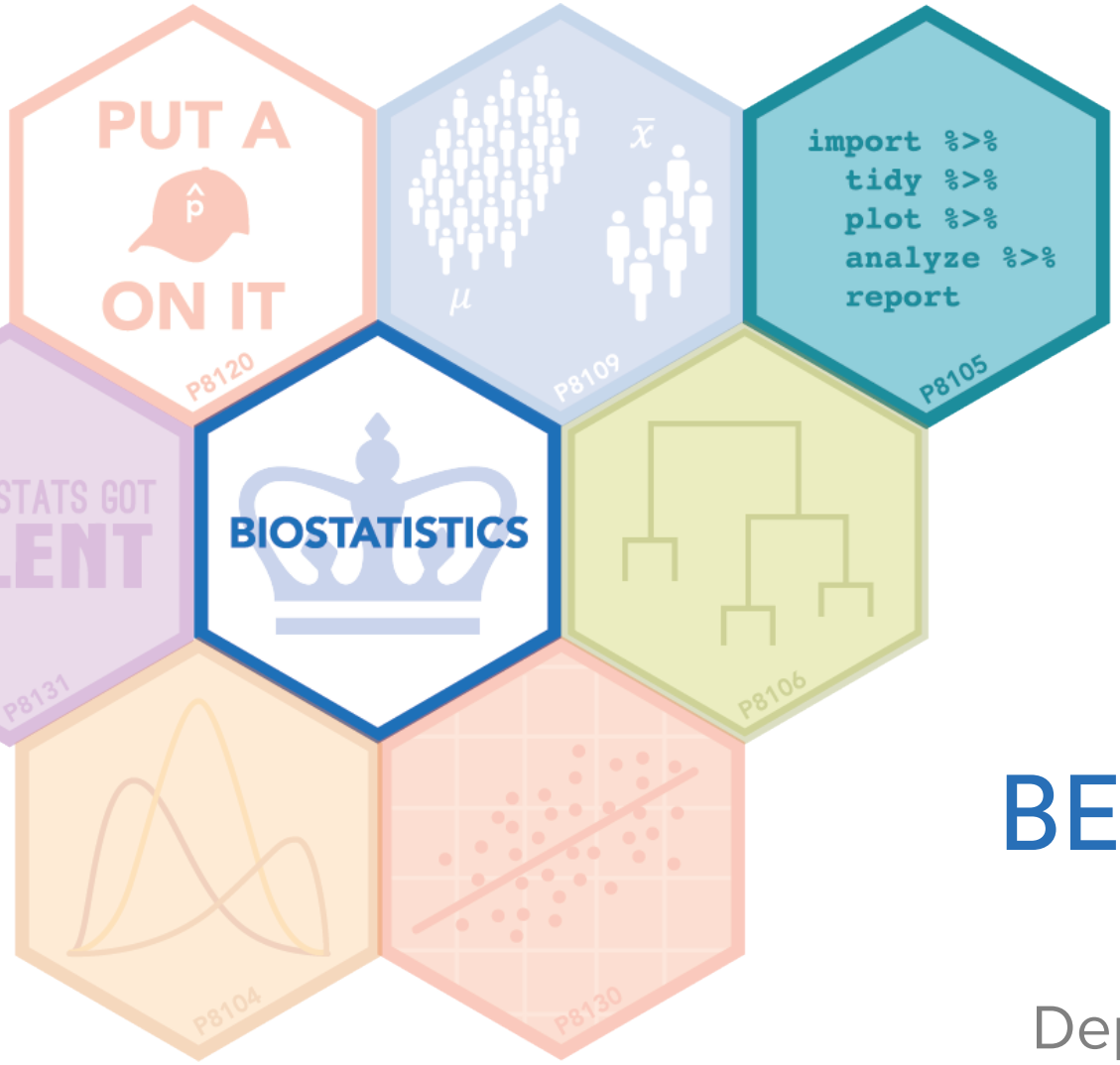


GETTING STARTED AND BEST PRACTICES

Jeff Goldsmith, PhD

Department of Biostatistics

What is R?

