Colloquium

Building blocks for your open and reproducible testing of behaviour and cognition

Johannes Julius Mohn | 16 April 2024
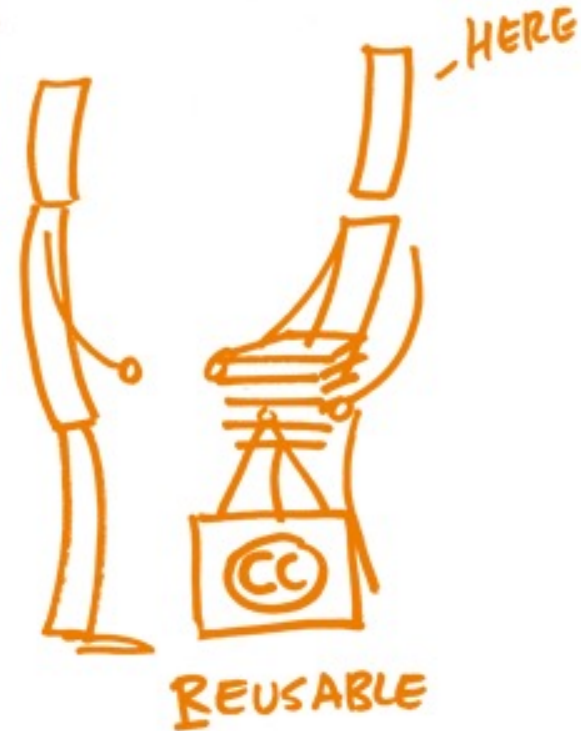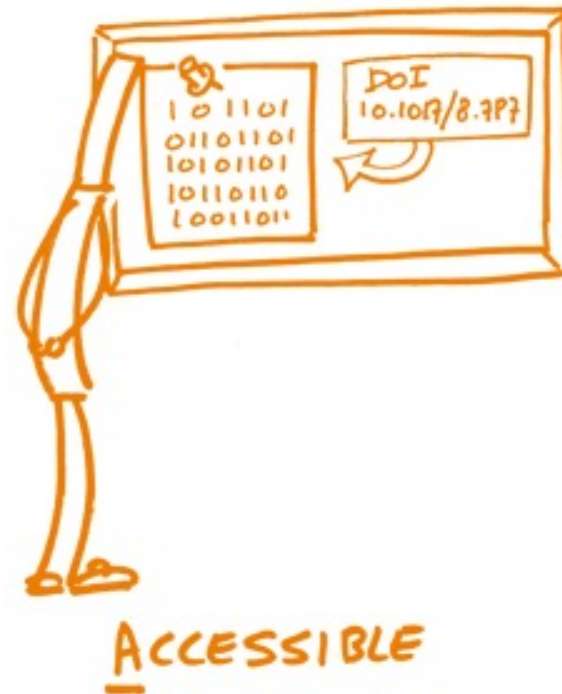
Institute of Medical Psychology

A starter kit of building blocks for open and reproducible data

1. Producing **FAIR** data

2. Konmari your project with simple **bash**

3. Open behavioural research with **PsychoPy**

4. Reproducible data analysis, visualization, and publishing with **R markdown**

1 Producing FAIR data

2

Konmari your project
with simple bash

Find data in a neat folder structure

Konmari your research project

Do you find yourself "looking for that one file"?

Do you keep creating new folders as you go, wondering "where to put this thing now"?
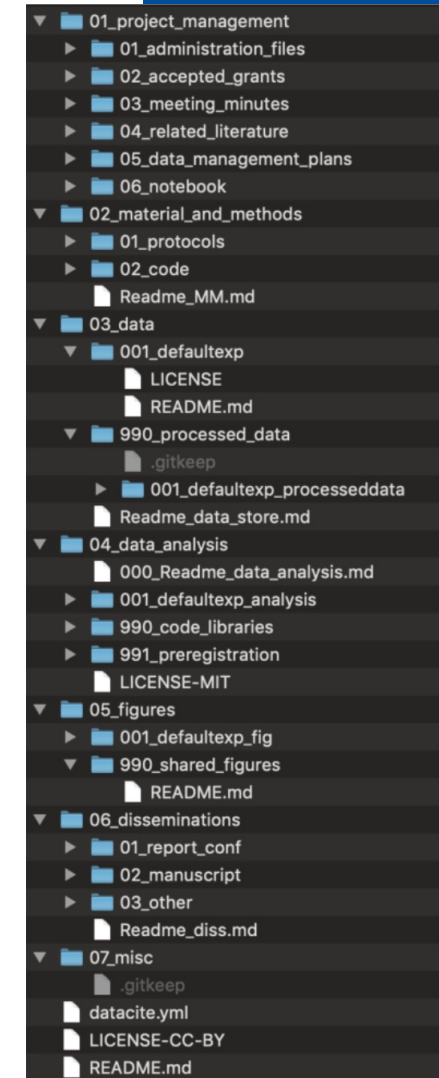
Standardization helps you to

... keep an overview of your current and future projects

... manage data in small and large teams

... collaborate across labs (No more "where is x file?")

