My title*

My subtitle if needed

First author Another author

February 11, 2024

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

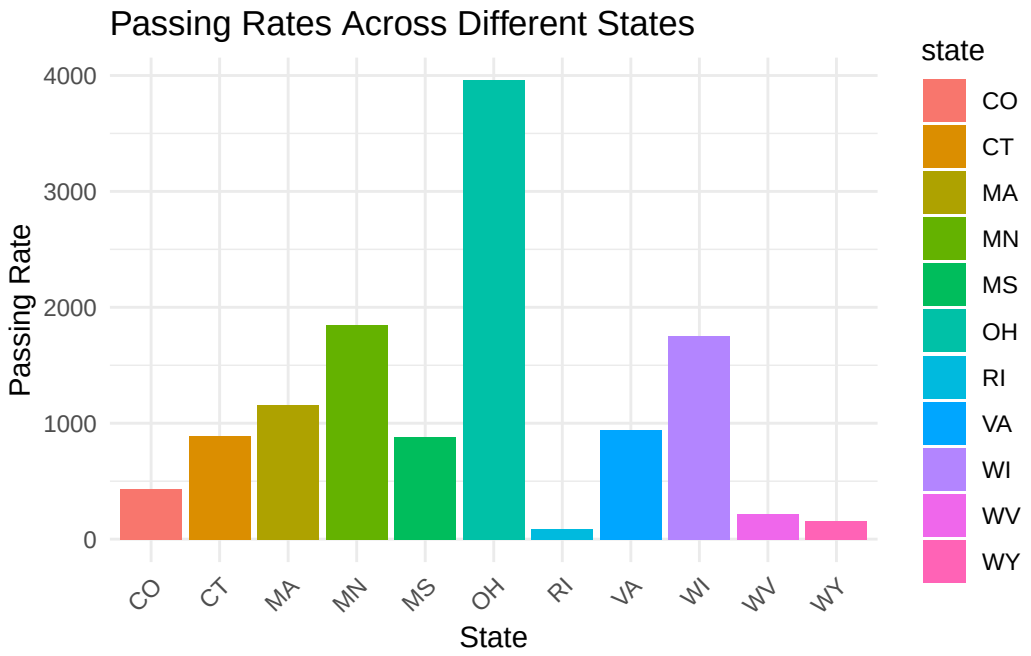

Figure 1: lets see

```
Warning: Removed 6882 rows containing missing values (`position_stack()`).
```

```
Warning: Removed 8192 rows containing missing values (`position_stack()`).
```

*Code and data are available at: LINK.

