1 YOUR PAPER TITLE

Abstract

YOUR ABSTRACT GOES HERE. All data and code for this study are shared via OSF, including the R markdown document that this article is generated from, and an R library that implements the models we present.

Keywords: KEY-WORD1; KEY-WORD2; KEY-WORD3; ...

YOUR PAPER TITLE

1 My TO DO list for this paper

This is a place where you can summarize your to-do list while you're working on the paper. By putting it at the beginning of your paper and using a logical flag to switch it on and off (in the main document), you can keep this information accessible to your collaborators while also making it easy to remove when you want to share your document with someone else.

1.1 Highest priority

- AUTHOR:
  - Do ….
  - Fix …
  - Make new plot for …
- CO_AUTHOR 1:
- Re-read … and make sure that we present their hypothesis correctly.
- CO-AUTHOR 2:
  - Code analysis for Experiment 2 …
  - Double check formula in Section …

1.2 To do later

- Everyone: Eat ice-cream and perhaps have a beer.

1 Introduction

This is an R Markdown-based template for APA articles, used by the Human Language Processing Lab at the University of Rochester. If you have questions or ideas on how to improve his template, please let us know, e.g., at fjaeger@ur.rochester.edu.

The template uses many cool R packages. In particular, the package relies heavily on papaja, knitr, citr, and other packages. Make sure to read the great https://frederikaust.com/papaja_man/writing.html.

To get started on using this manuscript, have a look at the index.Rmd file. It's the parent Rmd file that loads all the other Rmd files, one for each section of the paper. The index.Rmd file is also the file that is used to knit the entire document.

1.1 Issues with biblatex

This document uses biblatex, in order to allow multiple bibliographies—one at the end of the main text, and one at the end of the supplementary information. Biblatex and biber can be a bit difficult to handle, and you might see errors "Error: Failed to build the bibliography via biber" or lots of unrecognized references even when the .bib file contains them. In that case, make sure your biblatex and biber version are compatible. E.g., if you see something like:

```
ERROR - Error: Found biblatex control file version 3.11, expected version 3.10.
This means that your biber (2.19) and biblatex (3.20) versions are incompatible.
See compat matrix in biblatex or biber PDF documentation.
```

You need to make sure that you update your latex environment and that those updates are visible to RStudio. Generally, the easiest way to do that is via the R package `tinytex::tlmgr_update()`. Sometimes, however, this is not enough. In those cases, try `tinytex::tlmgr_install("biber")` and `tinytex::tlmgr_install("biblatex")`.

2 Another section with some examples of citations, figures, etc.

How humans managed to survive so far remains one of the central questions of the social sciences. … Here are some references (**nygaard1994**; **Perrachione2016**; **wade2007**; **weil2001a**; e.g.,

Bradlow & Bent, 2008; Sidaras et al., 2009; Xie et al., 2021). And here is a figure references to Figure 1.

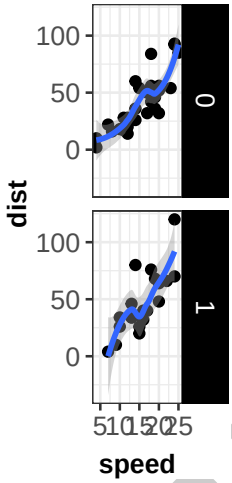

Figure 1. You should use a verbose caption that is self-contained and clearly states the main points of the figure. When you look at the R markdown for this document, note that the caption is *outside* of the R-chunk but linked to the R-chunk through a reference in the chunk option fig.cap. Notice also how the reference in the main text uses the label fig:label, whereas the caption and the R chunk option fig.cap that generates the figure use the label ref:label. Finally, the R-chunk itself is called label. Make sure to follow this format in order to make sure that your figure references and captions knit correctly. This example also demonstrates how you can use a globally defined base width and height for all figures. In this example, the base height is multiplied by two because we're faceting the data into two rows.

You can also make phonetic symbols, e.g., for the sound category [ʃ] (**newman2001**). And you can type equations like Equation (1), which describes Wichmann and Hill's psychometric model with parameters α and β and more.

$$p(category|input) = (1-\lambda)\frac{\mathcal{N}(input|\mu_c, \Sigma_c)\,\pi}{\Sigma_i \mathcal{N}\left(input|\mu_{c_i}, \Sigma_{c_i}\right)\pi_i} + \lambda\frac{\pi}{\Sigma_i \pi_i} \tag{1}$$

All data and code for this article can be downloaded from https://osf.io/q7gjp/. This article is written in R markdown, allowing readers to replicate our analyses with the press of a button using freely available software (R, R Core Team, 2022; RStudio Team, 2020), while changing any of the parameters of our models. Readers can revisit any of the assumptions we make—for example, by substituting alternative models of linguistic representations. The supplementary information (SI, **??**) lists the software/libraries required to compile this document.

Beyond our immediate goals here, we hope that this can be helpful to researchers who are interested in developing more informative experimental designs, and to facilitate the interpretation of existing results (see also Tan et al., 2021).

