My title*

My subtitle if needed

First author   Another author

October 21, 2024

First sentence. Second sentence. Third sentence. Fourth sentence.

1 Introduction

Overview paragraph

Estimand paragraph

Results paragraph

Why it matters paragraph

Telegraphing paragraph: The remainder of this paper is structured as follows. Section 2....

2 Data

2.1 Overview

We use the statistical programming language R (R Core Team 2023).... Our data (Toronto Shelter & Support Services 2024).... Following Alexander (2023), we consider...

Overview text

2.2 Measurement

Some paragraphs about how we go from a phenomena in the world to an entry in the dataset.

---

*Code and data are available at: https://github.com/RohanAlexander/starter_folder.

2.3 Outcome variables

Add graphs, tables and text. Use sub-sub-headings for each outcome variable or update the subheading to be singular.

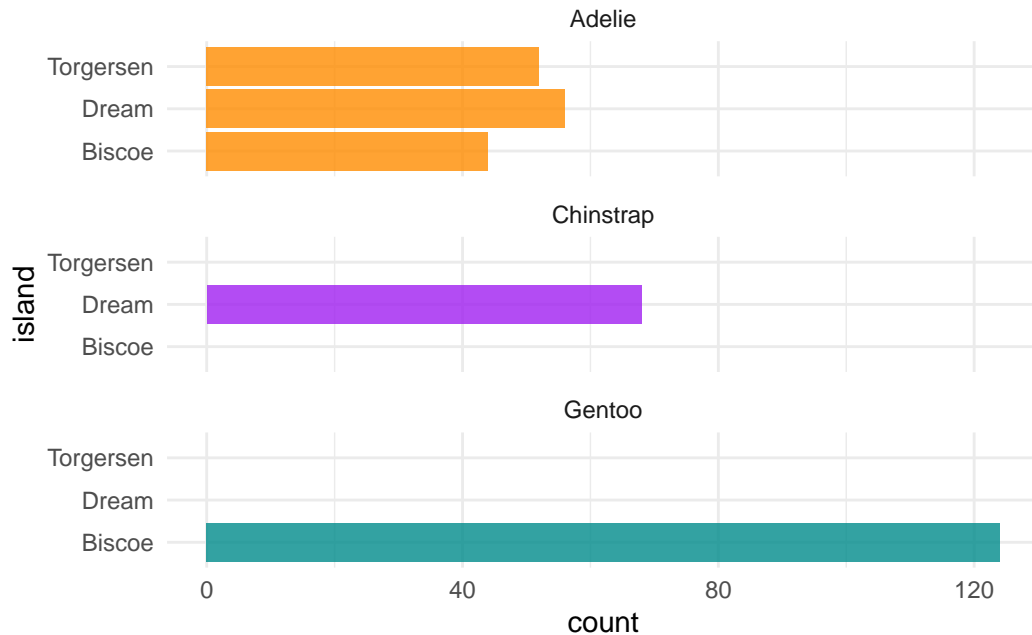Some of our data is of penguins (Figure 1), from Horst, Hill, and Gorman (2020).

Figure 1: Bills of penguins

Talk more about it.

And also planes (**?@fig-planes**). (You can change the height and width, but don't worry about doing that until you have finished every other aspect of the paper - Quarto will try to make it look nice and the defaults usually work well once you have enough text.)

Talk way more about it.

2.4 Predictor variables

Add graphs, tables and text.

Use sub-sub-headings for each outcome variable and feel free to combine a few into one if they go together naturally.

3 Model

The goal of our modelling strategy is twofold. Firstly,...

Here we briefly describe the Bayesian analysis model used to investigate... Background details and diagnostics are included in Appendix C.

3.1 Model set-up

Define y_i as the number of seconds that the plane remained aloft. Then β_i is the wing width and γ_i is the wing length, both measured in millimeters.

$$y_i | \mu_i, \sigma \sim \text{Normal}(\mu_i, \sigma) \tag{1}$$
$$\mu_i = \alpha + \beta_i + \gamma_i \tag{2}$$
$$\alpha \sim \text{Normal}(0, 2.5) \tag{3}$$
$$\beta \sim \text{Normal}(0, 2.5) \tag{4}$$
$$\gamma \sim \text{Normal}(0, 2.5) \tag{5}$$
$$\sigma \sim \text{Exponential}(1) \tag{6}$$

We run the model in R (R Core Team 2023) using the `rstanarm` package of Goodrich et al. (2022). We use the default priors from `rstanarm`.

