DISSERTATING IN RMARKDOWN
(Thesis format: Monograph)

by

Thea Lucille <u>Knowles</u>

Graduate Program in Department of Health & Rehabilitation Sciences

A thesis submitted in partial fulfillment
of the requirements for the degree of
Doctor of Philosophy

The School of Graduate and Postdoctoral Studies
The University of Western Ontario
London, Ontario, Canada

Abstract

Here's a story about a little guy that lives in a blue world. And all day and all night and everything he sees is just blue, like him inside and outside. Blue his house with a blue little window and a blue corvette and everything is blue for him and himself and everybody around 'cause he ain't got nobody to listen.

Planning to write is not writing. Outlining, researching, talking to people about what you're doing, none of that is writing. Writing is writing.

<div align="right">

E. L. DOCTOROW
SOME BOOK

</div>

Acknowledgments

I'd like to acknowledge my dog, Rocky, whose enthusiasm for cheese is unrivaled. If this dissertation is even half as good as Rocky thinks cheese is, I will deem this body of work a massive success.

Contents

List of Figures

List of Algorithms

List of Tables

List of Appendices

List of Abbreviations, Symbols, and Nomenclature

You can define nomenclature from the text by using printnomenclature:

You can also manually specify them:

Terminology

CNR   Contrast-to-noise ratio

SNR   Signal-to-noise ratio

Terms Introduced by this Thesis

$\mathbb{ABC}$ ABC

DEF   DEF

Preface

Chapter 1

Dissertating in RMarkdown + Bookdown: A preliminary guide

This tutorial was last updated: 25 April, 2019

This is a non-exhaustive guide to writing your dissertation using `RMarkdown` and `Bookdown`. Specifically, it will walk you through *one method* of organziing, writing, and rendering a dissertation with these tools, using an adapted version of the Western University thesis templates. This tutorial was written by me, Thea Knowles. At the time of writing, I am currently in the throes of dissertating. This means that there are likely several details I haven't quite hammered out yet, or techniques I've missed. In the last year and a half, I've been collecting other people's tutorials and resources on using RMarkdown + for the purposes of using it to write a dissertation. The final product is my interpretation of these resources, adapted to my needs, and presented here as a *"What-I've-learned-so-far"*-style tutorial.

1.1 Prerequisites

In order to use this tutorial, you need the following:

- R
- RStudio
    - Recent versions of RStudio also include Pandoc, which is required to compile documents
- Latex for Mac or Windows (if you want to compile to PDF).
    - Alternatively, install TinyTex, the Latex distribution created and recommended by Yihui Xie, creator of RMarkdown and bookdown[1].

- R packages:

---

[1]TinyTex is probably the best way to go because Yihui always anticipates the problems we will run into, but I personally have not used it.

```r
if(!require(devtools))
  install.packages("devtools", repos = "http://cran.rstudio.com")
install.packages("bookdown")
install.packages("knitr")
```

Chapter 2

Introduction

Chapter 3

Methods

Chapter 4

Results

4.1 This is the results section

NB: This is the exact same results section we used during our RMarkdown tutorial last year.

This section reads in the contents of `helper.R`. You can embed figures and tables directly in this section, or you can save them to another location. Every journal has slightly different requirements, so you may have to tweak your workflow depending on where you're submitting.

You can also cite your references from your `.bib` file using the bib key using the syntax `[@bibkey]` like this (Thompson and Arsel 2004)

4.1.1 Embedding a figure

We can embed figures just like we did in the summary document, by using R code chunks. We can also include extra information to include captions and to be able to cross reference them.

Caution: cross-referencing tables and figures is fairly straightfoward in RMarkdown when you're knitting to PDF and HTML outputs, but it's a lot more obnoxious in Word. To do that, we'll have to use a specialized output and another knitr package (bookdown). We'll visit that in a moment.

