

Reproducible paper writing

Some practical recommendations

Sebastian Sauer (FOM)

joint work with Christoph Kurz (Helmholz Zentrum)

September 21, 2016

Is science broken?

What is reproducible
writing?

Why should I write
my paper in a
reproducible
manner?

How to do it?

Style sheets

Acknowledgments

That's it

Is science broken?

Echo in academia press



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Echo in non-academia press

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The collage features several news snippets related to the reproducibility crisis in science:

- The Independent:** "Übersic" (partially visible), "INDEPENDENT", "News Voices Culture Lifestyle Tech Sport Olympics Daily Edition".
- The Economist:** "The Economist", "World politics Business & finance Economics Science & technology Culture".
- Problems with scientific research:** "How science goes wrong", "Scientific research has changed the world. Now it needs to change itself", "Oct 19th 2013 | From the print edition", "Timekeeper", "f Like", "29K", "Twitter".
- Reveals that a lot of psychology is really just 'psycho-babble':** "More than half could not be reproduced using the same method", "onnor | Thursday 27 August 2015 | 0 comments", "91 shares".
- The New York Times:** "SCIENCE", "The New York Times", "Science, Now Under Scrutiny Itself", "By BENEDICT CAREY", "JUNE 15, 2015".
- Süddeutsche Zeitung:** "SZ.de Zeitung Magazin", "Wissenschaftsethik", "17. Juli 2016, 14:15 Uhr", "Es mussten unbedingt bahnbrechende Ergebnisse produziert werden".
- Video:** "Ganze Sendung 'Krise in den Wissenschaften'", "Krise in den Wissenschaften?", "Ist Wissenschaft ein Mythos geworden?".

What is reproducible writing?

Write plain text with computer code included

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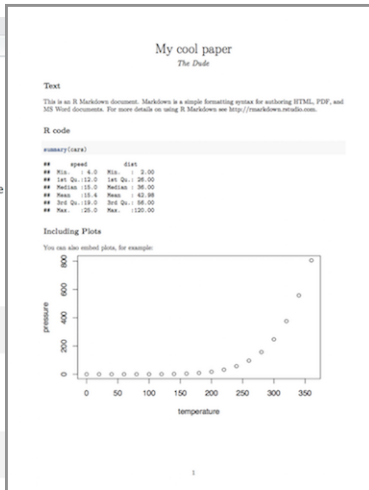
How to do it?

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```
my_cool_paper.Rmd x
1 ---
2 title: "My cool paper"
3 author: "The Dude"
4 output: pdf_document
5 ---
6
7 ## Text
8
9 This is an R Markdown document. Markdown is a simple
10 formatting syntax for authoring HTML,
11 PDF, and MS Word documents.
12 For more details on using R Markdown
13 see <http://rmarkdown.rstudio.com>.
14
15 ## R code
16
17 ```{r cars}
18 summary(cars)
19 ```
20
21 ## Including Plots
22
23 You can also embed plots, for example:
24
25 ```{r pressure, echo=FALSE}
26 plot(pressure)
27 ```
28
```



Why should I write my paper in a reproducible manner?

Re-do analysis with no pain



*Dude,
I sent you the wrong data. Find attached new
dataset. Re-do all analyses. Did I mention we
submit tommorrow?
Regards,
C. Kirk*

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Match R code to results in paper easily

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Paper with ~1,000 lines of wild R code.

In results section:

“After some wild computation, we found accuracy to be
78%...”

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How to do it?

Process of repro paper writing

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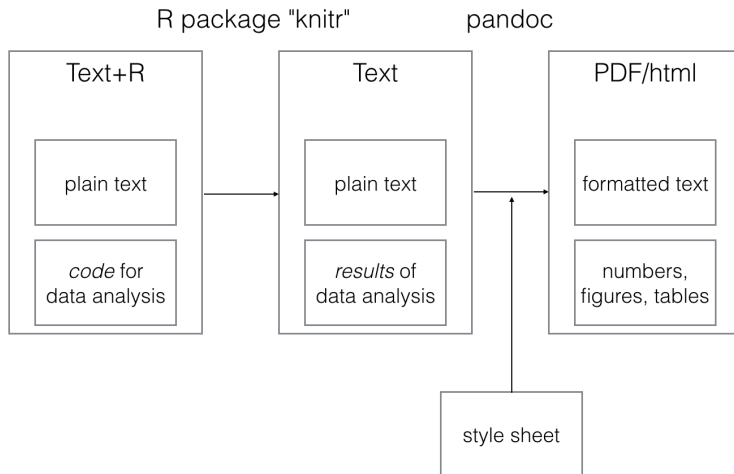
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Style sheet for thesis/assignment

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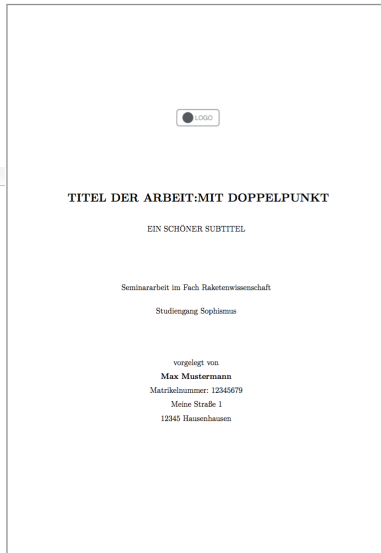
How to do it?

Style sheets

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That's it

