

# Reproducible paper writing

## Some practical recommendations<sup>1</sup>

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joint work with Christoph Kurz (Helmholtz Zentrum)

September 21, 2016

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<sup>1</sup>Slides on Github, <http://bit.ly/29N7YH0>

## Is science broken?

What is  
reproducible  
writing?

Why should I write  
my paper in a  
reproducible  
manner?

How to do it?

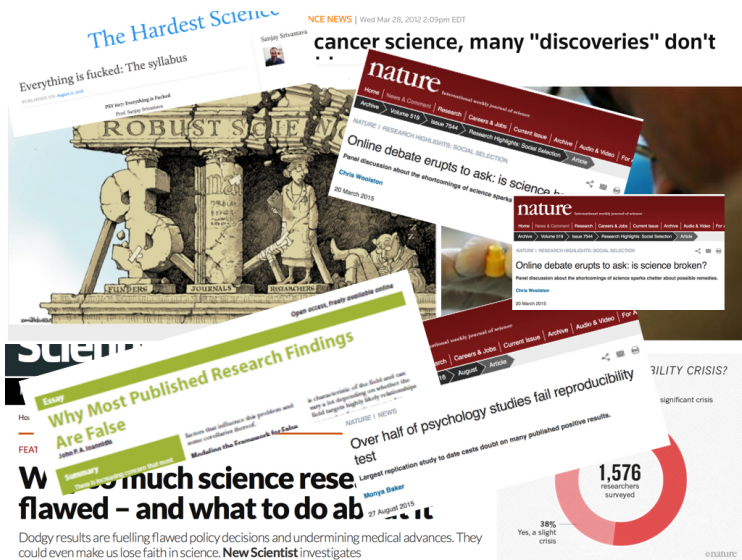
Style sheets

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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 overlapping elements:

- The Independent** website header with navigation links: News, Voices, Culture, Lifestyle, Tech, Sport, Olympics, Daily Edition.
- The Economist** website header with navigation links: World politics, Business & finance, Economics, Science & technology, Culture.
- A red banner with white text: "Geben Sie dem Bildungssystem in MV noch heute ein Update."
- A headline: "Problems with scientific research" followed by "How science goes wrong".
- A sub-headline: "Scientific research has changed the world. Now it needs to change itself".
- A date: "Oct 19th 2013 | From the print edition".
- A social media share button for "Timekeeper" with "Like" and "Retweet" icons.
- A headline: "reveals that a lot of psychology is really is just 'psycho-babble'".
- A sub-headline: "More than half could not be reproduced using the same method".
- A date: "Thursday 27 August 2015 | 0 comments".
- A share count: "91 shares".
- A headline from **The New York Times**: "Science, Now Under Scrutiny Itself".
- A byline: "By BENEDICT CAREY | JUNE 15, 2015".
- A headline from **Süddeutsche Zeitung**: "Es mussten unbedingt bahnbrechende Ergebnisse produziert werden".
- A date and time: "17. Juli 2016, 14:15 Uhr".
- A category: "Wissenschaftsethik".
- A video player interface with a play button and a video title: "Video: Ganze Sendung 'Krise in den Wissenschaften'".
- A headline: "Krise in den Wissenschaften? Ist Wissenschaft ein Mythos geworden?".

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# What is reproducible writing?

# Write plain text with computer code included

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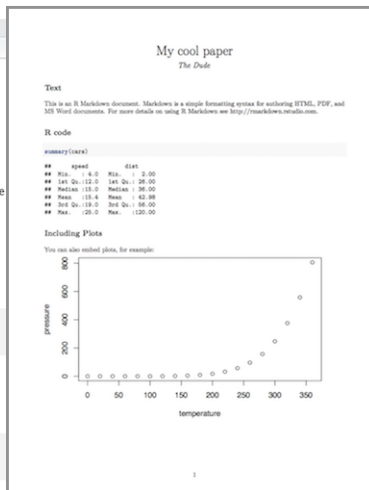
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```
my_cool_paper.Rmd x
1 ---
2 title: "My cool paper"
3 author: "The Dude"
4 output: pdf_document
5 ---
6
7 ## Text
8
9 This is an R Markdown document. Markdown is a simple
10 formatting syntax for authoring HTML,
11 PDF, and MS Word documents.
12 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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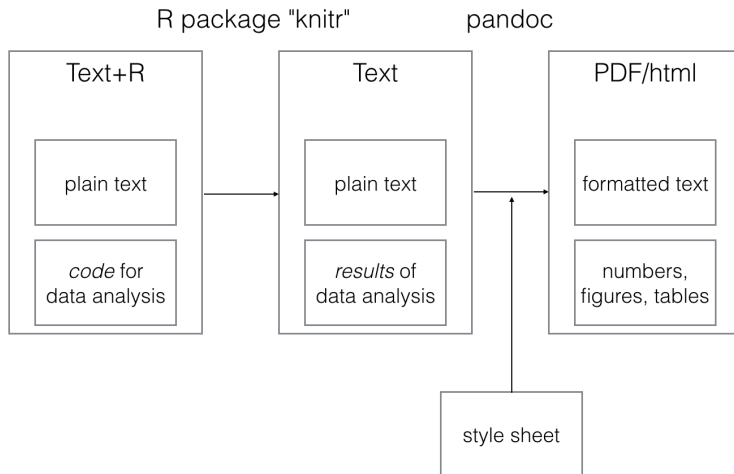
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How to do it?

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## Style sheets

# Style sheet for thesis/assignment

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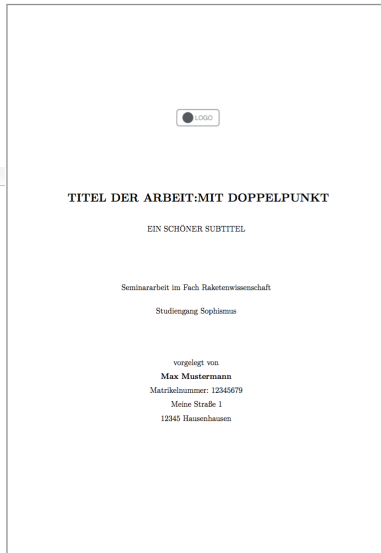
How to do it?

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```
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"
```

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# 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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**That's it**

That's it

# Thank you

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- ▶ **Get slides etc. of this talk here:**  
[https://github.com/sebastiansauer/talk\\_repro\\_writing\\_DGPs\\_2016](https://github.com/sebastiansauer/talk_repro_writing_DGPs_2016)
- ▶ Contact: [sebastian.sauer@fom.de](mailto:sebastian.sauer@fom.de)