3.1.1 Model justification

We expect a positive relationship between the size of the wings and time spent aloft. In particular...

We can use maths by including latex between dollar signs, for instance θ.

4 Results

Our results are summarized in Table 1.

Table 1: Explanatory models of flight time based on wing width and wing length

	First model
(Intercept)	1.12
	(1.70)
length	0.01
	(0.01)
width	−0.01
	(0.02)
Num.Obs.	19
R2	0.320
R2 Adj.	0.019
Log.Lik.	−18.128
ELPD	−21.6
ELPD s.e.	2.1
LOOIC	43.2
LOOIC s.e.	4.3
WAIC	42.7
RMSE	0.60

5 Discussion

5.1 First discussion point

If my paper were 10 pages, then should be be at least 2.5 pages. The discussion is a chance to show off what you know and what you learnt from all this.

5.2 Second discussion point

Please don't use these as sub-heading labels - change them to be what your point actually is.

5.3 Third discussion point

5.4 Weaknesses and next steps

Weaknesses and next steps should also be included.

Appendix

A Pollster Methodology Overview and Evaluation

A.1 Overview of SurveyUSA

SurveyUSA is a privately held opinion research company that operates nationwide, across all 50 U.S. states. Since its founding, the company has conducted over 40,000 research projects, serving a client base of 400 organizations, including media outlets, corporations, non-profits, government agencies, and academic institutions. Known for its expertise in localized opinion research, SurveyUSA focuses on gathering data at the city, county, and regional levels. The company offers timely, cost-effective surveys tailored to meet specific client needs, distinguishing itself from larger global firms.

A.2 Population, Frame, and Sample

- Target Population: U.S. citizens eligible to vote in the 2024 presidential election.

- Sample Frame: U.S. households with either home telephones or access to devices such as phones or tablets.

- Sample Size: Sample sizes vary across different polls. For the 2024 U.S. presidential election cycle, SurveyUSA conducted 49 polls, with sample sizes ranging from 507 to 2,330 for registered voters or likely voters. The average sample size for these polls is approximately 1,045 households.

A.3 Recruitment

SurveyUSA employs a mixed-method approach to recruitment, including online panels, telephone calls, and a text-to-web method. Some respondents are recruited through Random Digit Dialing (RDD) using telephone samples purchased from Aristotle, while others, who do not use home telephones, are invited to complete the survey on an electronic device such as a phone or tablet. Respondents from non-probability online panels are selected randomly by Cint/Lucid Holdings LLC.

A.4 Sampling approach and Trade-offs

SurveyUSA uses a blend of probability and non-probability sampling methods. Some respondents are drawn from non-probability online panels, while others are recruited using probability-based telephone sampling. Responses are weighted based on the latest U.S.

Census estimates for age, gender, ethnicity, and region, ensuring alignment with the target population. Questions and answer choices are rotated to reduce order bias, recency effects, and latency effects.

- **Advantages:**
  The diverse sampling approach not only ensures a broad range of opinions is captured but also complements probability-based sampling, which accurately reflects the overall population. Furthermore, reweighting the data according to U.S. Census demographics strengthens the credibility of the results by ensuring demographic accuracy. Additionally, rotating questions and answer choices helps mitigate bias, further improving the reliability of the data. Finally, the use of online surveys offers a cost-effective solution for efficient data collection.

- **Disadvantages:**
  Phone-based data collection tends to be time-consuming and can be affected by interviewer effects during telephone interviews. Additionally, challenges like non-response issues, such as busy signals or refusals to participate, can hinder the effectiveness of the data collection process.

A.5 Non-response Handling

In cases of non-response, SurveyUSA attempts follow-up calls if interviews are interrupted by answering machines or busy signals. Weighting is applied to adjust for non-response bias, although this doesn't completely eliminate challenges posed by unreachable or unwilling participants.