3 General discussion

An example of a section.

3.1 Methodological advances that can move the field forward

An example of a subsection.

References

Bradlow, A. R., & Bent, T. (2008). Perceptual adaptation to non-native speech. *Cognition*, *106*(2), 707–729.

R Core Team. (2022). *R: A language and environment for statistical computing*. R Foundation for Statistical Computing. Vienna, Austria. https://www.R-project.org/

RStudio Team. (2020). *Rstudio: Integrated development environment for r*. RStudio, PBC. Boston, MA. http://www.rstudio.com/

Sidaras, S. K., Alexander, J. E., & Nygaard, L. C. (2009). Perceptual learning of systematic variation in spanish-accented speech. *The Journal of the Acoustical Society of America*, *125*(5), 3306–3316.

Tan, M., Xie, X., & Jaeger, T. F. (2021). Using rational models to interpret the results of experiments on accent adaptation. *Frontiers in Psychology*, 4523.

Xie, X., Liu, L., & Jaeger, T. F. (2021). Cross-talker generalization in the perception of nonnative speech: A large-scale replication. *Journal of Experimental Psychology: General*, *150*(11), e22.

Supplementary information

Contents

§1 Required software

Both the main text and these supplementary information (SI) are derived from the same R markdown document available via OSF. It is best viewed using Acrobat Reader. Some links and animations might not work in other PDF viewers.

§2 Required software

Both the main text and these supplementary information (SI) are derived from the same R markdown document available via https://osf.io/hxcy4/. It is best viewed using Acrobat Reader. The document was compiled using `knitr` in RStudio with R:

```
##                _
## platform       aarch64-apple-darwin20
## arch           aarch64
## os             darwin20
## system         aarch64, darwin20
## status
## major          4
## minor          3.2
## year           2023
## month          10
## day            31
## svn rev        85441
## language       R
## version.string R version 4.3.2 (2023-10-31)
## nickname       Eye Holes
```

You will also need to download the IPA font SIL Doulos and a Latex environment like (e.g., MacTex or the R library `tinytex`).

We used the following R packages to create this document: R (Version 4.3.2; R Core Team, 2021) and the R-packages *assertthat* (Version 0.2.1; Wickham, 2019a), *brms* (Version 2.21.0; Bürkner, 2017, 2018, 2021), *cowplot* (Version 1.1.3; Wilke, 2020), *data.table* (Version 1.15.4; Dowle & Srinivasan, 2021), *diptest* (Version 0.77.1; Maechler, 2021), *dplyr* (Version 1.1.4; Wickham,

François, et al., 2021), *forcats* (Version 1.0.0; Wickham, 2021a), *gganimate* (Version 1.0.9; Pedersen & Robinson, 2020), *ggplot2* (Version 3.5.1; Wickham, 2016), *LaplacesDemon* (Version 16.1.6; Statisticat & LLC., 2021), *latexdiffr* (Version 0.2.0; Hugh-Jones, 2021), *linguisticsdown* (Version 1.2.0; Liao, 2019), *lme4* (Version 1.1.35.3; Bates et al., 2015), *lubridate* (Version 1.9.3; Grolemund & Wickham, 2011), *magick* (Version 2.8.3; Ooms, 2021), *magrittr* (Version 2.0.3; Bache & Wickham, 2020), *Matrix* (Version 1.6.5; Bates & Maechler, 2021), *modelr* (Version 0.1.11; Wickham, 2020), *MVBeliefUpdatr* (Version 0.0.1.10; Kleinschmidt & Jaeger, 2015), *papaja* (Version 0.1.2; Aust & Barth, 2020), *plotly* (Version 4.10.4; Sievert, 2020), *processx* (Version 3.8.4; Csárdi & Chang, 2021), *purrr* (Version 1.0.2; Henry & Wickham, 2020), *Rcpp* (Version 1.0.12; Eddelbuettel & Balamuta, 2018; Eddelbuettel & François, 2011), *readr* (Version 2.1.5; Wickham, Hester, & Bryan, 2021), *rlang* (Version 1.1.3; Henry & Wickham, 2021), *stringr* (Version 1.5.1; Wickham, 2019b), *tibble* (Version 3.2.1; Müller & Wickham, 2021), *tidyr* (Version 1.3.1; Wickham, 2021b), *tidyverse* (Version 2.0.0; Wickham et al., 2019), *tinylabels* (Version 0.2.4; Barth, 2022), and *tufte* (Version 0.13; Xie & Allaire, 2022). If opened in RStudio, the top of the R markdown document should alert you to any libraries you will need to download, if you have not already installed them. The full session information is provided at the end of this document.

§2.1 Interested in using R markdown do create APA formatted documents that integrate your code with your writing?

A project template, including R markdown files that result in APA-formatted PDFs, is available at https://github.com/hlplab/template-R-project. Feedback welcome. We aim to help others avoid the mistakes and detours we made when first deciding to embrace literal coding to increase transparency in our projects.