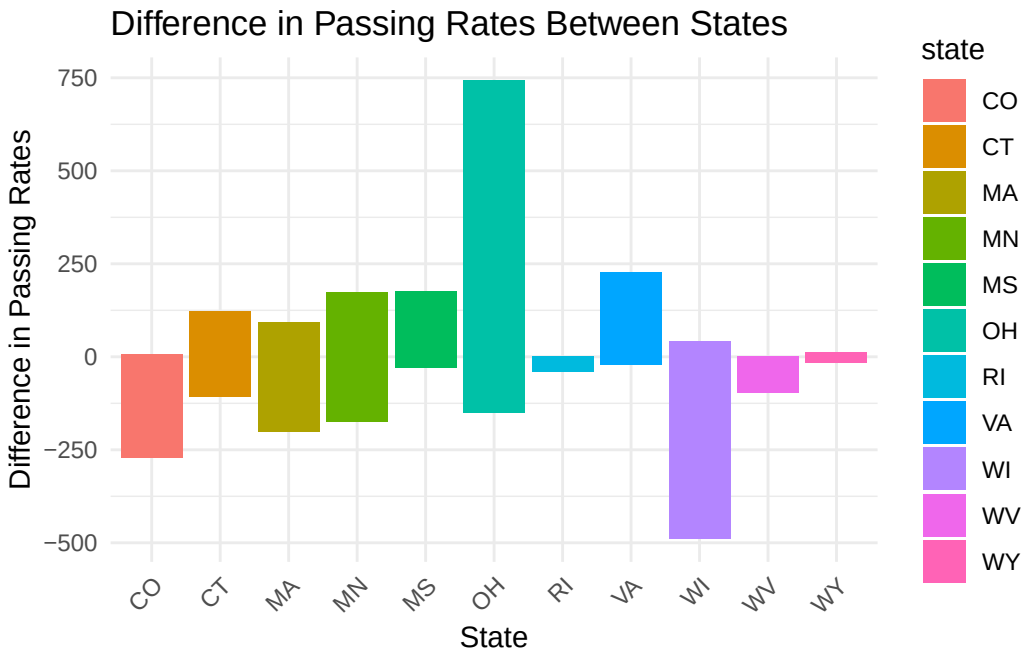

Figure 2: lets see

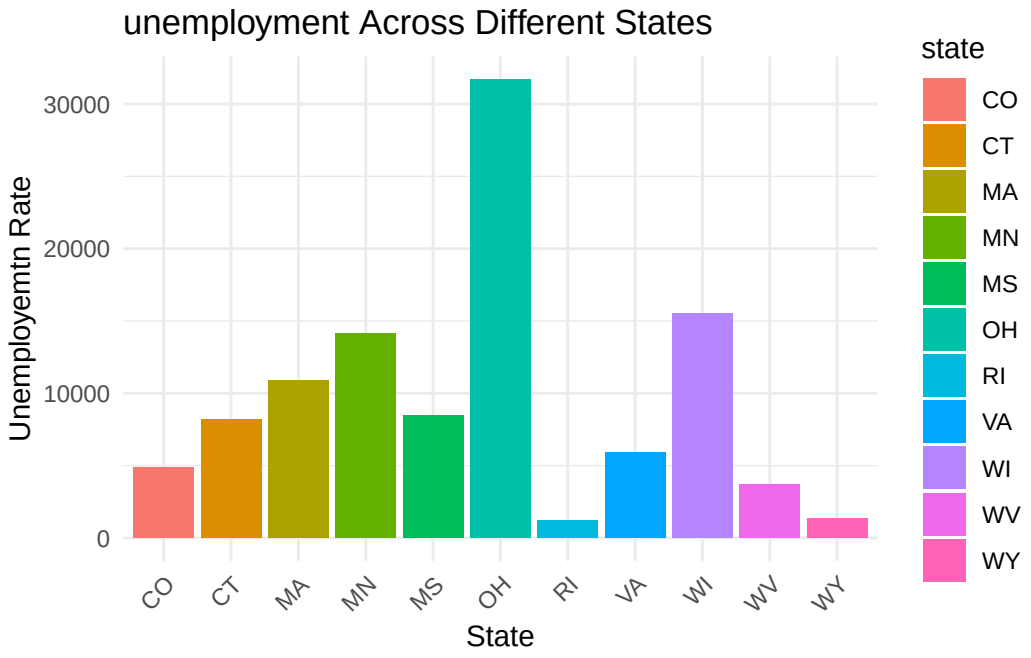

Figure 3: lets see

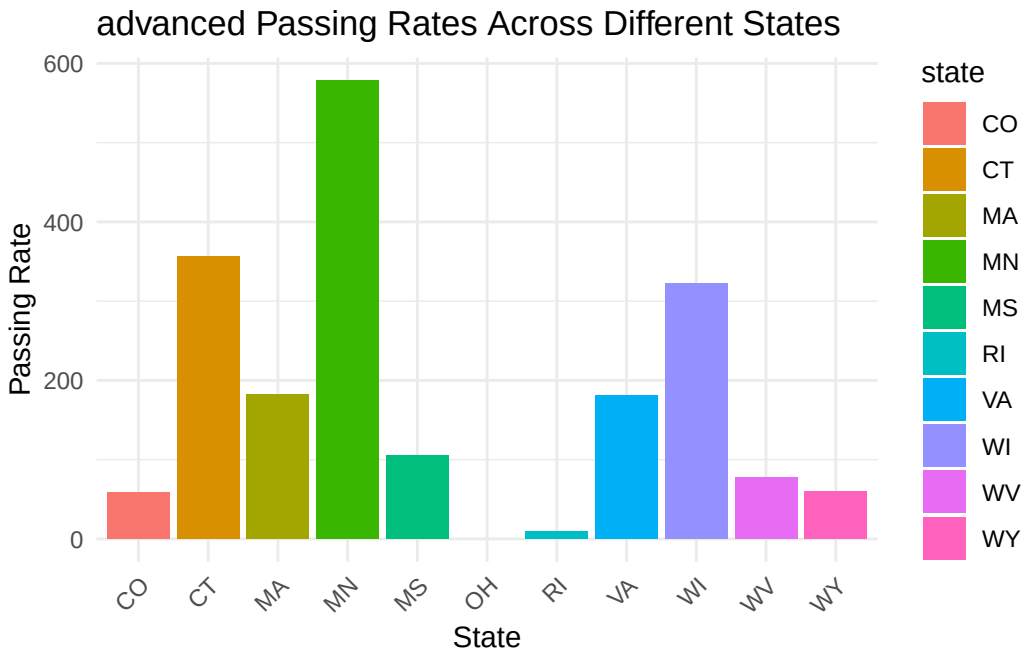

Figure 4: lets see

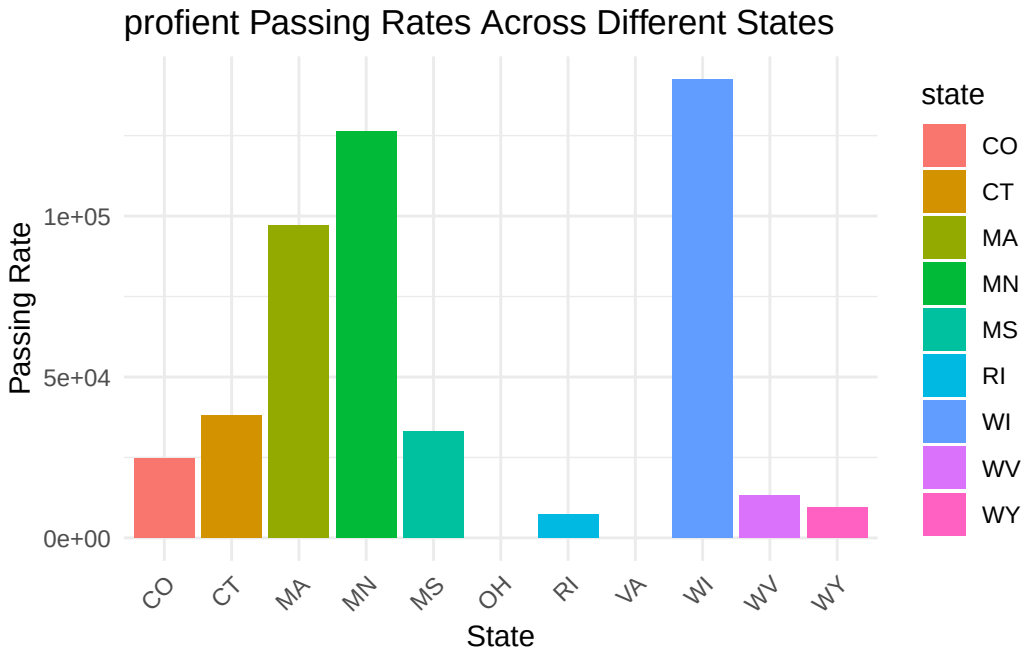

Figure 5: lets see

```
Warning: Removed 7979 rows containing missing values (`position_stack()`).
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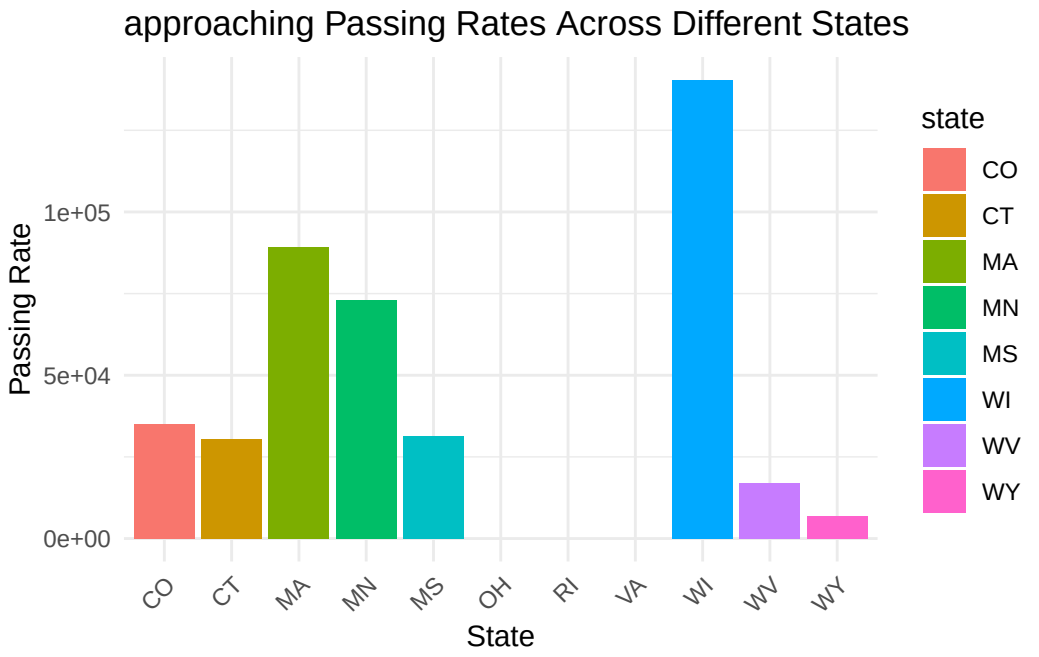