A.6 Questionnaire Evaluation

- **Positive Aspects:** A logical flow between questions facilitates easy navigation for respondents throughout the survey, while simple wording promotes inclusivity by enabling individuals from diverse backgrounds to comprehend the questions. Furthermore, all questions are directly relevant to analyzing the 2024 U.S. presidential election, and providing predefined response options simplifies the choices for participants.

- **Negative Aspects:** Static options for party affiliation and ideology may fail to capture the nuances of respondents' political beliefs. These rigid categories could oversimplify complex political identities.

A.7 Summary Evaluation

SurveyUSA's methodology reflects a balanced approach, leveraging various sampling approach and method to reach a representative sample. While its blend of probability and non-probability methods has strengths, such as cost-effectiveness and broad reach, it faces challenges related to telephone interview logistics, potential interviewer bias, and the limitations of fixed questionnaire options. Nevertheless, the inclusion of data weighting and question rotation adds credibility to its results, making SurveyUSA a reliable pollster for localized opinion research.

B Additional data details

C Model details

C.1 Posterior predictive check

In **?@fig-ppcheckandposteriorvsprior-1** we implement a posterior predictive check. This shows…

In **?@fig-ppcheckandposteriorvsprior-2** we compare the posterior with the prior. This shows…

Examining how the model fits, and is affected by, the data

C.2 Diagnostics

Figure 2a is a trace plot. It shows… This suggests…

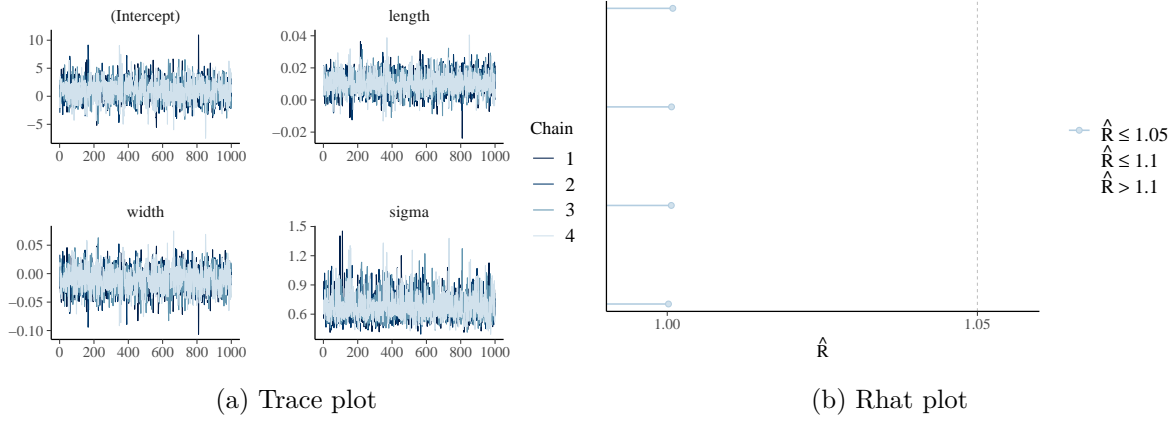Figure 2b is a Rhat plot. It shows… This suggests…

(a) Trace plot

(b) Rhat plot

Figure 2: Checking the convergence of the MCMC algorithm

References

Alexander, Rohan. 2023. *Telling Stories with Data.* Chapman; Hall/CRC. https://tellingstorieswithdata.com/.

Goodrich, Ben, Jonah Gabry, Imad Ali, and Sam Brilleman. 2022. "rstanarm: Bayesian applied regression modeling via Stan." https://mc-stan.org/rstanarm/.

Horst, Allison Marie, Alison Presmanes Hill, and Kristen B Gorman. 2020. *palmerpenguins: Palmer Archipelago (Antarctica) penguin data.* https://doi.org/10.5281/zenodo.3960218.

R Core Team. 2023. *R: A Language and Environment for Statistical Computing.* Vienna, Austria: R Foundation for Statistical Computing. https://www.R-project.org/.

Toronto Shelter & Support Services. 2024. *Deaths of Shelter Residents.* https://open.toronto.ca/dataset/deaths-of-shelter-residents/.