repository
- U of R researchers are encouraged to archive their work in the **oURspace** digital repository
- All Master's and PhD theses at the U of R are housed in oURspace, and in the National Library of Canada

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## Preregistration and Registered Reports

- One of the key contributors to the reproducibility crisis is 'p hacking'
- **Preregistration** of hypotheses clarifies what was (truly) predicted in advance, and what was discovered through exploring the data
- Preregistration is time-stamped so that other researchers can compare date on data files to date of preregistration

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## Preregistration and Registered Reports

- A **registered report** is an alternative to the traditional research article that rewards transparency
- Researchers with a good idea write the Introduction and Method sections of their reports along with a plan for analyzing the data
- This then undergoes peer review (usually multiple rounds)
- Once accepted by the Editor, the author begins data collection
- The agreement is, no matter how the data turn out, as long as the researcher sticks to the plan the paper will be published

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## Using the Open Science Framework

- The Open Science Framework is a resource provided to researchers for free by the non-profit Open Science Foundation
- Materials can be housed here permanently, using a consistent and standardized organization
- Because OSF acts as a permanent repository, researchers can publish a persistent URL in their paper that links to their materials or data

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## Transparency Statements

- ChatGPT! Ever heard of it?
- Funders, journals, and course instructors vary with respect to how much use of AI and AI-powered tools they will allow
- Before using ANY AI tool to assist you with your research, you MUST get your supervisor's permission!!!!
- If you are collaborating with others, they need to be made aware of which AI tools you intend to use and how you intend to use them

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## Transparency Statements

- **If** you are allowed to use the tool, you need to clarify in a transparency statement how the tool was used
- Your statement should specify the names of all tools used, including writing assistance tools like Grammarly, Quillbot, and so on
- For each tool, you should explain how the tool was used

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## Transparency Statements

- Common tasks that can be enhanced or carried out entirely by AI tools are:
  - Summaries of research articles
  - Formatting of references
  - Generation of article templates/outlines
  - Translation
  - Proofreading
  - Data analysis
  - Image production

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## Transparency Statements

- Here is a sample of a transparency statement:

“Deep AI was used to generate article summaries, from which the literature review was derived. Additional content was generated by ChatGPT. ChatGPT was also used to identify areas for improvement in the manuscript. Quillbot was used to improve the grammar and syntactic structure of the writing. Finally, DALL-E was used to generate Figure 1.”

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## Transparency Statements

- It is **imperative** that readers know what content should be credited to (human!) authors and what was generated by AI
- Information generated by AI applications should not itself be cited
  - Rather, you should locate the source of the original information that genAI is summarizing for you
  - Verify the accuracy of the information by checking with the source
  - Then cite *that* source rather than genAI as the source of the information

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## Discussion

### Ethical issues in open research

- What ethical concerns are reduced by open research practices?
- What ethical issues are increased by open research practices?

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## Discussion

### Ethical issues in open research

- Is it ever acceptable to researchers NOT to carry out their research in an open and transparent way?
- What barriers might prevent someone from engaging in open research who wishes to do so?

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