Figure 6: lets see

```
Warning: Removed 20981 rows containing missing values (`position_stack()`).

Warning: Removed 7873 rows containing missing values (`position_stack()`).


Attaching package: 'reshape2'

The following object is masked from 'package:tidyr':

    smiths

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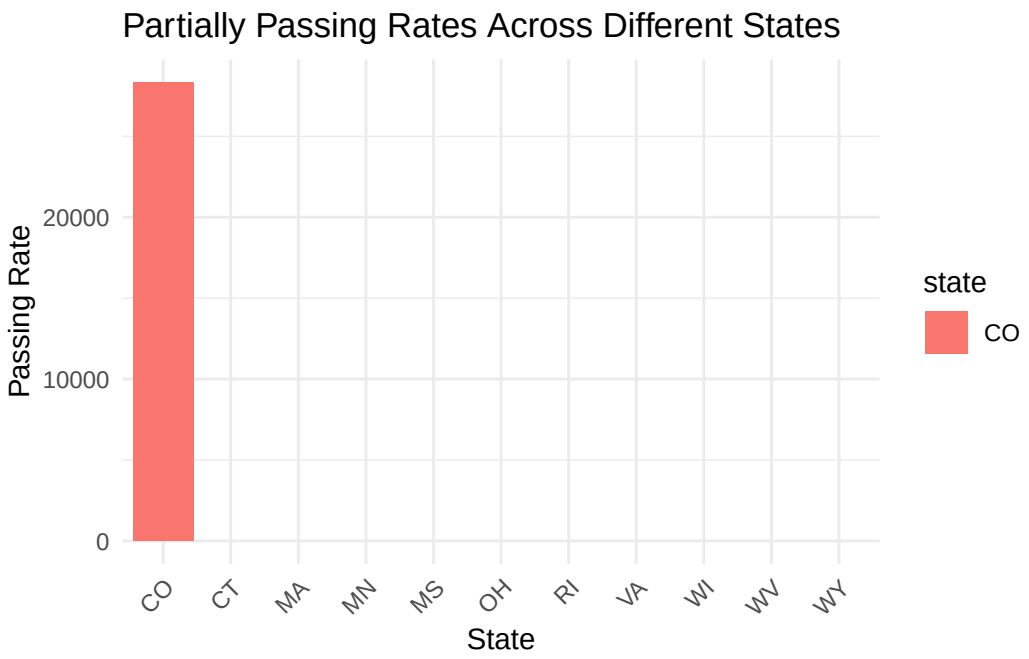


