How Has The Number Of Shootings in Toronto Changed?*

An analysis

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    Recently, Canada has been named the safest country in the world. A major component of Canada's safety comes from the safety of Toronto. Data detailing the number of shootings that have occured between the years of 2014 to 2019 have been obtained an will be thouroughly analysed within this paper through the use of various figures. Our findings show that in general, the number of shootings have increased in Toronto. From this paper, we learn that although Canada is considered a safer county overall, the number of shootings in Toronto have increased and we also learnt that datasets do have certain biases attached to them.

1 Introduction

Over the years, having having data that describes and shows explicity the number of shootings that have occured has proven to be extremely valuable. It it provides information about how well a community is doing, law enforcement efficiency and the general well being of the area. In terms of Toronto, information about shooting occurrences will help shape policy and inform law makers and community shareholders where to focus their attention on. This paper focuses on the shooting occurrences between 2014-2019 in Toronto and aims to analyse shooting occurrences and their geographical locations between this time period.

It is important to not that current literature on this issue does not go beyond the surface of the issue, but rather, it just focuses on the number and the general trend. This study aims to bridge the gap and provide a mneuanced and detailed explanation as to why these trends occur.

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

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*Code and data are available at: https://github.com/fatimahsy/Shootings.git

2 Data

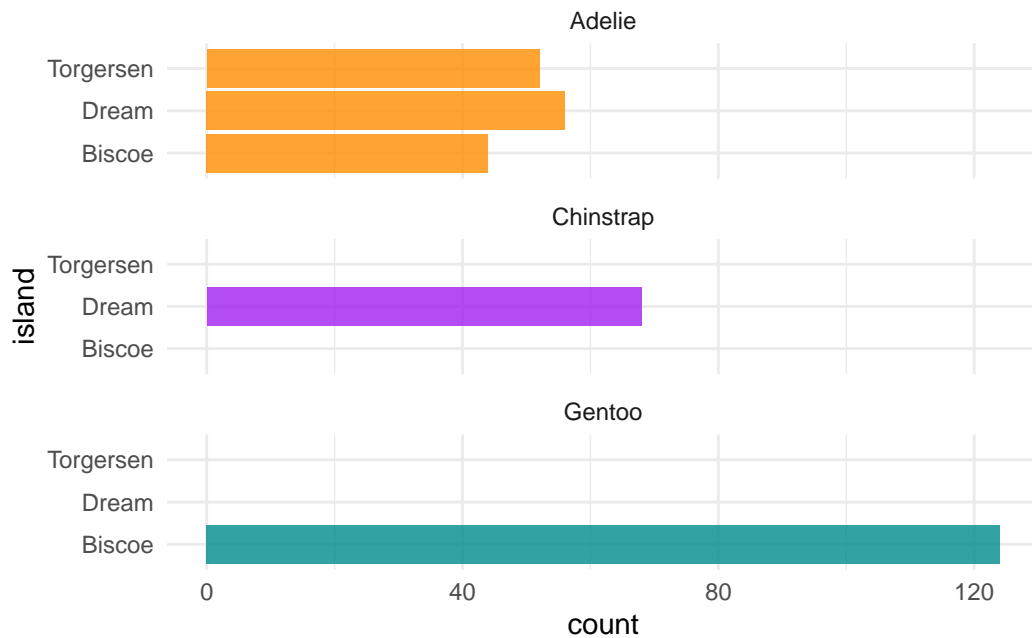Some of our data is of penguins (Figure 1), from Horst, Hill, and Gorman (2020).

Figure 1: Bills of penguins

Talk more about it.

And also planes (Figure 2). (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.

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.
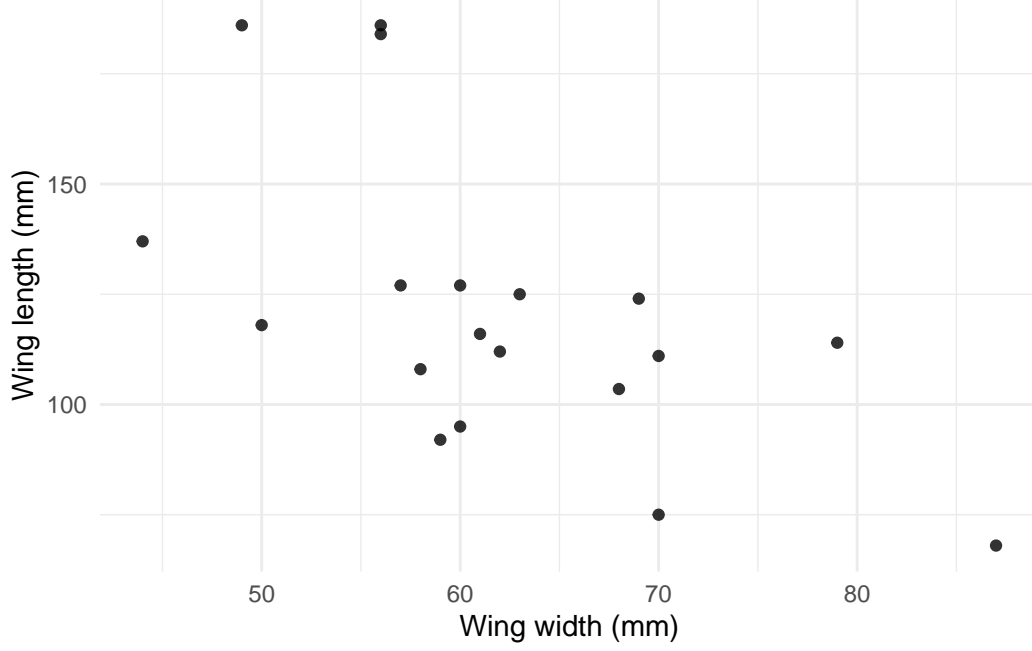
Figure 2: Relationship between wing length and width

