

**The title of your amazing work!**

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*Keywords:* stuff, major good stuff, really good stuff, crap

*Running title: Reproducibility!*

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# Abstract

The greatest study ever!

## 1 Introduction

2 This document serves as an example of how to make a reproducible workflow—from R to  
3 manuscript. For this example, you must link your Overleaf project to a git repo, then link  
4 your R project to the same repo. For more on how to do this see Jessi Rick’s tutorial (click  
5 here).

6 The figure and one of the tables in this manuscript are R script outputs. We run Make  
7 to update these and our manuscript. See the document “How to use Make” that is in this  
8 repo for more.

### *Why use L<sup>A</sup>T<sub>E</sub>X?*

10 As you will see, L<sup>A</sup>T<sub>E</sub>X helps with reproducibility, saves you time inputting results into  
11 your manuscript, keeps you from screwing up stuff like adding data to tables or misnumbering  
12 figures, makes it easy to format a manuscript however you want, avoid having figures move  
13 around like they do in Word, avoid the damnable compression algorithm that Word uses  
14 that makes your figures look like crap, keep you from writing or formatting citations, allow  
15 you to format your manuscript as required for your journal with minimal effort using style  
16 templates, write waaay better math (this alone could be a selling point, if you do the math),  
17 built in version control with Overleaf, the ability to build document classes for templates  
18 that you commonly use, like reference/cover letters....probably more stuff that I am not  
19 remembering.

20 However, L<sup>A</sup>T<sub>E</sub>X has a bit of a learning curve that can be frustrating at first. Persevere,  
21 get comfortable Googling stuff that you can’t figure out, and soon under no circumstances  
22 would you go back to using Word.

23 As mentioned, a benefit of L<sup>A</sup>T<sub>E</sub>X is easy, streamlined citation incorporation. You can  
24 source a bib file and make use of any of the citations therein with the citep, citet, citalt, and  
25 other cite commands. For more click (here)

26 RECOMMENDED: You can also link your citation manager to your Overleaf project.  
27 See how to do that by clicking (here). This is very handy since you can simply refresh  
28 as needed to quickly bring new citations into your manuscript. Note where we define the  
29 bibliography after the acknowledgements. At that point we specify style. You can download  
30 citation styles for many journals, so never reformat citations by hand!

## Methods

## Results

Here are is our scatter plot (Fig. 1). Note that the number of the figure is automatically updated based on its order in the figure section. This is another handy thing about  $\text{\LaTeX}$ . One does not have to worry about accidentally misnumbering a figure in the text after moving figures around (particularly nice for those pesky supplemental figures that often get misnumbered).

Here are some made up results (Table. 1) and also check out results from our linear regression (Table. 2). The cool thing here is that for the latter table we output the results straight from R via the xtable package. This package takes a matrix object and converts it into the appropriate format for  $\text{\LaTeX}$  (see the associated R script linearModel.R in the Supplemental Material).

## Discussion

## Acknowledgments

Funding was provided by XXXX. Computing was performed in the Teton Computing Environment at the Advanced Research Computing Center, University of Wyoming, Laramie (<https://doi.org/10.15786/M2FY47>).

## Data availability

All scripts and processed data are available at:

Figure 1: A scatterplot of some random data

Table 1: Example table.

Treatment 1	Treatment 2	Sample size
Yes	Yes	62
Yes	No	68
No	Yes	54
No	No	54
Controls		
Yes	Yes	13
Yes	No	13
No	Yes	18
No	No	18

Table 2: Results from a regression of a simulated vector of deviates from a normal distribution centered at 100 against deviates from a normal distribution centered at 10. xtable is awesome!

Estimate	Std. Error	t value	Pr(> t )
100.15	1.10	91.15	0.00
-0.02	0.11	-0.18	0.86

## Supplementary Material

R scripts used follow. Note that much cleaner output can be generated using R Markdown. Please see Jessi Rick's tutorial (linked above) for information on how to do that.

```
#linearModel.R
#J. G. Harrison

library(xtable)

dat <- read.csv("./data/testdata.csv")

reg <- lm(dat$rnorm.100..100. ~ dat$rnorm.100..10.)

#NOTE that it is very helpful to label your tables and figures so that you can
#reference them from anywhere in a document when in Latex and it will always
#reference them by the proper order. No more checking through to make sure figure numbers
#are correct after reordering them!

print(xtable(summary(reg)$coefficients,
  type = "latex",
  caption = "Results from a regression of a simulated vector of deviates from a normal distribution",
  label = "table:lm_results",
  digits = 2, #round to the correct number of digits automatically
  align = rep("c", dim(summary(reg)$coefficients)[2] + 1) #align cell contents, horizontal
  #You can add horizontal lines, etc. too. Basically, all the easy formatting stuff
  #If you have to build a really crazy table then you may need to copy the output
  #build a function to paste content into the output of xtable prior to printing.
),
  caption.placement = "top",
  file = "./results/lm_results.tex",
  floating.environment='table', #Can change to sideways table if landscape format desired
  include.rownames = FALSE)



---



dat <- read.csv("./data/testdata.csv")

pdf(width = 8,
  height = 8,
  file = "./results/scatterplot.pdf")
plot(dat$rnorm.100..100.,
  dat$rnorm.100..10.,
  main = "",
```

```
      xlab = "fake data",  
      ylab = "more fake data")  
dev.off()
```