The SFB1315 infrastructure team headed by Julien Colomb have created a standardized folder structure that could be your starting point: https://gin-tonic.netlify.app/standard/

https://gin-tonic.netlify.app/standard/

All you need is bash

A short and simple script to automate your project folder creation, forever

```bash
1  #!/bin/bash
2
3  # Set the base directory where the folder structure will be created
4  BASE_DIR="/path/to/project/folder"
5
6  # Prompt the user to specify the name for the new project directory
7  echo "Enter the name for the new project directory:"
8  read PROJECT_NAME
9
10 mkdir -p "$BASE_DIR/$PROJECT_NAME"
11
12 NEW_PROJECT_DIR="$BASE_DIR/$PROJECT_NAME"
13
14 # Create the main folder structure for a new project
15 mkdir -p "$NEW_PROJECT_DIR"/01_project_management/grant_proposal
16 mkdir -p "$NEW_PROJECT_DIR"/02_admin/logins
17 mkdir -p "$NEW_PROJECT_DIR"/03_documentation/docu_topic
18 mkdir -p "$NEW_PROJECT_DIR"/04_data/measure
19 mkdir -p "$NEW_PROJECT_DIR"/05_scripts
20 mkdir -p "$NEW_PROJECT_DIR"/06_tables
21 mkdir -p "$NEW_PROJECT_DIR"/07_figures
22 mkdir -p "$NEW_PROJECT_DIR"/08_presentations
23 mkdir -p
       "$NEW_PROJECT_DIR"/09_conferences/20XX_conference/
       {abstract,poster,social_media}
24 mkdir -p
       "$NEW_PROJECT_DIR"/10_manuscripts/author_et_al_topic/
       {cover_letter,main,supplement}
25
26 # Print a message indicating the folder structure has been created
27 echo "Folder structure created in $BASE_DIR"
```

Demo

Access your data and scripts from anywhere

Ways to making your data accessible

https://gin.g-node.org/

Manage, share, version-control your data (*DSGVO-konform*)

https://github.com/

Manage, share, version-control your code

Pavlovia
/pævlɒvɪə/
where behaviour is studied

https://pavlovia.org/

Host experiments, test subjects, share tasks (*DSGVO-konform*)

https://osf.io

Host and share study materials

Interoperable file formats
Make things that last and are easy to work with

Have you ever wondered how to open an .x@fa;s?! file?

Have you ever received a file that is convenient on mac but impossible to work with on windows?

File type	Recommended file format	Avoid
Text	**.txt .md .html** .rtf .pdf/a .docx	.doc .pages
Tables	**.csv .tsv** .xlsx	.xls SPSS.sav .numbers
Images/Graphics	**.svg .tiff .png** **.wav** .mp3	.gif .jpeg
Multimedia	.mpeg4 .mkv	QuickTime Flash

In general, avoid proprietary or very OS-specific formats when possible!

Why do FAIR principles matter?

"
You are your most important collaborator.

3

Open behavioural research with PsychoPy

https://www.redbubble.com/i/t-shirt/Why-I-love-PsychoPy-by-ost-ltd/57721842.WFLAH.XYZ

Reusable, open tasks for behavioural and cognitive experiments
Easy coding in PsychoPy

Don't have an active E-prime license? The person who knew presentation retired years ago? You're too noob for psychtoolbox? But ...

