ABCD BIOSTATS LONGITUDINAL PAPER

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Abstract

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1 Sectioning

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2 (Pandoc) Markdown syntax

2.1 Basic formatting

Text can be **bold**, *italic*, or `verbatim` (e.g., for code).

This is a quotation:

> *This is an infamous quote.*
>
> — The Author

Explicit URLs and email addresses are automatically converted to clickable links, e.g., `https://abcdstudy.org` and `janosch@ucsd.edu`. Links can also be shown with alternative text, e.g., The ABCD study's website and Janosch's email address.

One can also use LaTeX syntax directly if one has or wants to, like the `\medskip\noindent` above.

2.2 Footnotes

Footnotes can be added like this.[2]

---

[2] This is a footnote.

2.3 Lists

This is an *unordered* list:

- first item
- second item
  - first subitem
  - second subitem
    * first subsubitem
    * second subsubitem
- third item

This is an *ordered* list:

1. first item
2. second item
3. third item
4. fourth item
5. fifth item
6. sixth item
7. seventh item
8. eighth item
9. ninth item
10. tenth item
    i. first subitem
    ii. second subitem
    iii. third subitem
    iv. fourth subitem
    v. fifth subitem
    vi. sixth subitem
    vii. seventh subitem
    viii. eighth subitem
    ix. ninth subitem
    x. tenth subitem
    xi. eleventh subitem
        a. first subsubitem
        b. second subsubitem
        c. third subsubitem
11. eleventh item

2.4 Citations

Citations can be added using the following syntax:

- `[@citation1]` / `[@citation2; @citation3]` for parenthetical citations.[3]
- `@citation4` for in-text citations.

This is what one paper says (see Hadash et al. 2018, for an overview). This is what two other say (Kour and Saabne 2014b, 2014a). Hadash et al. (2018) said more.

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[3]Prefixes and suffixes can be added to parenthetical citation, e.g., `[cf., @citation1]`.

2.5 Mathematical notation

Math is based on LaTeX syntax.[4] To display math inline, one has to enclose mathematical expressions in `$...$`, e.g., $\sum_{n=1}^{10} n^2$. To add an equation, one can utilize LaTeX equation environments:

$$Y_i = \beta_0 + \beta_1 X_i + \epsilon_i \tag{1}$$

3 R Markdown syntax/elements

3.1 Code

One can embed arbitrary R code[5] anywhere in the document like "the square root of 36 is 6." Furthermore, one can use "code chunks" to execute bigger chunks of R code and have the results displayed in the document (or not[6]).

```r
# select variables
y <- iris$Species
x <- iris$Sepal.Length

# print regression model
glm(y~x, family = 'binomial')
```

```
Call:  glm(formula = y ~ x, family = "binomial")

Coefficients:
(Intercept)
    -27.829
          x
      5.176

Degrees of Freedom: 149 Total (i.e. Null);  148 Residual
Null Deviance:      191
Residual Deviance: 71.84    AIC: 75.84
```

3.2 Figures

Code chunks can also be used to embed plots generated with R (or other programming languages). The appearance of figures in the output document can be modified using chunk options.[7] For example, the following prints a figure that takes up 75% of the column width. It's set in a floating environment, so might not appear at this exact location.

While it possible to use standard Markdown syntax to include locally stored images, it's suggested to also use code chunks for these images. This makes it easy to format an image's appearance, add figure captions, and reference figures throughout the document (see below). The following figure is using a local image.

3.3 Cross-references

Using the Bookdown extension of R Markdown, it is possible to embed cross-references to different elements of the document.[8]

- `\@ref(section-id)` to reference sections, e.g., see Section 2.

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[4] See, e.g., `https://en.wikibooks.org/wiki/LaTeX/Mathematics` or `https://www.overleaf.com/learn/latex/mathematical_expressions`.

[5] A number of other programming languages are also supported, see `https://bookdown.org/yihui/rmarkdown/language-engines.html`.

[6] For an overview of different chunk options which determine how code chunks are displayed in the resulting document, see `https://yihui.org/knitr/options/`.

[7] See, e.g., `http://zevross.com/blog/2017/06/19/tips-and-tricks-for-working-with-images-and-figures-in-r-markdown-d`

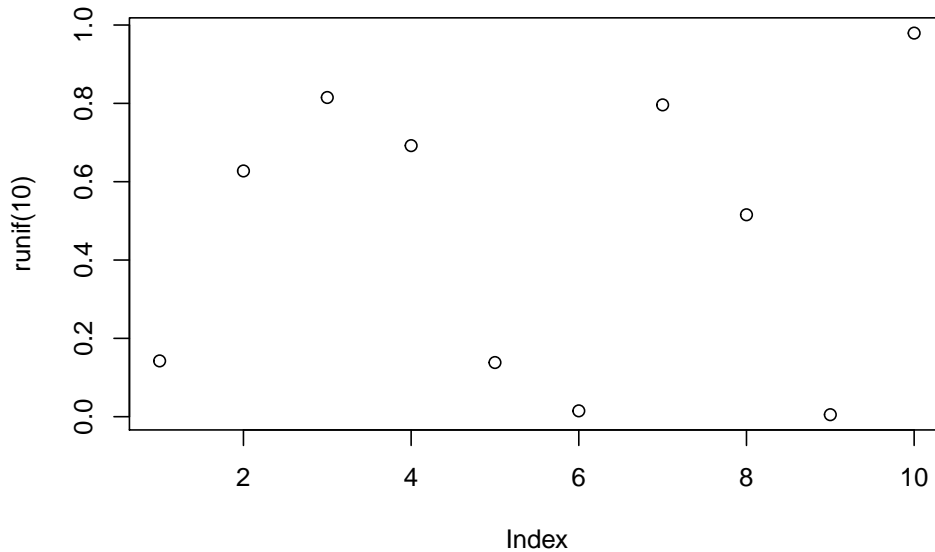[8] See `https://bookdown.org/yihui/bookdown/cross-references.html`.

Figure 1: A figure.

- `\@ref(fig:plot-name)` to reference figures, e.g., see Figure 1.
- `\@ref(eq:equation-name)` to reference equations, e.g., see Equation (1).

4 Random tips and tricks

- To make on-the-fly changes to the layout
  - use `header_includes` in the YAML header to add code to the LaTeX preamble or
  - put a modified class file in the same directory as the `.Rmd` file.
- To eliminate "overfull lines/boxes"
  - modify LaTeX's `\emergenystretch` parameter by including, e.g., `\setlength{\emergencystretch}{8em}` in the `.Rmd` file before the first overful box.
- To have URLs in figure captions be displayed with colored links
  - use `\\url{}` around the URL.

5 Summary

This document gave a brief introduction on how to use R Markdown to generate reports in PDF format. For more thorough information on how to use R Markdown, see the following web resources:

- R Markdown guide
- R Markdown cookbook
- R Markdown for scientists
- Bookdown book

References

Hadash, Guy, Einat Kermany, Boaz Carmeli, Ofer Lavi, George Kour, and Alon Jacovi. 2018. "Estimate and Replace: A Novel Approach to Integrating Deep Neural Networks with Existing Applications." *arXiv Preprint arXiv:1804.09028*.

Kour, George, and Raid Saabne. 2014a. "Fast Classification of Handwritten on-Line Arabic Characters." In *Soft Computing and Pattern Recognition (SoCPaR), 2014 6th International Conference of*, 312–18. IEEE.

———. 2014b. "Real-Time Segmentation of on-Line Handwritten Arabic Script." In *Frontiers in Handwriting Recognition (ICFHR), 2014 14th International Conference on*, 417–22. IEEE.