First, we'll just embed a plot. This is how you'll reference it, but it won't turn out nice in regular word output just yet.
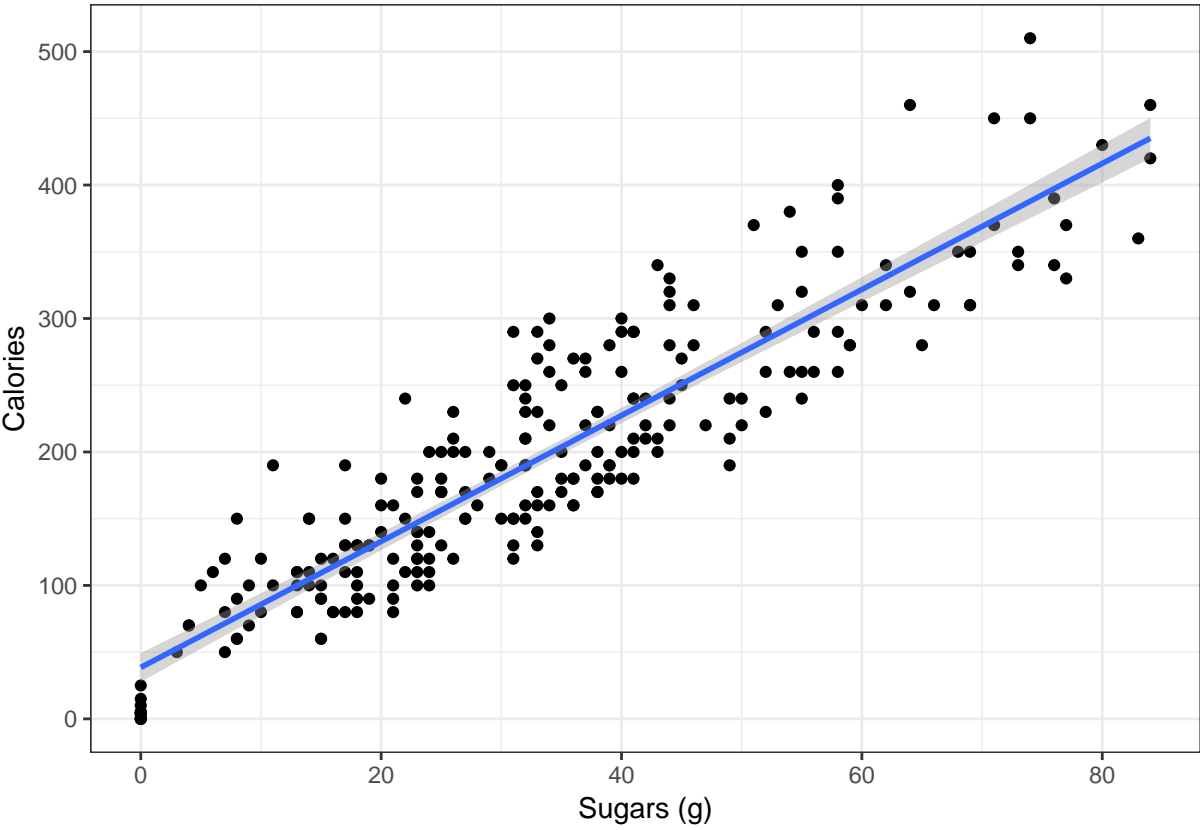
See Figure 4.1 below.

Figure 4.1: Calories by sugars

Table 4.1: Calories and sugars for each beverage.

Beverage_category	cals	sug
Classic Espresso Drinks	144.91	17.6
Coffee	4.25	0.0
Frappuccino Blended Coffee	276.94	57.1
Frappuccino BlendedCreme	233.08	48.5
Frappuccino Light Blended Coffee	162.50	32.4
Shaken Iced Beverages	114.44	26.0
Signature Espresso Drinks	250.00	38.6
Smoothies	282.22	36.8
Tazo Tea Drinks	177.31	30.3

4.2 Cross referencing figures and tables

You can cross-reference figures and tables. This is a bit more complicated, but the benefit is that you don't have to remember which figure/table was in which position (especially helpful if you are adding/removing figs/tables during editing phase). You simply refer to the figure by its chunk label.

Figure 4.2 is shown here.