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 2022) 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...

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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

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

4 Results

Our results are summarized in Table 1.

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

5.3 Third discussion point

5.4 Weaknesses and next steps

Weaknesses and next steps should also be included.

Appendix

A Additional data details

B Model details

B.1 Posterior predictive check

In Figure 3a we implement a posterior predictive check. This shows...

In Figure 3b we compare the posterior with the prior. This shows...
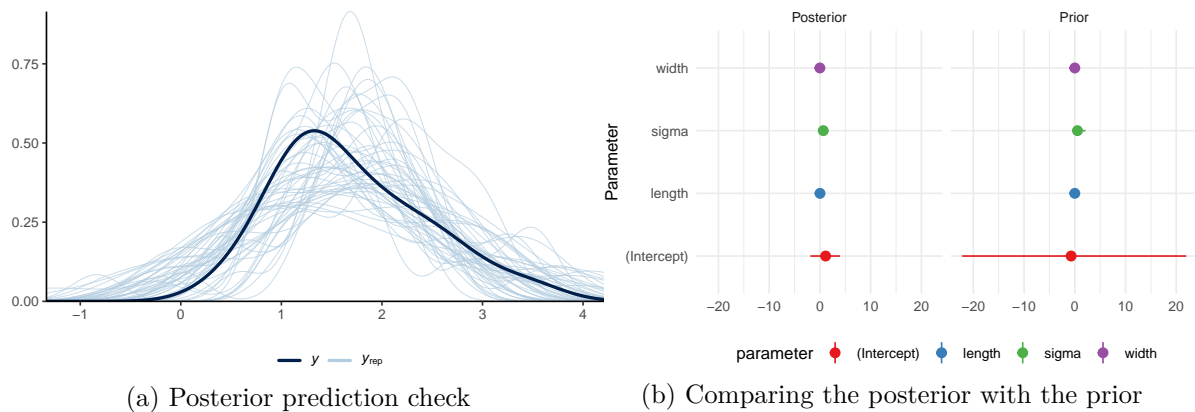

(a) Posterior prediction check

(b) Comparing the posterior with the prior

Figure 3: Examining how the model fits, and is affected by, the data

B.2 Diagnostics

Figure 4a is a trace plot. It shows... This suggests...

Figure 4b is a Rhat plot. It shows... This suggests...
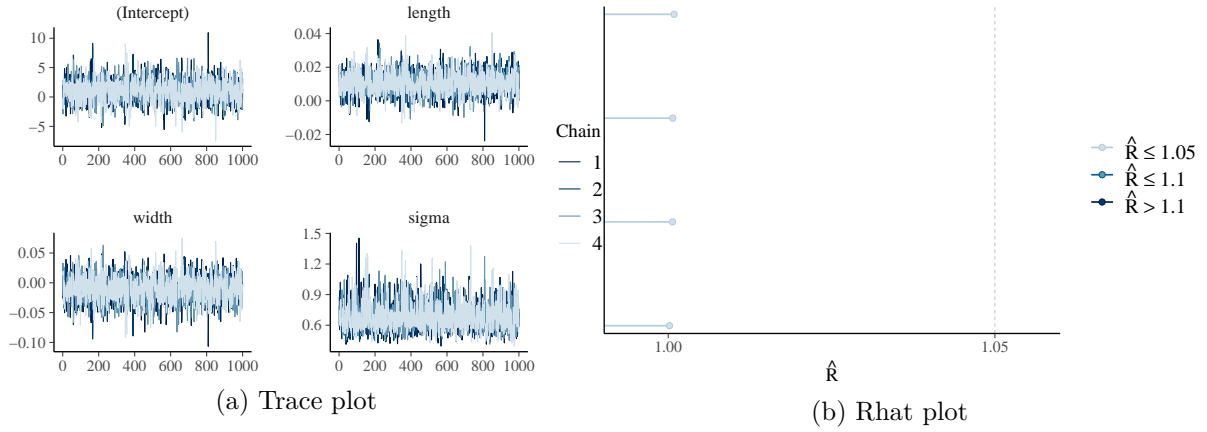
(a) Trace plot

(b) Rhat plot

Figure 4: Checking the convergence of the MCMC algorithm

References

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.39602 18.

R Core Team. 2022. *R: A Language and Environment for Statistical Computing.* Vienna, Austria: R Foundation for Statistical Computing. https://www.R-project.org/.