

My title*

An analysis of solved and unsolved homicides from 2007 to 2017 in the United States's 2 largest cities

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

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*Code and data are available at: <https://github.com/ moonsdust/unsolved-murders>.

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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 (The Washington Post 2018).... 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.

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 (**?@fig-bills**), from Horst, Hill, and Gorman (2020).

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 B](#).

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`.

3.2 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 `?tbl-modelresults`.

4.1 Model Results

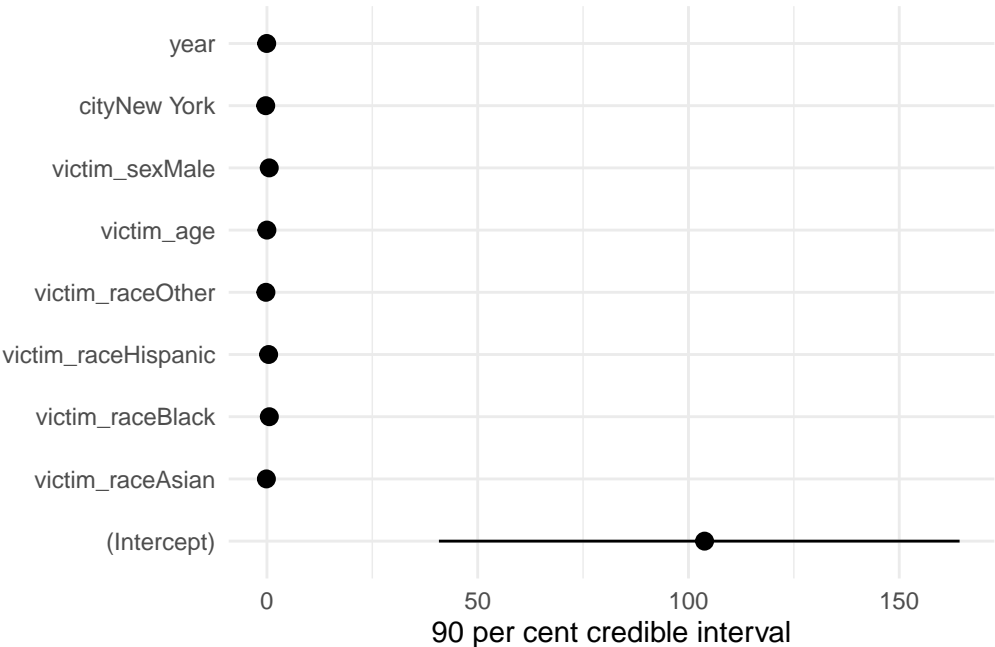


Figure 1: The credible intervals (line) for coefficient estimates (dot) of predictors of homicides that go unsolved from 2007 to 2017

Table 1: Relationship between a homicide being unsolved from 2007 to 2017 with the city and date (month, year) a victim is found in/on and the race, age, and sex of a victim with their mean absolute deviation (MAD) values in parenthesis

	Unsolved homicides (2007 to 2017)
(Intercept)	103.817 (36.659)
victim_raceAsian	−0.125 (0.325)
victim_raceBlack	0.570 (0.154)
victim_raceHispanic	0.406 (0.154)
victim_raceOther	−0.239 (0.317)
victim_age	−0.004 (0.003)
victim_sexMale	0.548 (0.116)
cityNew York	−0.282 (0.111)
year	−0.052 (0.018)
Num.Obs.	2820
R2	0.035
Log.Lik.	−1902.792
ELPD	−1912.0
ELPD s.e.	10.1
LOOIC	3824.0
LOOIC s.e.	20.1
WAIC	3824.0
RMSE	0.49

5 Discussion

5.1 First discussion point

If my paper were 10 pages, then should 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 Areas of improvement and next steps

Weaknesses and next steps should also be included.

Appendix

A Surveys, sampling, and observational data (To be changed)

B Model details

B.1 Posterior predictive check

In Figure 2a we implement a posterior predictive check. This shows...

In Figure 2b we compare the posterior with the prior. This shows...

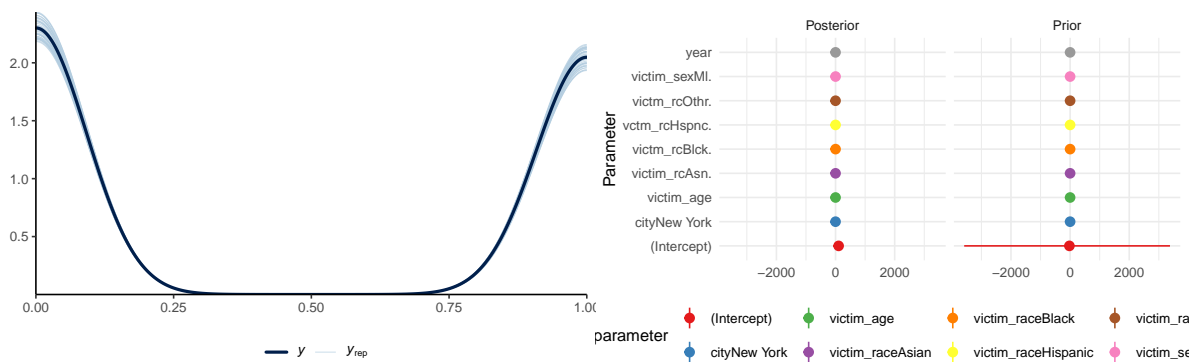


Figure 2: Examining how the model fits, and is affected by, the data

B.2 Diagnostics

Figure 3a is a trace plot. It shows... This suggests...

Figure 3b is a Rhat plot. It shows... This suggests...

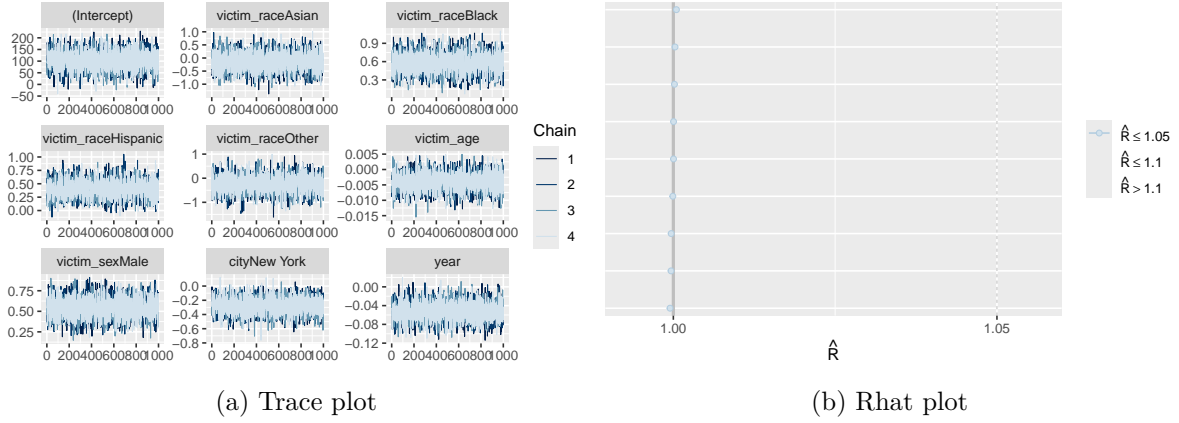


Figure 3: Checking the convergence of the MCMC algorithm

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/>.
- The Washington Post. 2018. *Deaths of Shelter Residents*. <https://github.com/washingtonpost/data-homicides>.