See Table 4.1.
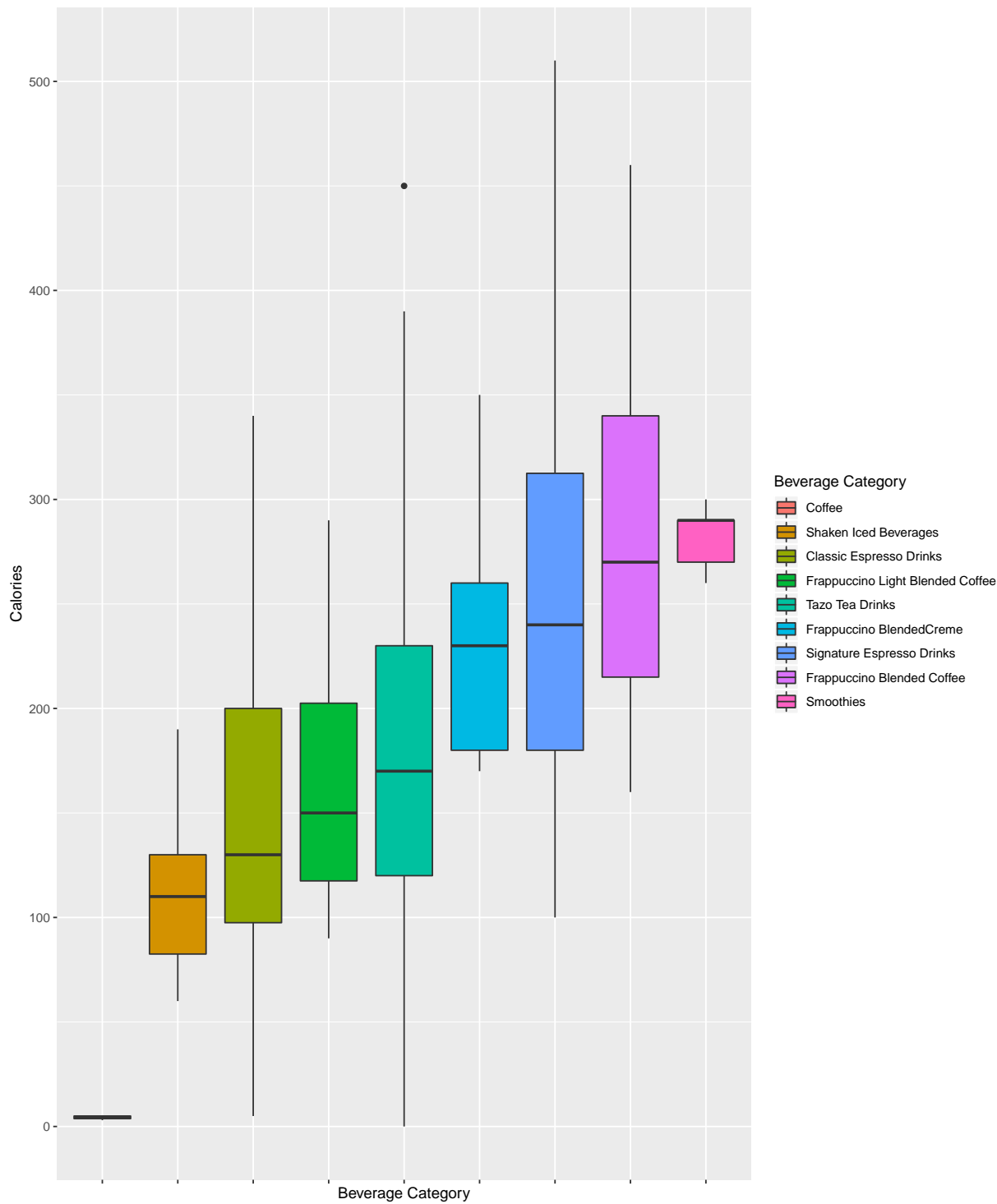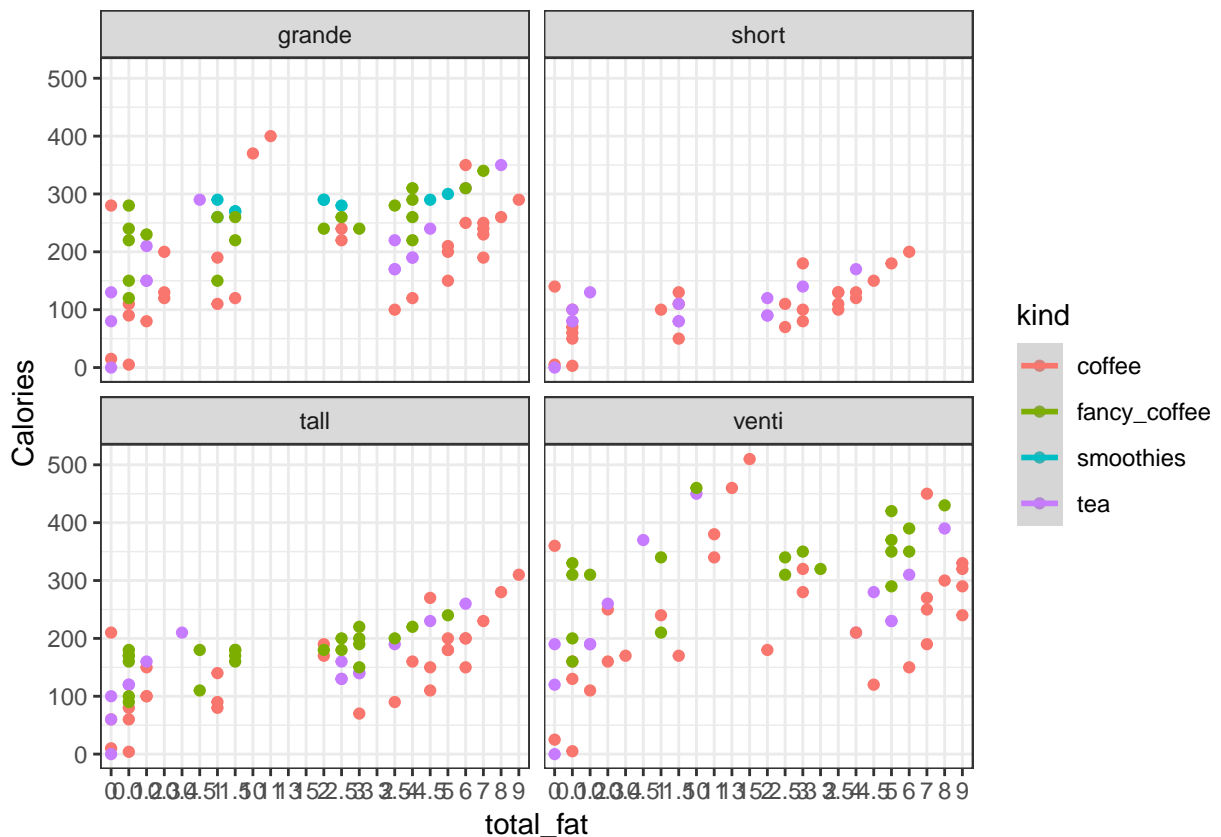
We can also just redo the plot