- Language and environment for statistical computing
- Based on the (proprietary) S language, but open source and open development

Why is R good?

- Powerful
- Flexible
- Extendable – “base” R vs the collection of R packages
- Active community
- Free
- RStudio

Why is R bad?

- Not easy to learn
- Not designed for “modern” challenges
- No central support
- No central coordination of extensions / packages
- No “guarantees”
- Not always fast

Why are we using R?

- One of the recognized “data science” languages (with good reason)
- Extensions matter a lot, and we’ll use them extensively

Why are we using RStudio?

- Makes life much easier for useRs (not a typo – people who use R are sometimes referred to as useRs…)
- The RStudio folks are also leading the development of a new analytic framework within R, and that work is integrated into RStudio

Working in R

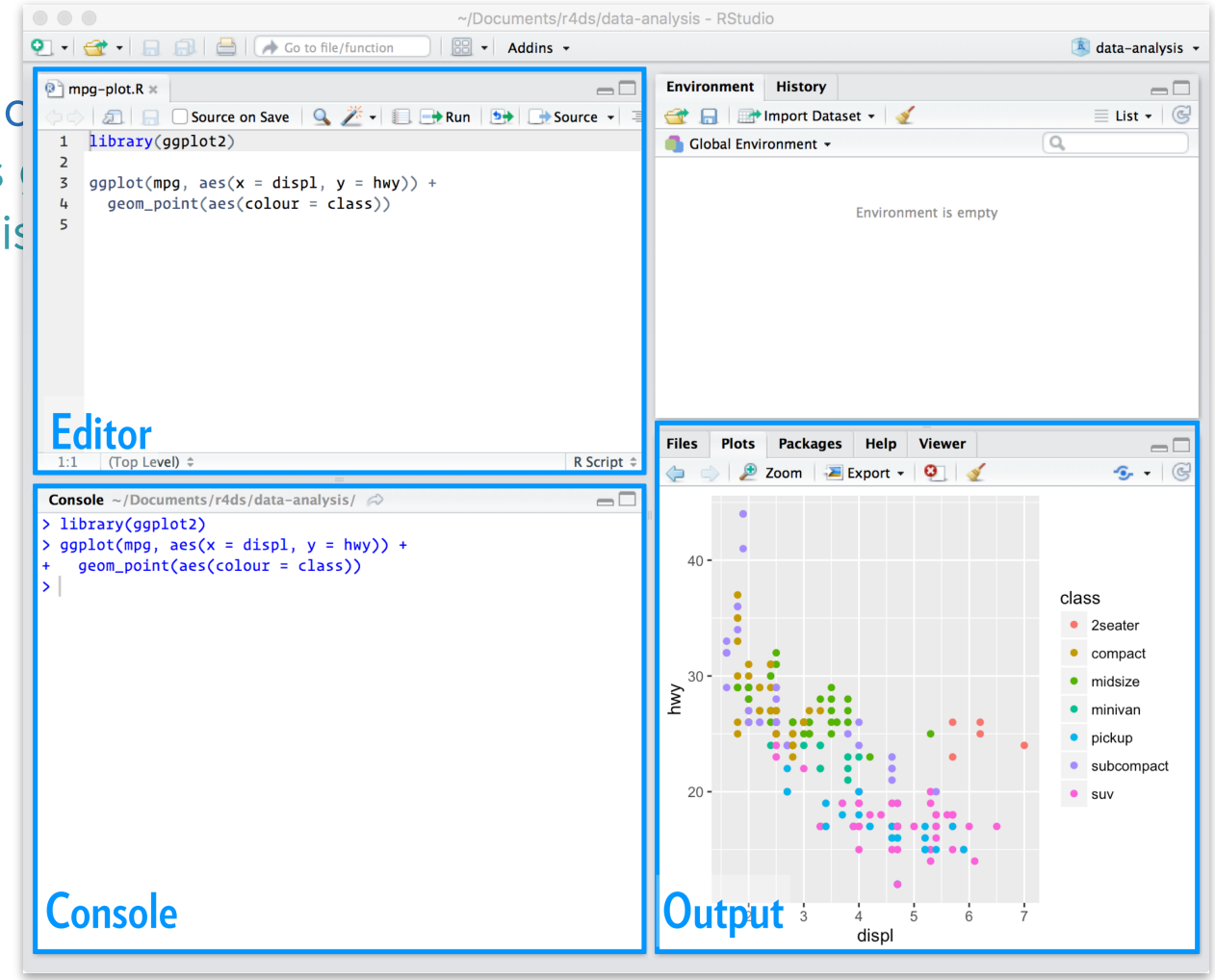
- Console – where commands are executed
- Scripts – where sequences of commands are saved for reproducibility
- Functions – operations performed on inputs, usually producing outputs