Figure 7: lets see

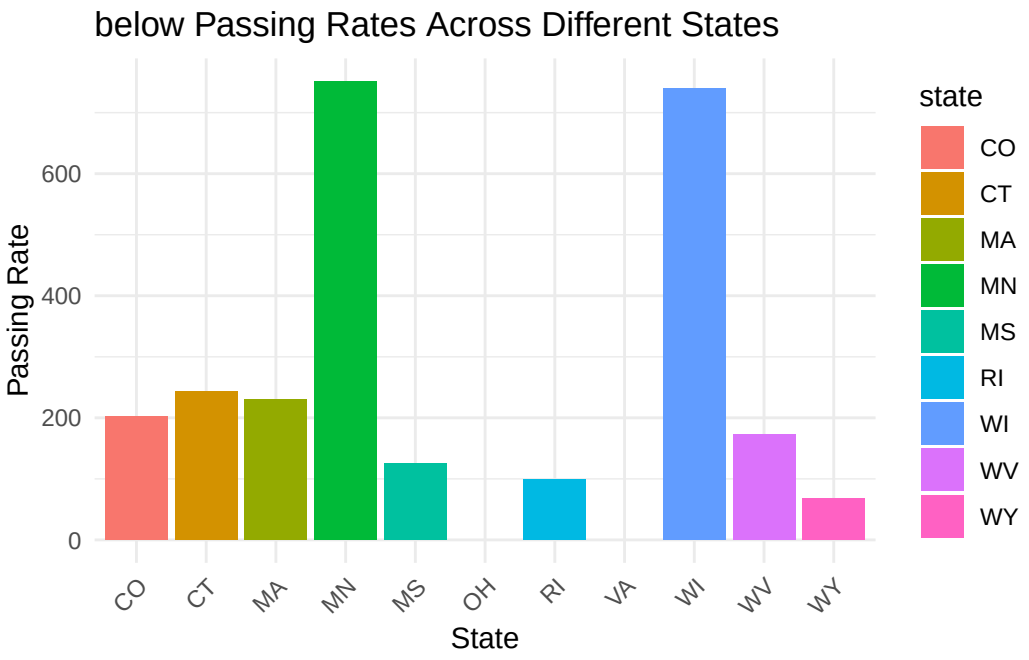
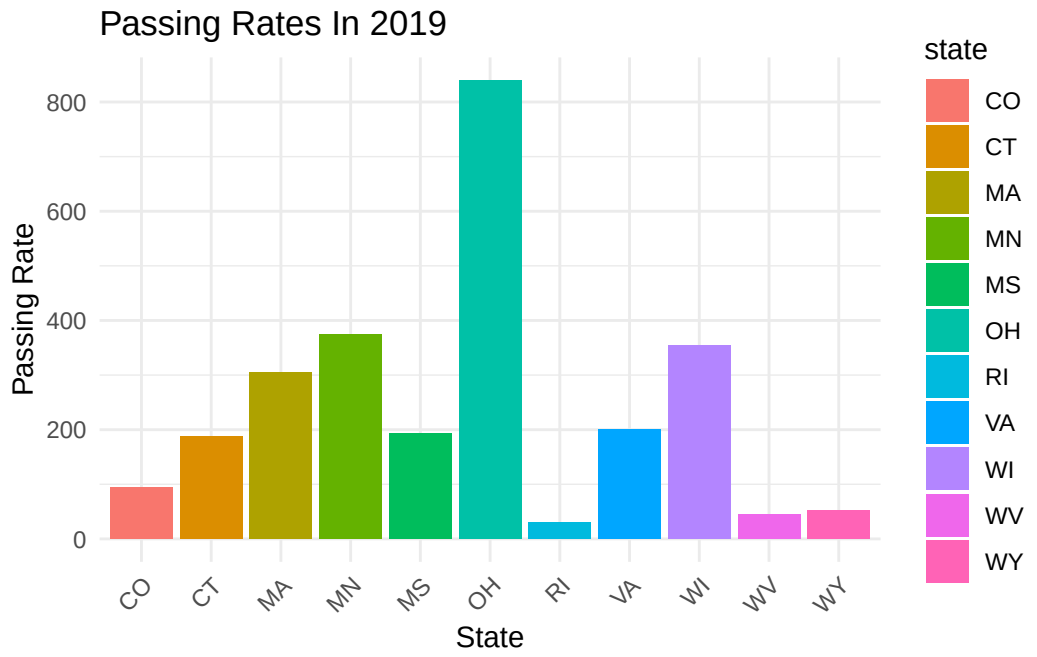


Figure 8: lets see



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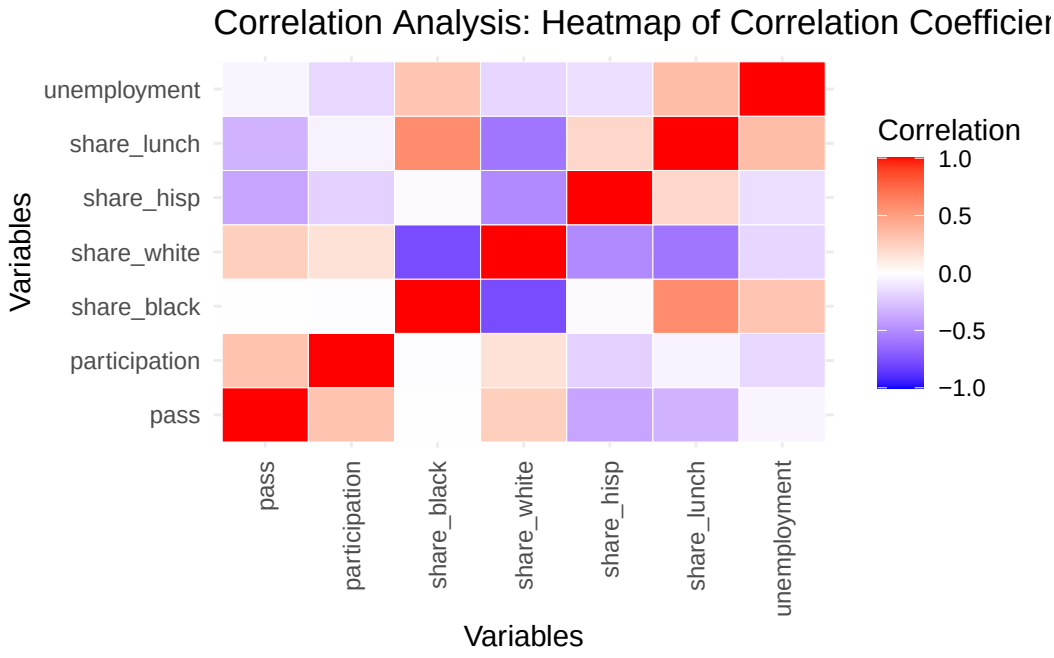


