

Behind the Delays: Exploring Variations in Toronto's Transit Disruptions*

A Comparative Analysis of Delay Frequency and Duration Across TTC Subway, Streetcar, and Bus Systems

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November 26, 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....

The remainder of this paper is structured as follows. Section 2 discusses the data used for this analysis, including key variables and sources, with particular attention to the quality metrics that affect polling accuracy. ?@sec-models outlines our modeling approach..., incorporating lessons learned from recent electoral cycles. Our predictions are under section of each model. ?@sec-discuss discusses the implications of our findings and suggests directions for future research. Finally, ?@sec-appendix evaluates methodology and survey copy.

*Code and data are available at: [https://github.com/ClaireUoft/Toronto_TTC_Transportation).

2 Data

2.1 Overview

Following Alexander (2023), we consider...

In this project, we used data from the opendatatoronto dataset created by (**opendatatoronto?**). This dataset provided bus, subway, streetcar records essential for our analysis. In this project, we used R(R Core Team 2023) and several R packages for data processing, analysis, and visualization. Specifically, tidyverse (**tidyverse?**), arrow(**arrow?**), here(**here?**), ggplot2(**ggplot2?**), while dplyr(**dplyr?**) was key for data manipulation tasks. For dynamic report generation, knitr(**knitr?**) used, providing enhanced formatting for outputs. Together, these packages enabled efficient data cleaning, analysis, and visualization throughout the study.

2.2 Overview text

2.3 Measurement

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

2.4 Outcome variables

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

Talk way more about it.

2.5 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 duration of delay (in seconds) for a given transit event. Let β_i represent the transit mode, encoded as an indicator variable for subway, streetcar, or bus, and γ_i represent the time of day, categorized into morning peak, midday, evening peak, and late night.

$$y_i | \mu_i, \sigma \sim \text{Normal}(\mu_i, \sigma) \tag{1}$$

$$\mu_i = \alpha + \beta_i + \gamma_i \tag{2}$$

$$\alpha \sim \text{Normal}(0, 2.5) \tag{3}$$

$$\beta \sim \text{Normal}(0, 2.5) \tag{4}$$

$$\gamma \sim \text{Normal}(0, 2.5) \tag{5}$$

$$\sigma \sim \text{Exponential}(1) \tag{6}$$

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 `?@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

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 Additional data details

B Model details

B.1 Posterior predictive check

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