§3 Other sections

§4 Session Info

```
## - Session info ---------------------------------------------------------------------------
##  setting  value
##  version  R version 4.3.2 (2023-10-31)
##  os       macOS Sonoma 14.4.1
##  system   aarch64, darwin20
##  ui       X11
##  language (EN)
##  collate  en_US.UTF-8
##  ctype    en_US.UTF-8
##  tz       America/New_York
##  date     2024-05-30
##  pandoc   3.1.11 @ /Applications/RStudio.app/Contents/Resources/app/quarto/bin/tools/aarch64
##
## - Packages -------------------------------------------------------------------------------
##  package         * version    date (UTC) lib source
##  abind             1.4-5      2016-07-21 [1] CRAN (R 4.3.0)
##  arrayhelpers      1.1-0      2020-02-04 [1] CRAN (R 4.3.0)
##  assertthat      * 0.2.1      2019-03-21 [1] CRAN (R 4.3.0)
```

```
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##  bayestestR        0.13.2     2024-02-12 [1] CRAN (R 4.3.1)
##  bookdown          0.39       2024-04-15 [1] CRAN (R 4.3.1)
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##  curl              5.2.1      2024-03-01 [1] CRAN (R 4.3.1)
##  data.table        1.15.4     2024-03-30 [1] CRAN (R 4.3.1)
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##  mime              0.12       2021-09-28 [1] CRAN (R 4.3.0)
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##  multcomp          1.4-25     2023-06-20 [1] CRAN (R 4.3.0)
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##  remotes           2.5.0      2024-03-17 [1] CRAN (R 4.3.1)
##  reshape2          1.4.4      2020-04-09 [1] CRAN (R 4.3.0)
##  rlang           * 1.1.3      2024-01-10 [1] CRAN (R 4.3.1)
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##  rstan             2.32.6     2024-03-05 [1] CRAN (R 4.3.1)
##  rstantools        2.4.0      2024-01-31 [1] CRAN (R 4.3.1)
##  rstudioapi        0.16.0     2024-03-24 [1] CRAN (R 4.3.1)
##  sandwich          3.1-0      2023-12-11 [1] CRAN (R 4.3.1)
##  scales            1.3.0      2023-11-28 [1] CRAN (R 4.3.1)
##  sessioninfo       1.2.2      2021-12-06 [1] CRAN (R 4.3.0)
##  sf                1.0-16     2024-03-24 [1] CRAN (R 4.3.1)
##  shiny             1.8.1.1    2024-04-02 [1] CRAN (R 4.3.1)
##  StanHeaders       2.32.7     2024-04-25 [1] CRAN (R 4.3.1)
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##  stringr         * 1.5.1      2023-11-14 [1] CRAN (R 4.3.1)
##  survival          3.6-4      2024-04-24 [1] CRAN (R 4.3.1)
```

```
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##  TH.data           1.1-2      2023-04-17 [1] CRAN (R 4.3.0)
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##  tidyr           * 1.3.1      2024-01-24 [1] CRAN (R 4.3.1)
##  tidyselect        1.2.1      2024-03-11 [1] CRAN (R 4.3.1)
##  tidyverse       * 2.0.0      2023-02-22 [1] CRAN (R 4.3.0)
##  timechange        0.3.0      2024-01-18 [1] CRAN (R 4.3.1)
##  tinylabels      * 0.2.4      2023-09-02 [1] CRAN (R 4.3.0)
##  transformr        0.1.5      2024-02-26 [1] CRAN (R 4.3.1)
##  tufte             0.13       2023-06-22 [1] CRAN (R 4.3.0)
##  tweenr            2.0.3      2024-02-26 [1] CRAN (R 4.3.1)
##  tzdb              0.4.0      2023-05-12 [1] CRAN (R 4.3.0)
##  units             0.8-5      2023-11-28 [1] CRAN (R 4.3.1)
##  urlchecker        1.0.1      2021-11-30 [1] CRAN (R 4.3.0)
##  usethis           2.2.3      2024-02-19 [1] CRAN (R 4.3.1)
##  utf8              1.2.4      2023-10-22 [1] CRAN (R 4.3.1)
##  V8                4.4.2      2024-02-15 [1] CRAN (R 4.3.1)
##  vctrs             0.6.5      2023-12-01 [1] CRAN (R 4.3.1)
##  viridis           0.6.5      2024-01-29 [1] CRAN (R 4.3.1)
##  viridisLite       0.4.2      2023-05-02 [1] CRAN (R 4.3.0)
##  withr             3.0.0      2024-01-16 [1] CRAN (R 4.3.1)
##  xfun              0.44       2024-05-15 [1] CRAN (R 4.3.3)
##  xtable            1.8-4      2019-04-21 [1] CRAN (R 4.3.0)
##  yaml              2.3.8      2023-12-11 [1] CRAN (R 4.3.1)
##  zoo               1.8-12     2023-04-13 [1] CRAN (R 4.3.0)
##
##  [1] /Library/Frameworks/R.framework/Versions/4.3-arm64/Resources/library
##
## ------------------------------------------------------------------------------
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