Figure 10: lets see

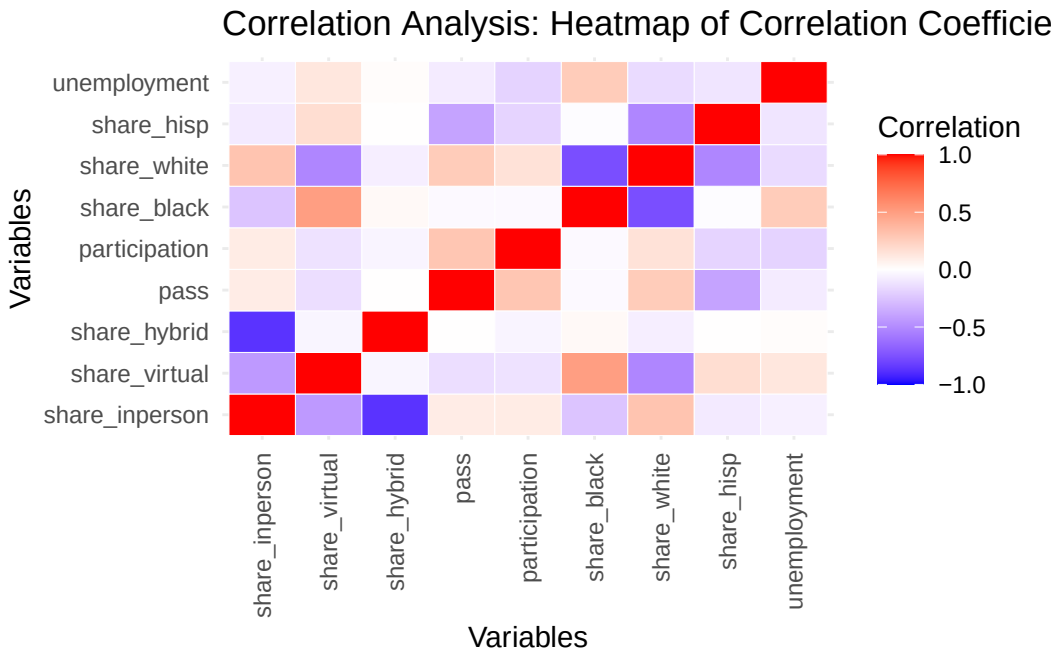


Figure 11: lets see

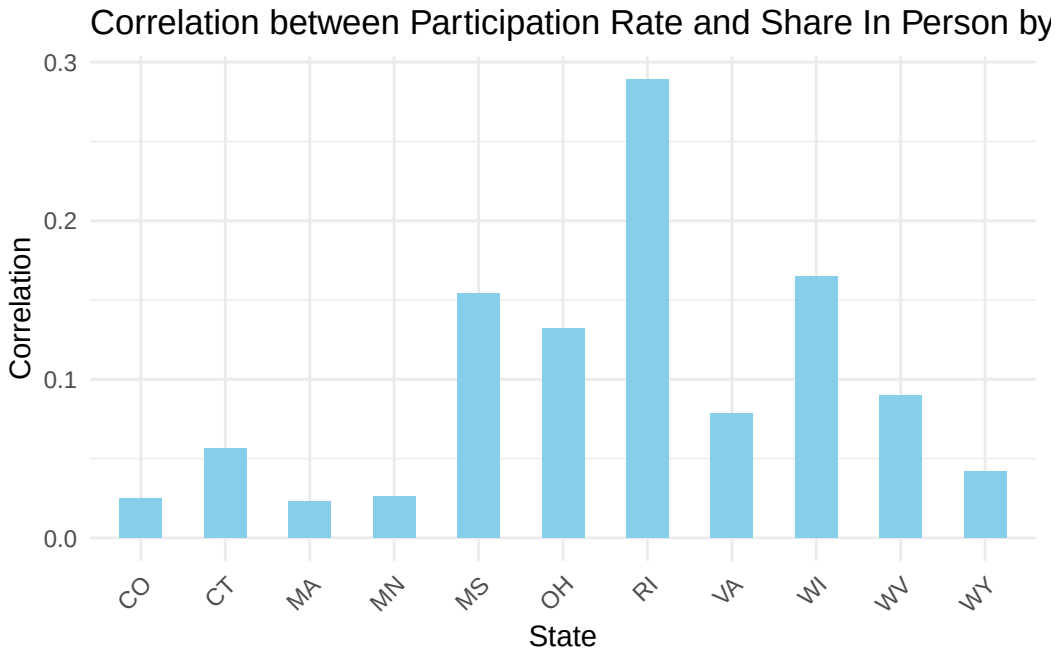
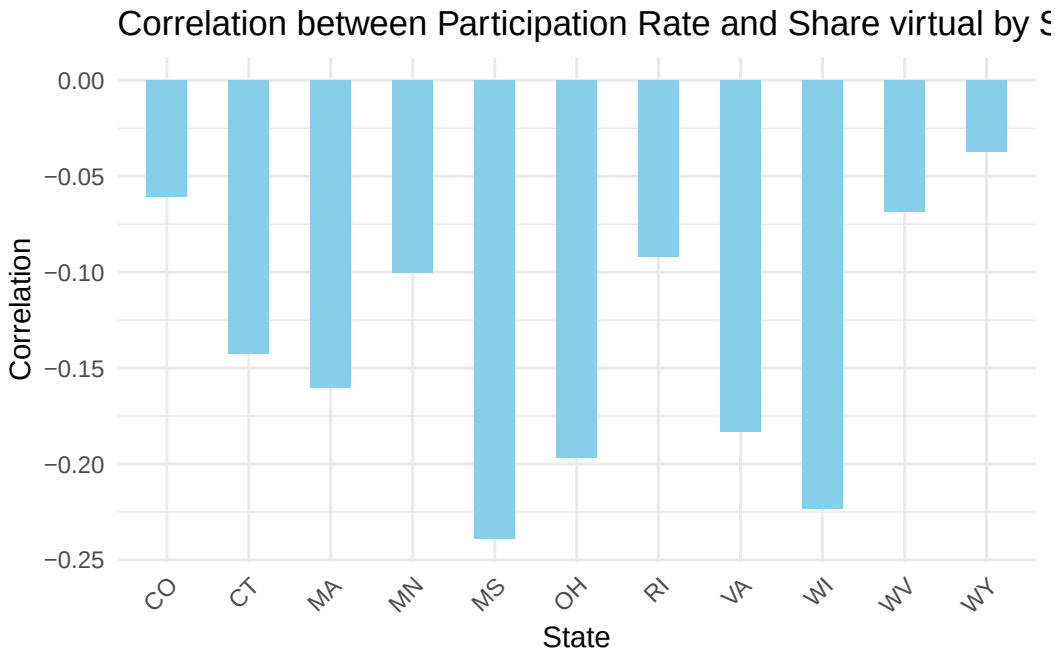