```
1 ---
2 title: "Titel der Arbeit:mit Doppelpunkt"
3 subtitle: Ein schöner Subtitel
4 referee: Prof. Dr. I. Weiß-Ois
5 course: Seminararbeit im Fach Raketenwissenschaft
6 field: Studiengang Sophismus
7 author: Max Mustermann
8 ID: "Matrikelnummer: 12345679"
9 street: Meine Straße 1
10 zipcity: 12345 Hausenhausen
11 date: 13\. Mai 2016
12 graphics:
13 toc: true
14 lof: true
15 lot: true
16 lang: de-De
17 bibliography: Literatur.bib
18 logo: logo.png
19 documentclass: scrartcl
20 highlight-style: kate
21 output:
22   pdf_document:
23     number_sections: true
```



Style sheet for APA papers

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Install PAPAJA and open new APA template in RStudio

```
---
title: "How to use papaja: An Example Manuscript Including Basic Instructions"
shorttitle: "How to use papaja"
author:
  - name: Frederik Aust
    affiliation: 1
    corresponding: yes # Define only one corresponding author
    department:
    address: "Department Psychology, University of Cologne, Herbert-Lewin-Str. 2, 50931
Köln, Germany"
    email: "frederik.aust@uni-koeln.de"
affiliation:
  - id: 1
    institution: "University of Cologne"

abstract: |
  This manuscript demonstrates how to use R Markdown and papaja to
  create an APA conform manuscript. papaja builds on R Markdown, which
  uses pandoc to turn Markdown into PDF or Word documents. The conversion
  to Word documents currently supports only a limited set of features.

autor_note: |
  `papaja` has not yet been submitted to CRAN; a development version is available at
  https://github.com/crsh/papaja.

keywords: "APA style, knitr, R, R markdown, papaja"
```

Acknowledgments

Acknowledgments/ more infos

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- ▶ Yihui Xie for `knitr` more
- ▶ John Gruber & Aaron Swartz for `markdown` more
- ▶ John MacFarlane for `pandoc` more
- ▶ RStudio team for RStudio more
- ▶ R community for R [more]
(<https://cran.r-project.org>)
- ▶ Frederik Aust for `papaja` more
- ▶ Get my thesis template here
- ▶ Github team for `github` more
- ▶ Steven V. Miller for this beamer template
- ▶ The unknown God

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Thank you

- ▶ **Get slides etc. of this talk here:**
https://github.com/sebastiansauer/talk_repro_writing_DGPs_2016
- ▶ Contact: sebastian.sauer@fom.de

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