Working in RStudio

- Rstudio is an Integrated Development Environment (IDE)
  - It's got everything you need to do data science in R
  - This IDE is one of the better reasons to use R ...

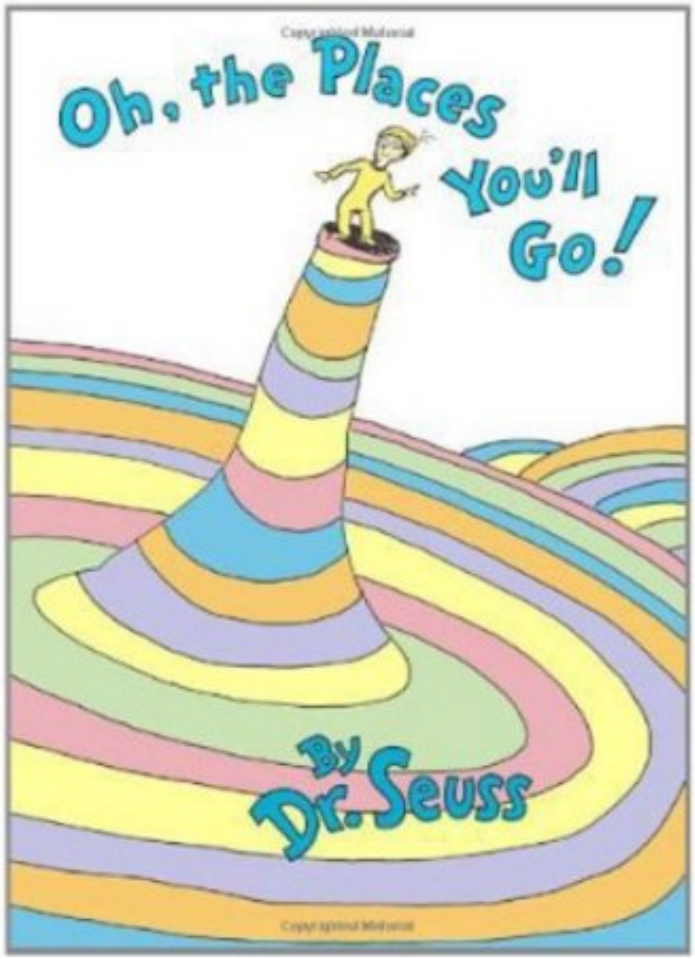
Working in RStudio

- Rstudio
  - It's
  - This



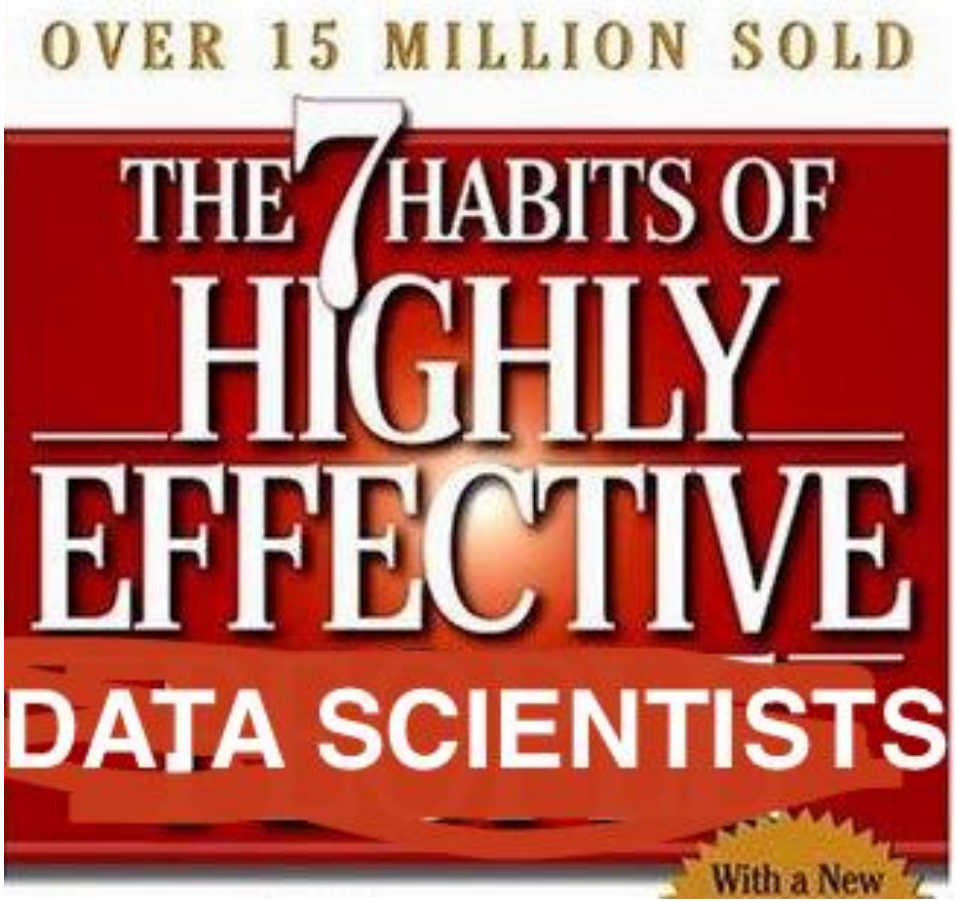
R for Data Science

You'll have big projects…



… someday.

- Better get ready by establishing good habits now!



Code

- Code is case sensitive
- There is no autocorrect

- Establish a variable naming convention
  - this_is_snake_case
  - this.is.period.case
  - thisIsLowerCamelCase
  - ThisIsUpperCamelCase
  - ThIsIsNoTaNaMiNgCoNvEnTiOn

- Your names should match your regex skills
  - If you don't have regex skills, your variable and file names should be as simple as possible.