Figure 12: lets see



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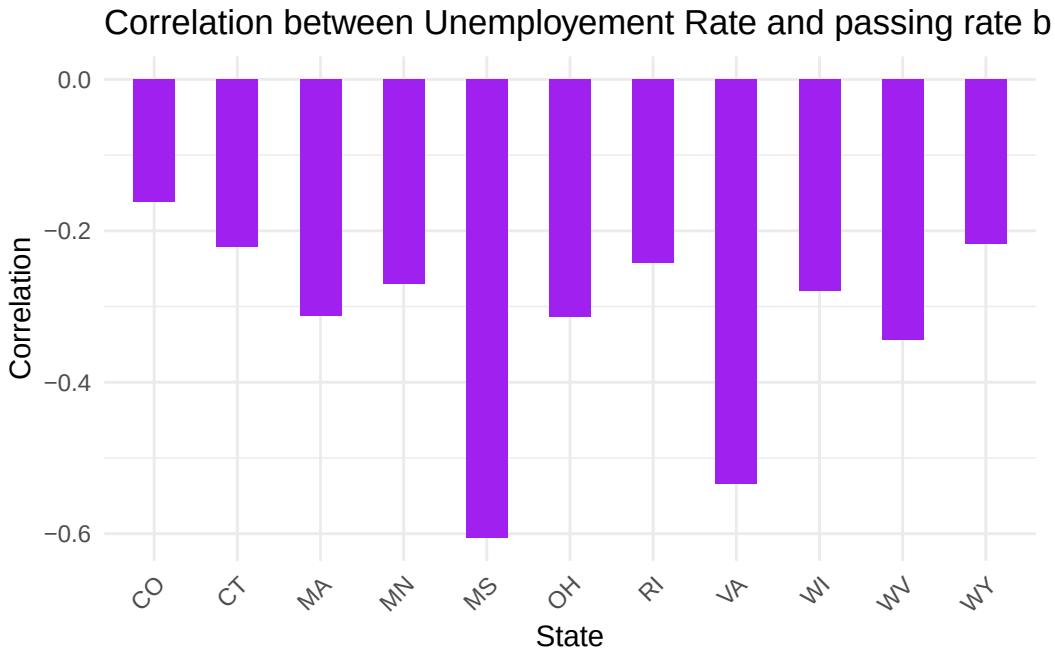

