Report 1 Assignment

Introduction to R graduate seminar

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The assignment

The objective here is for you to apply `R` and `R markdown` skills developed so far in the seminar to your own data. The expectation is that you will create a little report on an existing dataset. At a mimimum, this report should include:

- Brief description of the research question for which your data have been collected.

- Brief description of the data themselves:
  - How were the data collected? Over what time frame and how frequently?
  - Distinguish response and predictor variables
  - Identify variable types
  - *note that some, but not all, of these points can be supported by R functions.*

- At least one table showing summary statistics. A formatted table, rather than simple `R` output, is preferred, and a caption is encouraged.

- At least one plot generated by `ggplot`:
  - The plot must be of a type appropriate for the data shown
  - Do all you can to enhance the readibility of the plot: pay attention to colors, sizes, weights, and informative labels.
  - Including a caption is encouraged.

- Offer a brief summary of how the plot informs the research questions identified at the beginning of the report.

- Additional points:
  - We want to see all of your `R` script but not in the body of the report.
  - Please save your Word output as a `.pdf` file before uploading to Blackboard.

Bear in mind that we don't really care what you turn in, just so you turn something in. So if the bare minimum suits you, fine. But the point here is to hone your ability to apply R to the routine tasks that make up the day-to-day life of a research scientist. You will learn more the more you attempt to do, so take this opportunity to learn more about the various options of the functions we've used. You are welcome to try and use new functions, as well, depending on how comfortable you are using the help files and online answer community. Explore but don't get carried away such that you can't get the thing to knit.

Creating your R markdown file

As discussed in class you can either launch a new R markdown file specifically using File > New... in R studio and modifying all the defaults, or simply open a blank new file (R script or text file) and tell R studio you want it to be a .Rmd file by selecting R markdown from the list in the lower righthand corner of the script window.

Create your YAML header

At the top of an R markdown file is the YAML header. It should look something like this:

```
---
title: "Intro to R"
author: " your name here "
date: "`r Sys.Date()`"
output: word_document
csl: author_year.csl
subtitle: 'Report 1'
bibliography: bibliography.bib
---
```

Note that one can call the .csl and .bib files and not use them, but if they are called they need to be in the same folder as the .Rmd file whether one uses them or not.

knitr options

I recommend using this in your initial setup code chunk:

```
if (!require("pacman")) install.packages("pacman")
pacman::p_load(knitr)
opts_chunk$set(message = FALSE, warning=FALSE,
                echo=FALSE, eval=TRUE, fig.path='Figs/')
```

In the above, echo=FALSE hides all of your R script. But we still want to see it. knitr can put it all together as an appendix; put this at the end:

```
# Code

```{r ref.label=knitr::all_labels( ), echo=TRUE,eval=FALSE}
```
```

What if I want to knit this sucker straight to `.pdf`?

Brave, but I applaud you. Really all you need is a local LaTeX installation (Table 1); `R studio` and `pandoc` take care of everything for you (unless for some reason a problem arises, then you are down the rabbithole).

Remember: One can easily knit `.Rmd` to `.pdf`. You might start Googling how to do various things and some LaTeX mark-up code will creep in to your document, and eventually you might find you want the full control of a `.Rnw` file—called `R sweave` in `R studio`—but just remember, with great power comes great responsibility. You won't have the template of `R markdown` to cushion you but you can make your document look however you want.

Most immediately in this transition you will realize that you can't do *anything* you don't specifically tell the compiler to do. `R markdown` works on a template that sets various defaults for you, so you don't have to; customization means re-setting these defaults. But straight-up `.Rnw` files offer little defaults. Note also that code chunks are defined differently.

Table 1: Software necessary to knit to `.pdf`, by operating system.

System	Software	URL
Windows	MikTex (recommended)	`https://miktex.org/download`
Windows	TeXLive	`http://www.tug.org/texlive`
Mac	MacTeX	`http://www.tug.org/mactex/`