- Extensive comments will save you headache

Code

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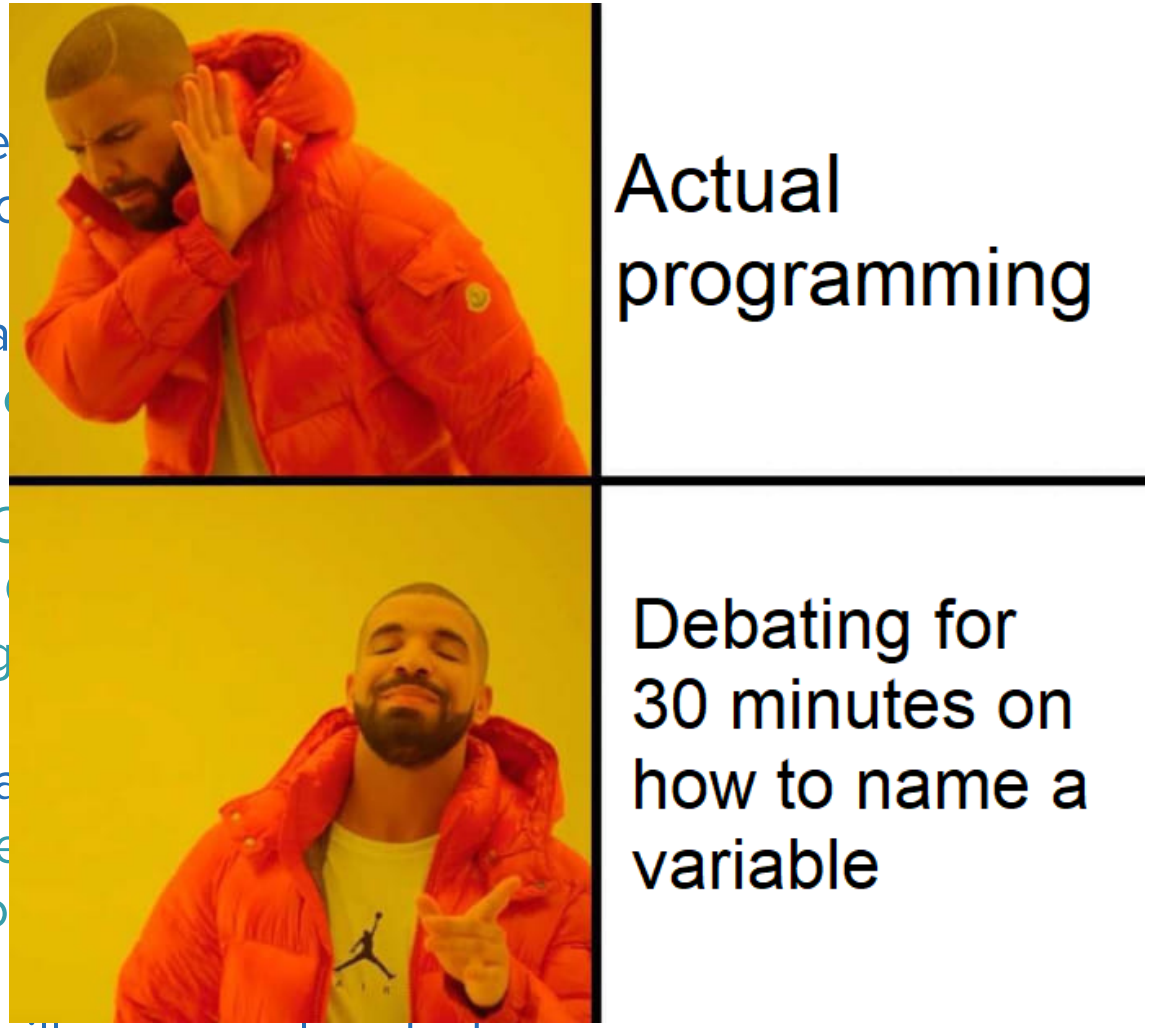
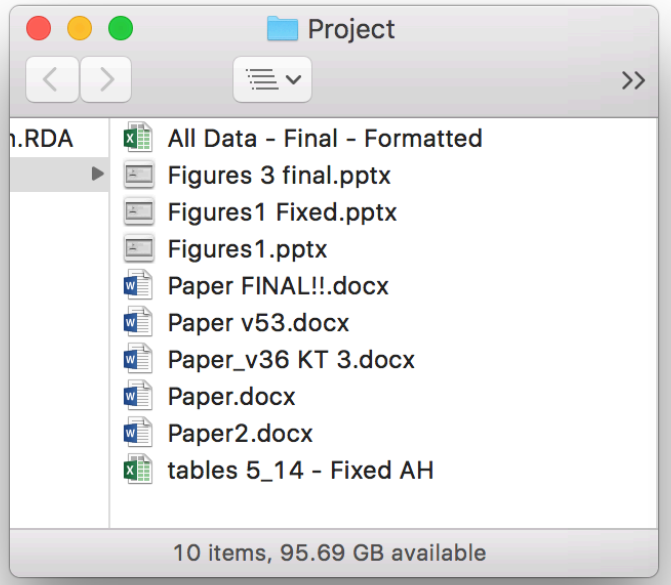