Figure 14: lets see

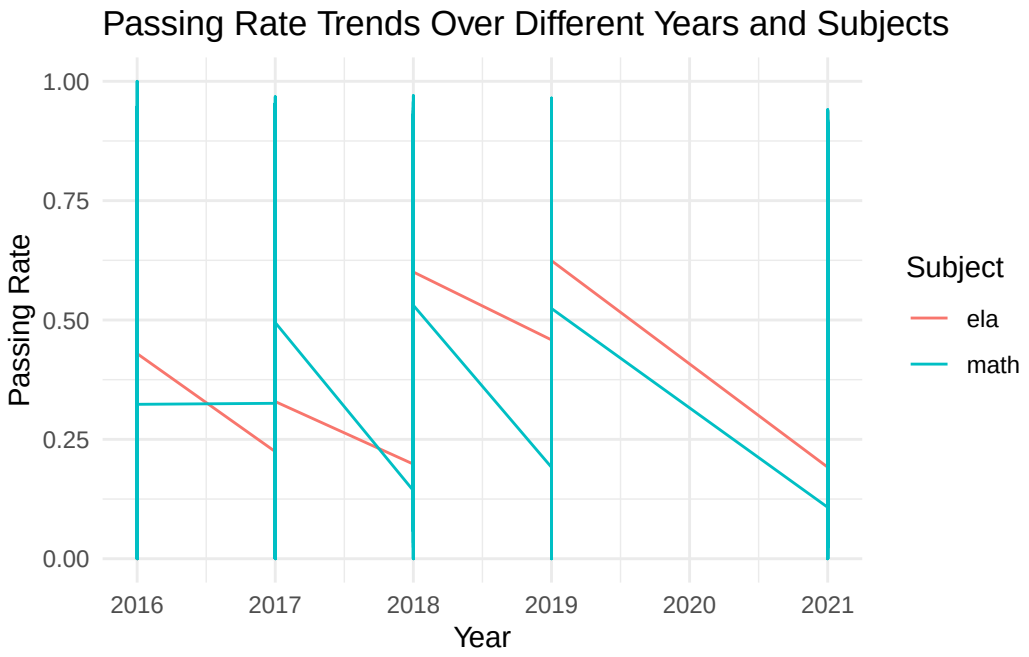

Figure 15: lets see

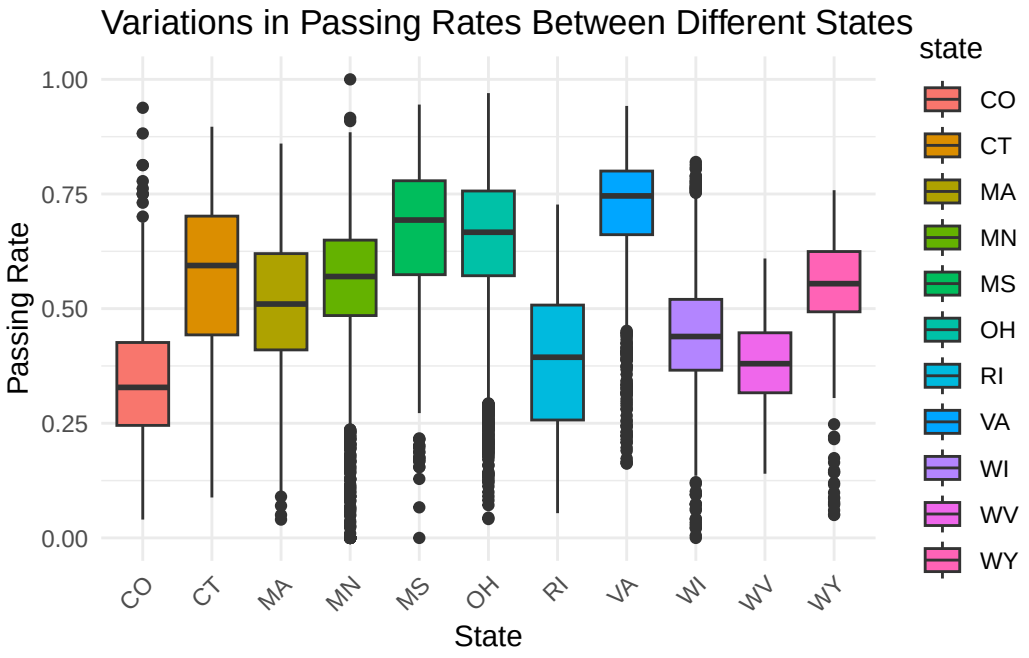

Figure 16: lets see

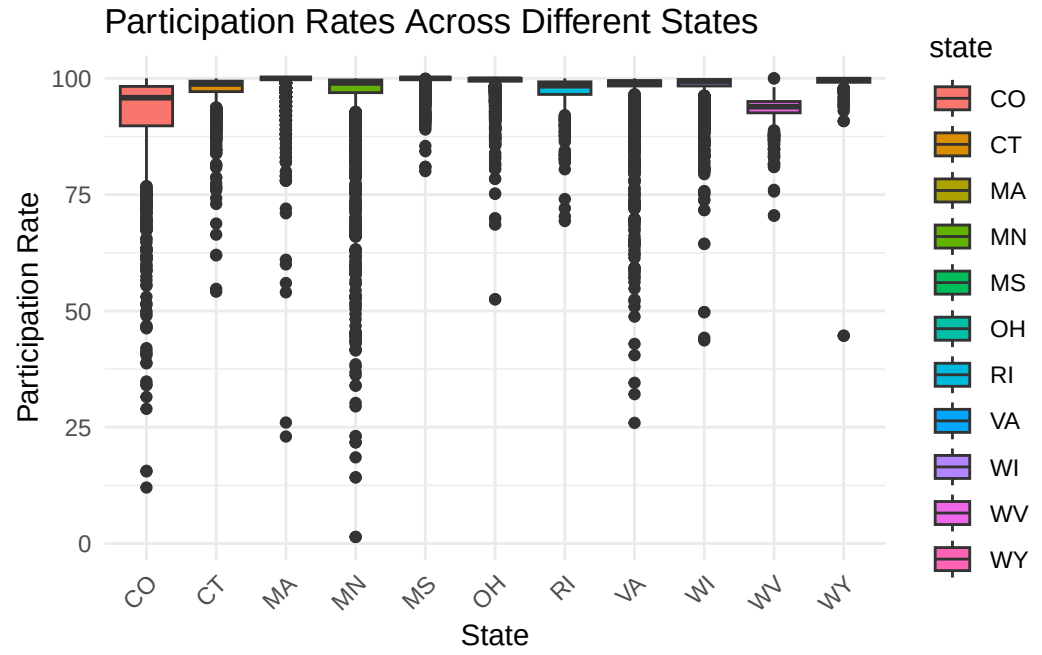

Figure 17: lets see

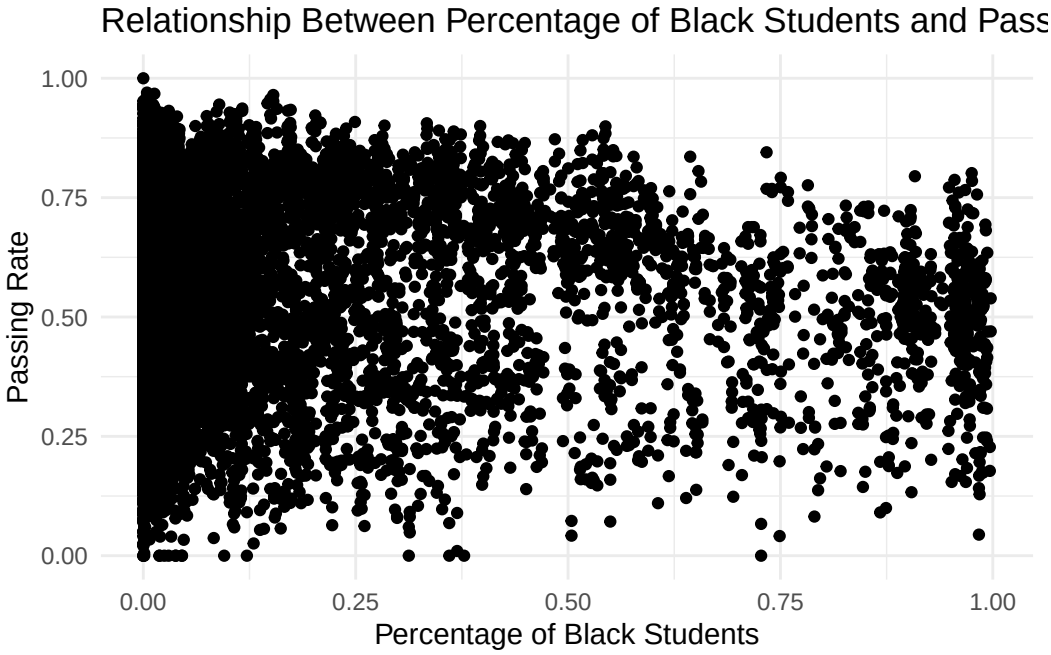

Figure 18: lets see

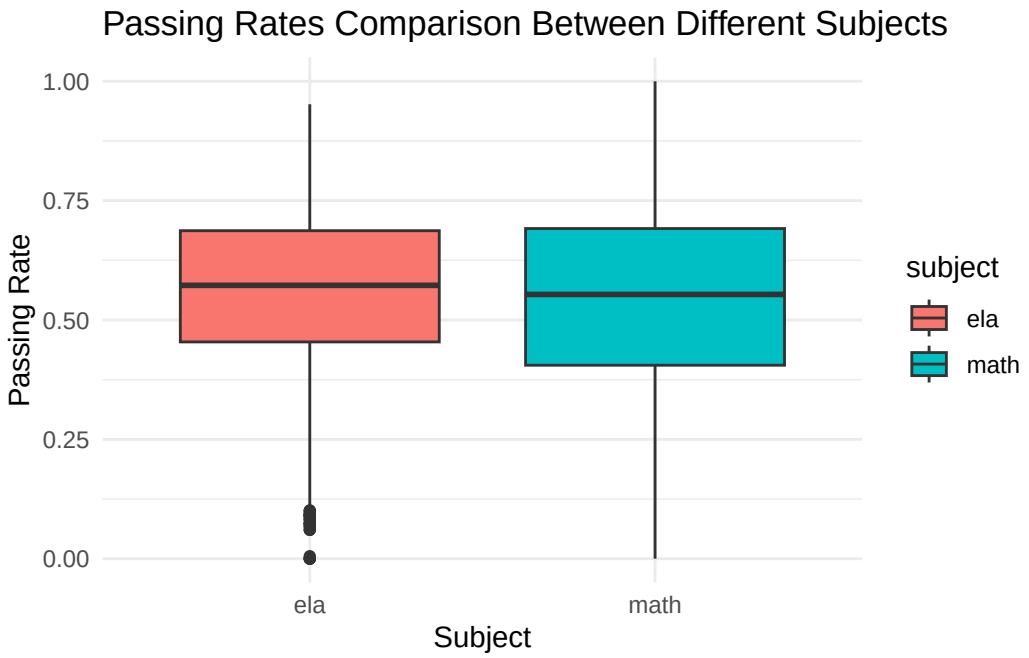

Figure 19: lets see

1 Introduction

The COVID-19 pandemic has profoundly disrupted education systems worldwide, compelling schools and districts across the United States to rapidly adapt their learning models. In 2020 and 2021, educational institutions faced unprecedented challenges, transitioning between in-person, hybrid, and virtual learning models in response to evolving public health guidelines and infection rates. This shift has brought into sharp focus the need to understand the implications of these various schooling models on educational outcomes.

This paper delves into a comprehensive analysis across 11 U.S. states, examining the relationship between different schooling models and their impact on student enrollment and staffing patterns. The unique dataset compiled for this study encompasses a variety of metrics, including total enrollment, in-person and virtual attendance, as well as staff count across different learning models. By analyzing data from kindergarten to 12th grade, this study provides a granular view of how the pandemic has reshaped the educational landscape across these states.

