

R-reproducible-science

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R-reproducible psychological science

Themes

1. What is reproducible psychological science?
2. How can R make my science more transparent, open, and reproducible?

Is there a crisis?

Baker 2016

Not just in psychology

If so, why?

Baker 2016

Here are the data from the Nature survey.

What am I trying to reproduce?

- My own workflow
 - Data collection
 - Cleaning
 - Visualization
 - Analysis

- “Hit by a truck” scenario

Reproducible workflows

- Scripted, automated = minimize human-dependent steps.
- Well-documented
- Transparent to me & colleagues == transparent to others

Using R for reproducible workflows

- Mix R code, output, comments, tables using R Markdown
- R Markdown files = text files
- One input file, multiple outputs to
 - PDF, Word (.docx)
 - HTML for web pages, slides

Example 1

- James’ R commands from Day 1
- Raw R script (.R)
- Converted to R Markdown
- Output as | HTML Slides | PDF | DOCX |

How to

- Add header info in YAML Ain’t Markup Language (YAML) format
- Wrap R code “chunks” with triple backticks and {r}
- Separate segments with --- and/or ## or ###
- Render via `knit` button or `rmarkdown::render(file=“my-file.Rmd”)`

How to

- Create new R Markdown file: New/New File/R Markdown...
 - Specify default, alternative output formats:
 - `pdf_document`
 - `word_document`
 - `ioslides_document`: HTML slides
 - `github_document`: renders nicely on GitHub
-
- Create your document
 - Use an “outline” with Header_1, Header_2, Header_3, etc.
 - Header_1 text starts with `# This is a top level header`
 - Header_2 text starts with `## This is a 2nd level header`
 - Header_3 text starts with `### This is a 3rd level header`
 - Surround R code with triple back-ticks
 - Sections that start with Header_1, Header_2, and --- will start new slides in `ioslides_presentation` mode.
 - **Bold text:** `**This is bold**`; *Italicized text:* `*Italics*`
 - Start lists with hyphens - Item 1 or numbers 1. Item 1.

Let's try it

- bootcamp-survey.Rmd
- bootcamp-survey.html

Key points

- Use R Markdown files for documents, reports, presentations.
 - One or more output formats from the same file.
 - Analysis/lab notebook.
- Use R scripts to automate different pieces of the pipeline.
- Make README files to explain how to put pieces together.

Advanced topics

- Version control with git and GitHub
- Websites, blogs, (even books) with R Markdown
- Reference lists
- Scriptable analysis workflows
 - Reports for each participant
 - Example: PEEP-II project