Some perspective on code

- Treat your inputs (e.g. raw data) and code as “real”
  - Your results and created by input and code, and you can always reproduce your results from these if you need to
- Your code matters
  - It’s one of the most central ways you will communicate. Do it well.
- Plan for mistakes
  - You will make them, and that’s fine. Write code that makes it easy to fix mistakes without breaking the rest of your analysis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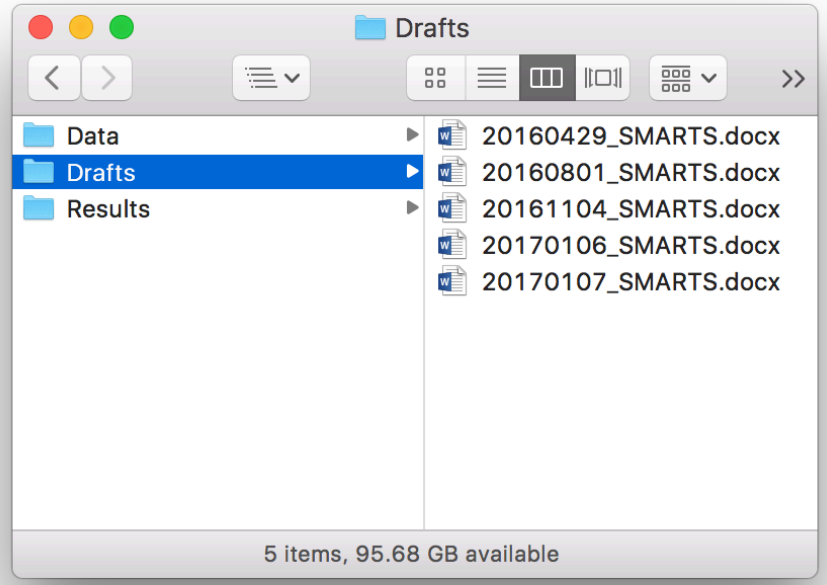
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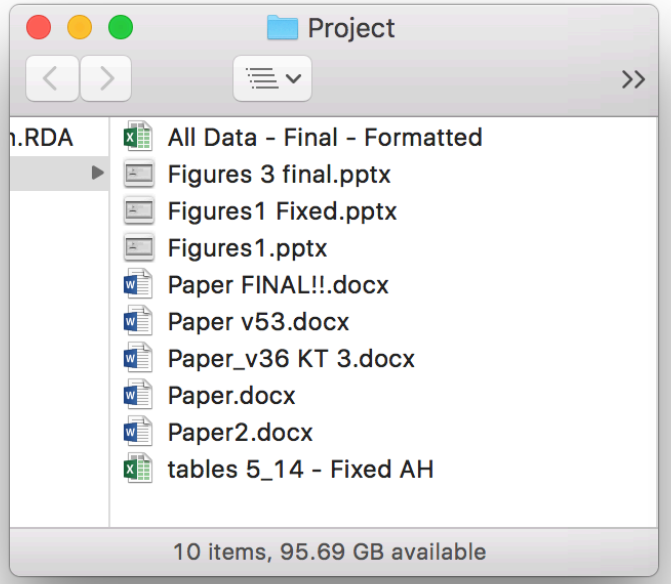
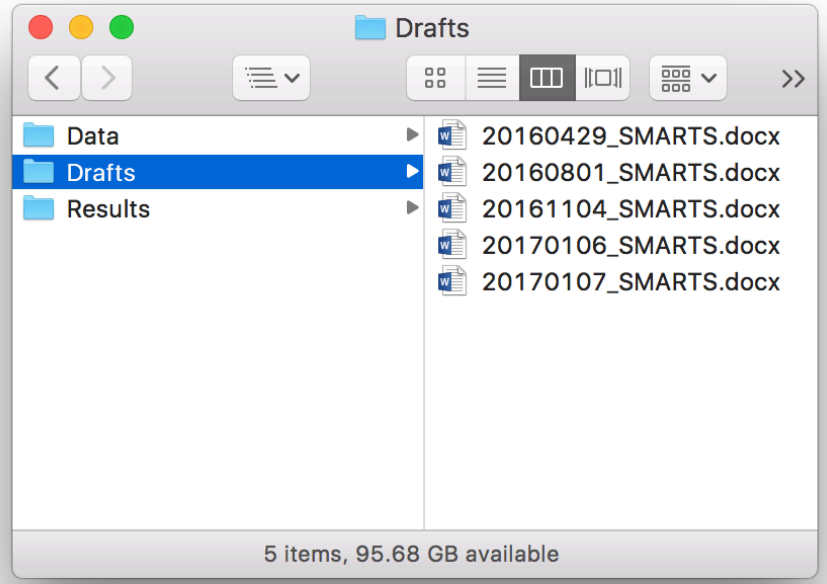
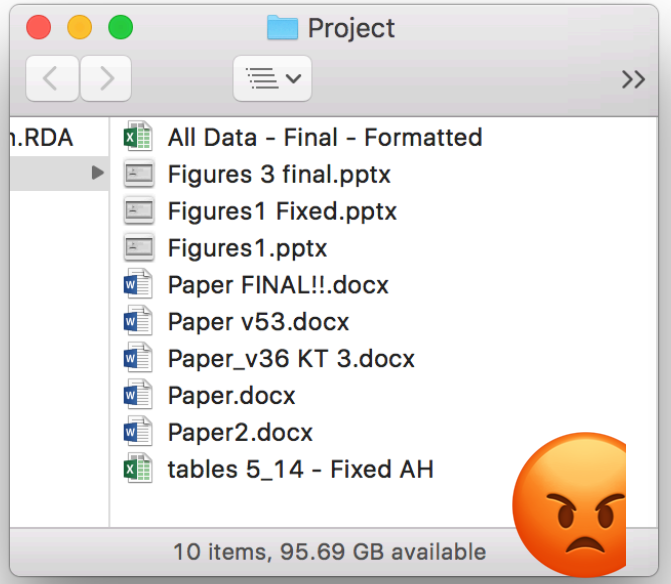
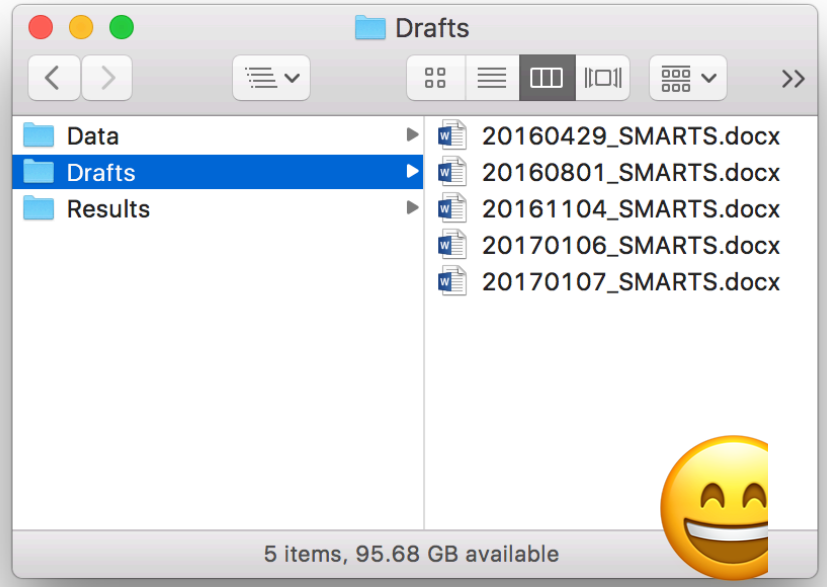
Organizing files