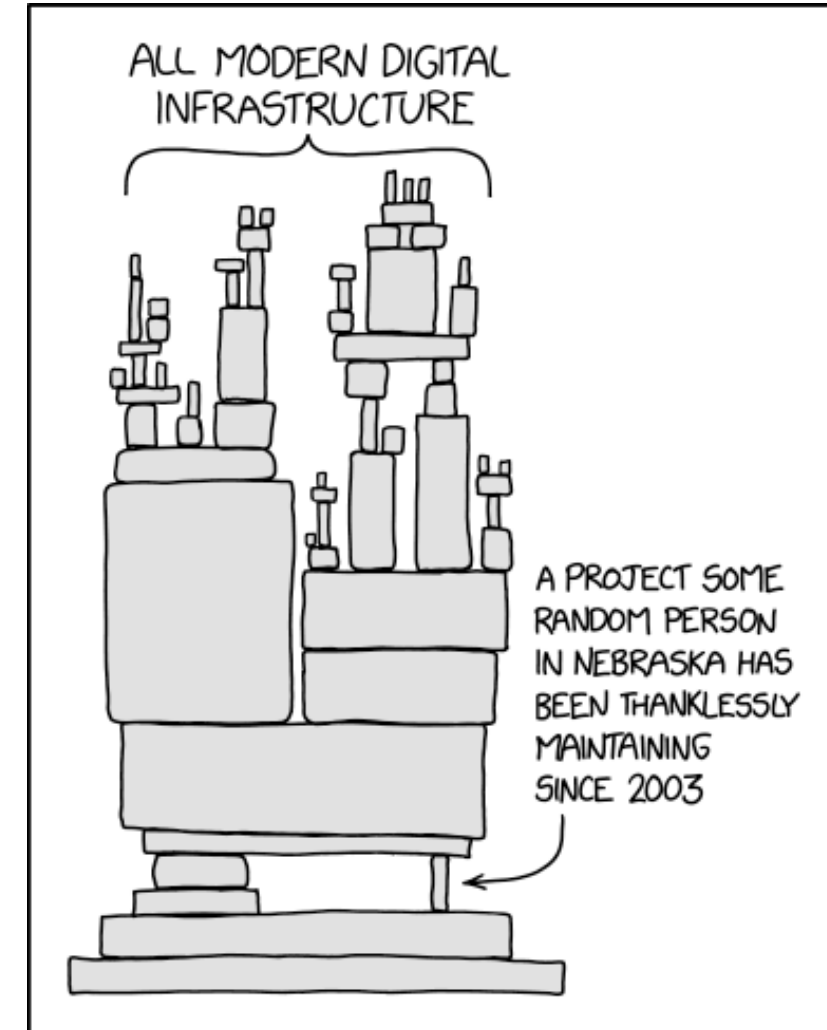**You do know what you want to do!**

PsychoPy provides an easy-to-learn experiment builder for the flexible coding of tasks with precise timing (eye-tracking, fMRI, EEG, generally TTL). And it's free!

PsychoPy is (in the meantime) professionally maintained by a group of developers.

And it's free and comes with loads of online tutorials and a dedicated forum:
https://www.youtube.com/@PsychoPy_official (tutorials)

https://discourse.psychopy.org/ (forum)

ALL MODERN DIGITAL INFRASTRUCTURE

A PROJECT SOME RANDOM PERSON IN NEBRASKA HAS BEEN THANKLESSLY MAINTAINING SINCE 2003

Demo

4 Reproducible analysis, visualization and publishing with R markdown

%>%

Ceci n'est pas une pipe

Reproducible workflows in R markdown
Analysis, visualization, documentation, interpretation all in one place

Do you ever find yourself clicking through SPSS and two weeks later wonder how you got your results?

Do you find yourself copy+paste'ing figures into powerpoint, documenting your analysis in word, and remembering important details from your paper notes?
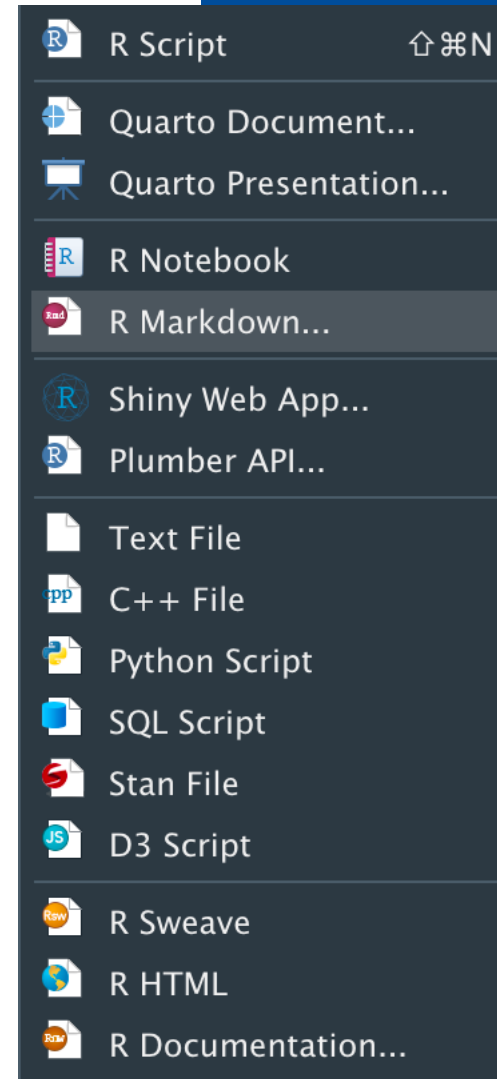
Ever needed to "do an entire analysis again" because you decided to use a different threshold / approach or remove outliers?

R markdown combines **R code** for analysis / visualization with **editable text** in one document, allowing you to combine your pipeline with documentation.

Produce nice results, rerun things easily.

For a very gentle introduction:
https://youtu.be/c7EhBASskXw?si=eREHwTnuKqRuRJ7G

R Script   ⇧⌘N
Quarto Document...
Quarto Presentation...
R Notebook
R Markdown...
Shiny Web App...
Plumber API...
Text File
C++ File
Python Script
SQL Script
Stan File
D3 Script
R Sweave
R HTML
R Documentation...

Demo

▷ github.com/johannesjuliusm/fair_data_tools