Our findings reveal significant variations in how states have navigated the challenges posed by the pandemic, with notable differences in the adoption of in-person, hybrid, and virtual learning models. We observe that these variations are not only reflective of public health policies but also indicate broader socio-economic and demographic influences. For instance, preliminary analysis suggests that shifts to virtual learning correlate with changes in student

enrollment, raising questions about equity and access in education during these challenging times.

The remainder of the paper is structured as follows: Section 2 provides a detailed overview of the data and methodology employed in this study. Section 3 presents an in-depth analysis of the schooling models across the 11 states, offering insights into the trends and patterns observed in the data. Section 4 discusses the key findings, exploring the implications of these schooling models on educational outcomes. Finally, Section 5 concludes with a reflection on the study's findings, limitations, and potential directions for future research in this critical area of educational policy.

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

2 Data

Some of our data is of penguins (Figure 20), from Horst, Hill, and Gorman (2020).

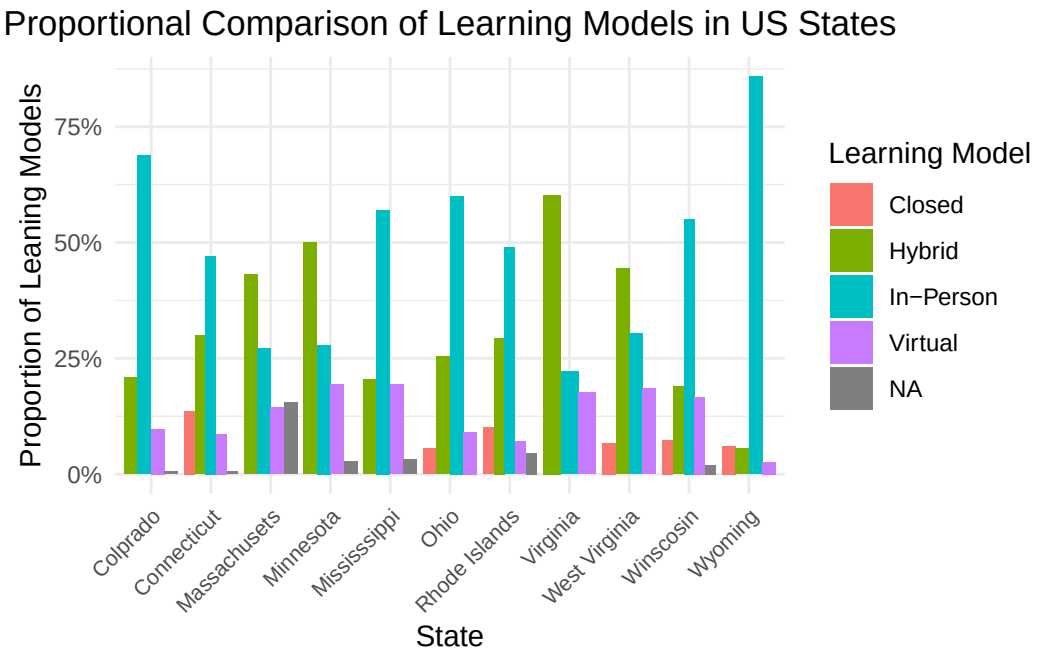

Figure 20: Bills of penguins

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.

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 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...

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

4 Results

Our results are summarized in **?@tbl-modelresults**.

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

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

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.3960218.

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