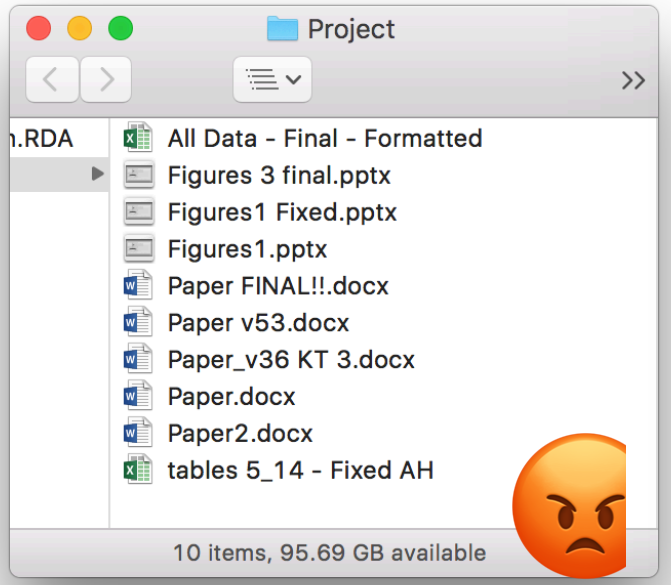


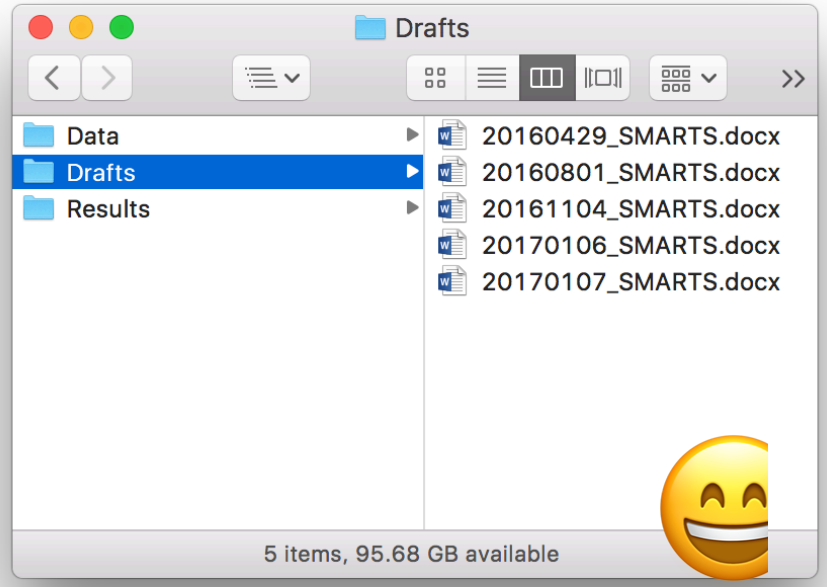
Organizing files

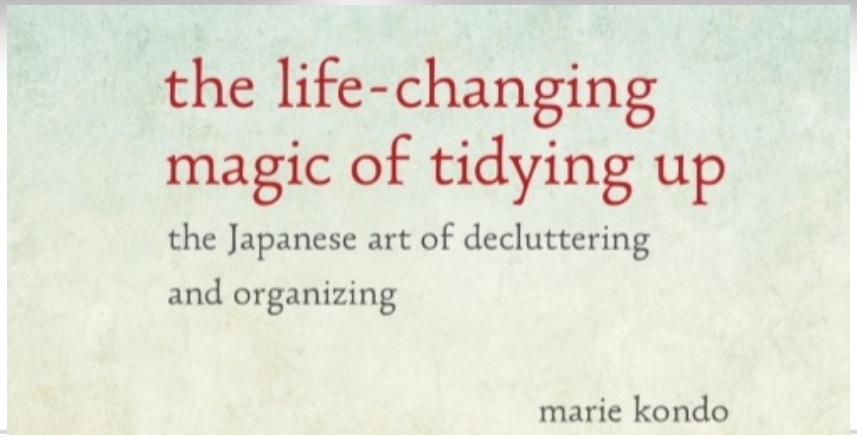




Organizing files







Some perspective on files

- You will need to find everything again someday. Make sure it's easy to find.
  - Name your files reasonable things
  - Avoid special characters and spaces
  - Put everything for a project in the same place

Why organization matters

Being organized will frequently make your life easier

- "Your most frequent collaborator is you from six months ago, but you don't reply to emails"[1]
- Eventually, someone other than you (or even future you) will need to reproduce your results
  - Be ready for that.

1. This version of the quote comes from Karl Broman, who traced it to a tweet: http://bit.ly/motivate_git