Bush-2022

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Lessons Learned: A Neuroimaging Research Center's Transition to Open and Reproducible Science

- File: data/review/fulltext/oa-id-W4283836446.pdf
- DOI: https://doi.org/10.31219/osf.io/fe74t
- OpenAlex ID: https://openalex.org/W4283836446

Characteristics of the paper

- Type of paper (e.g., tips, example): example
- Themes (e.g., tools, organization): tools
- Other keywords (e.g., newcomers): workflow

Tools

Specific tools mentioned - their function - where in the researh process used

- Github - open-source code, version control, collaboration - analysing
- Python - open-source programming - analysing
- R - open-source programming - analysing
- arXiv/bioRxiv/psyRxiv - preprint sharing - disseminating
- OpenNeuro - data sharing - disseminating
- Open Science Framework - preregistration - planning
- clinicaltrials.gov - preregistration - planning
- FAIR (findability", "accessibility", "interoperability", and "reusability") -principles to organize data, not a tool per se, but I think they need to be emphasized - data collection, organization and sharing -
- Brain imaging data structure (BIDS) - a common and standardized framework all scientists can work on - data collection and sharing
- Containarized pipelines - code that allows easy reproduction - data analysis
- ReproBIDS - dictionary with standardized terms for BIDS neuro data - planning, data collection, data deposition

Organizational structure for open collaboration

Workflow

- The steps below were identified after: 1) assessing the crisis of reproducibility, 2) literature search (systematic review) #worth noting since it pops up in so many papers as a previous step to implementation.

- hypothesis - experiment - data collection - data analysis - reporting

Centre workflow of practices to become more open (the ones above are more on the individual level)

- publish code, publishing pre-prints, standardizing data to BIDS, transition to containarized pipelines, publish data in repositories, establish data dictionaries, pre-registration,

Educational perspectives

Educational needs

- people in the organization need to learn additional programming, version control, and data management skills and work with unfamiliar naming conventions and directory structures mandated by the used standards

Barriers

Barriers for open science

- costs of effort to be borne by individuals already engaged in challenging, time-consuming work
- during transition, the research productivity will suffer

Bibliography