R Programming Resources for SIS PhD Program

This is a list of online resources to get started with R and RStudio! It's not exhaustive by any means, but the internet can be a dizzying place when it comes to programming tutorials, so this list includes resources I consult regularly or have used in the past to learn.

Disclaimer: Anyone who has learned R knows that there are several different ways to do the same thing, therefore tutorials might offer different options for manipulating data or creating visualizations. The advice I got when I started out with R was to try everything once and see what works best in terms of whether the code "clicks" in my brain (like any other language) and whether it works for my theory/data. We have students in our program who are more advanced R users, and they might have different recommendations.

Installing R and RStudio (for the live workshop)

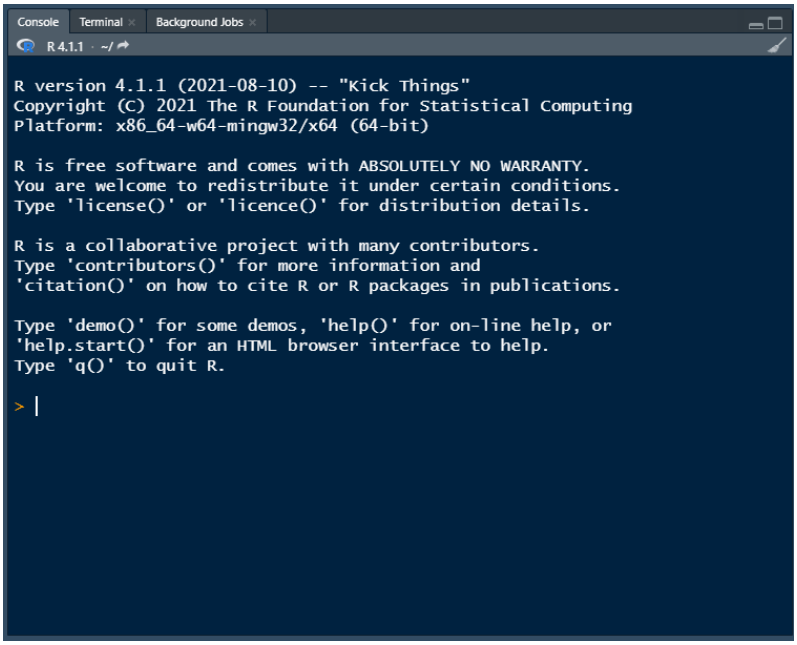
This link has a basic guide to getting started with R and RStudio on your computers: https://rstudio-education.github.io/hopr/starting.html

Please note, I am using R 4.1.1 and RStudio 2022.07.1+554. There are updates available, but I am keeping these versions to remain compatible with a few other packages that are sensitive to updates (open-source pains). If you already have R and RStudio installed on your computer, here's how you can check your versions:

1. Open RStudio and find **About RStudio** under Help. This should tell you which R Studio version you are currently using. I recommend updating if you don't have a compelling reason to keep it as is.

2. To find out what version of R is running behind the scenes, there are two options:

   a) Find the "**Console**" in your R environment. You should see the R version information given there. For instance, in the image below from my screen, you can see R 4.1.1 right under Console and in the first line of the description.



b) The other method (in case you don't see the Console or are just curious) is to use the following code: `R.version.string`

```
1 R.version.string
```

Which will give you the following output:

```
> R.version.string
[1] "R version 4.1.1 (2021-08-10)"
```

Other resources on getting started with Base R and RStudio

- Highly recommend you start with this tutorial offered by Dataquest: https://www.dataquest.io/blog/tutorial-getting-started-with-r-and-rstudio/
- Markus Freitag's workshop for political scientists: https://m-freitag.github.io/intro-r-polsci/
- A fantastic guide by Richard Blissett on R for Stata users (useful for those of us who began their quantitative methods journey with Stata like I did): http://rslblissett.com/wp-content/uploads/2016/09/RTutorial_160930.pdf
- Must-have book recommendation: Muenchen, R. A., & Hilbe, J. (2010). *R for Stata users*. New York, NY: Springer.

For slightly advanced beginners (to explore more of what R has to offer)

- R Introduction module in this online tutorial: https://iqss.github.io/dss-workshops/Rintro.html (the R Installation module is a useful recap if you've done some R before but need a refresher).
- This Github repository for a UCLA Intro to R workshop: https://github.com/ibsali33/IntroToR-1 (for those not familiar with Github, find the green "Code" button on the right, click it and select Download ZIP.
- Quantitative Politics in R by Larsen and Fazekas: http://qpolr.com/

Tidyverse

- I use this set of packages a lot, especially ggplot2 which is fantastic for graphs, figures, other types of visualizations.
- But what is it?
    - The simple version: https://www.geeksforgeeks.org/what-are-the-tidyverse-packages-in-r-language/
    - The complicated (but essential) version: https://github.com/tidyverse
- Getting started with Tidyverse: https://www.datacamp.com/tutorial/tidyverse-tutorial-r
- More on ggplot2, dplyr etc.: https://monashbioinformaticsplatform.github.io/r-more/topics/tidyverse.html
- Ggplot2 visualizations: http://r-statistics.co/Top50-Ggplot2-Visualizations-MasterList-R-Code.html#Bar%20Chart

R for Political Scientists Blog

- Leans heavy on the visualization side and is advanced but I use it very regularly to find new ways to visualize survey data: https://rforpoliticalscience.com/blog-2/

More on Visualizations

- A helpful tutorial for making graphs in base R (aka no fancy packages): https://www.geo.fu-berlin.de/en/v/soga/Introduction-to-R/Plotting-Data/base-R-graphics/index.html
- Another one in base R (I often go back to this to make basic kernel density plots or matrices): https://towardsdatascience.com/a-guide-to-data-visualisation-in-r-for-beginners-ef6d41a34174
- Couple more advanced resources on ggplot2:
    - https://r4ds.had.co.nz/data-visualisation.html#geometric-objects
    - https://rkabacoff.github.io/datavis/index.html

Regressions in R

- Getting started with regression analysis in R: https://iqss.github.io/dss-workshops/Rmodels.html#models-with-continuous-outcomes
- Fixed and Mixed Effects Regressions: http://ladal.edu.au/regression.html#Introduction

Interpreting and Troubleshooting Errors

I wish there was one resource that had all the answers, but I often find myself on Stack Overflow trying to figure out what went wrong with my code. These links are permanently bookmarked in my library:

- An easy guide to understanding errors: https://warin.ca/posts/rcourse-howto-interpretcommonerrors/
- An easy guide with relatively easy fixes to common problems: https://medium.com/analytics-vidhya/common-errors-in-r-and-debugging-techniques-f11af3f1c7d3
- Can get slightly more technical: https://bookdown.org/yih_huynh/Guide-to-R-Book/trouble.html

RStudio Cheatsheets

If you're comfortable with R but stuck somewhere or trying to find an easier way to do something, these cheatsheets are useful and published by RStudio:
https://www.rstudio.com/resources/cheatsheets/

If you like books…

Using R for Data Analysis in Social Sciences. Quan Li, Oxford University Press, 2018.

Hands-On Programming with R: Write Your Own Functions and Simulations. Garrett Grolemund, O'Reilly Media, 2014.

R for Data Science: Import, Tidy, Transform, Visualize, and Model Data. Hadley Wickham and Garrett Grolemund, O'Reilly Media, 2017.

R for Everyone: Advanced Analytics and Graphics. Jared P. Lander. Addison-Wesley, 2014.