Figure 4.2: A nice figure caption

4.2.1 Using inline R code to refer to values in tables

Here I will include a little extra embedded R code to clean up our model results, but I won't include this code to be shown. In the next paragraph, I'll refer directly to the contents of my model output using in-line R code. For this, we don't use embedded chunks, but rather the syntax ' r someCodeHere '. See the next paragraph in the results.Rmd file for an example.

Sugars demonstrated a significant main effect on the calorie content of starbucks beverages (estimate = 4.721, t = 33.311, p = 0).

Notice that our small $p - value$ shows up as 0, when it really should show up as <0.001. I'm going to include another chunk that cleans up the p-value column. Caution: This code is pretty wordy.

Now I'll refer to the same p-value as before, using almost the same inline R code as I did previously. One main difference now, though, is that we've converted the contents of the table to character variables (i.e., they're no longer numeric). We did our rounding in the code above, so I no longer have to round in the inline code.

As previously stated, sugars demonstrated a significant main effect on the calorie content of starbucks beverages (estimate = 4.721, t = 33.311, p = <0.001).

Table 4.2: This is the caption for my model coefficients table.

	Estimate	Std. Error	t value	Pr(>|t|)
(Intercept)	38.518	5.464	7.049	<0.001
sugars	4.721	0.142	33.311	<0.001

4.2.2   Printing a table

Here I will reference a table.

Other stuff

- How do we change the row names?
- if $p < 0.001$, can we write it out that way?

4.3   You can save plots

Some journals require that you upload figures and tables separately. In this case, it may not make sense to have them print to the document output. The following code will allow you to save an image (default is the working directory) but it won't be included in the document.

```
jpeg("images/pressure.jpg")
plot(pressure)
dev.off()
```

```
## pdf
##   2
```

You could, for example, make a subdirectory called "`figures`", and include that in the path.

Chapter 5

Conclusions

5.1   Another results section

References

Thompson, Craig J, and Zeynep Arsel. 2004. "The Starbucks Brandscape and Consumers'(anticorporate) Experiences of Glocalization." *Journal of Consumer Research* 31 (3): 631–42.