Wheels of Misfortune: Exploring Auto Theft Trends in Ottawa*

An Analysis on Top Car Brands Stolen, Recovery Rate, and Top Neighborhoods with High Theft Rates

Catherine Punnoose

April 24, 2024

The surge in auto theft rates across Canada has prompted car owners to become more vigilant regarding their vehicle's security. This paper examines auto theft occurrences within Canada's capital, Ottawa, Ontario. Focusing on the years 2018-2023, the paper considers the types of vehicles, brands, and neighborhoods targeted within Ottawa as well as the recovery rate. Additionally, the study aims to discuss reasons for auto theft and comparisons to data in province.

Table of contents

*Code and data are available at: https://github.com/catherinee1216/AutoTheft_Ottawa.git.

1 Introduction

There is no doubt that auto theft has become an increasingly popular topic over the last few years. Canada has seen exceeding rates of auto theft, where many thefts are starting to become more frequent and more violent. Between the years 2021-2023, Ontario has seen a 48.2% increase, while Quebec has seen a 57.9% increase (Equite 2024a). Major cities like Toronto reported to have more than 12,000 vehicles stolen in 2023, which is equal to having one car stolen every 40 minutes (CBC 2024). In addition, a report from Canadian Finance & Leasing Association (CFLA) stated that Toronto saw a 300 per cent increase in vehicle thefts from 2015 to 2022 (Post 2024).

The country's capital, Ottawa has reported 221 stolen vehicles cases since January 1, 2024 (Pringle 2024). This escalating trend in auto theft poses a considerable risk to public safety. Although Ottawa police have made efforts to mitigate such reports as well as educate the public, the number of reported cases continues to rise steadily, specifically from the years 2018-2023. However, questions regarding potential patterns in the types of cars targeted and the proportion of vehicles successfully recovered following theft have increased.

This paper aims to provide a deep analysis of auto theft rates in Ottawa, Canada. The estimand for this paper is to quantify the impact of various factors on the occurrence and frequency of auto thefts in Ottawa, ultimately aiming to understand the dynamics driving the escalating trend in auto theft rates within the city. Subsequently, the Section 2 section focuses on the methodology for data collection and data cleaning. The Section 3 section delves into a comprehensive analysis of auto theft patterns in Ottawa from the years 2018-2022. Finally, in the Section 4 section, the paper explores potential drivers behind the escalation in auto theft rates and comparing the data to trends across Ontario.

2 Data

The dataset used for this paper was provided by Ottawa Police (Police 2024). The dataset contains theft of motor vehicle occurrencesfrom the years 2018-2023.The data was cleaned by using the open source statistical programming language R (Team 2023), with libraries `tidyverse` (Wickham et al. 2019), `ggplot2` (Wickham 2016), `dplyr` (Wickham et al. 2022), `readr` (Wickham, Hester, and Bryan 2022), `tibble` (Müller and Wickham 2022), `kableExtra` (Zhu 2021), `janitor` (Firke 2021), arrow (Richardson et al. 2024) ,and `knitr` (Xie 2014).

2.1 Data Cleaning

For the data cleaning process, many variables from the original dataset was removed to focus on the necessary variables. From the original dataset, the following variables were selected: vehicle_make, vehicle_model, vehicle_year, vehicle_colour, vehicle_value, occurred_date, reported_date, weekday, recovered, year, neighborhood. For clarity purposes, the variable "year" was renamed to "theft_year" to make it clear that the variable accounted for the year the vehicle was stolen.

3 Results

3.1 Average Count of Auto Theft Cases from 2018-2023 in Ottawa

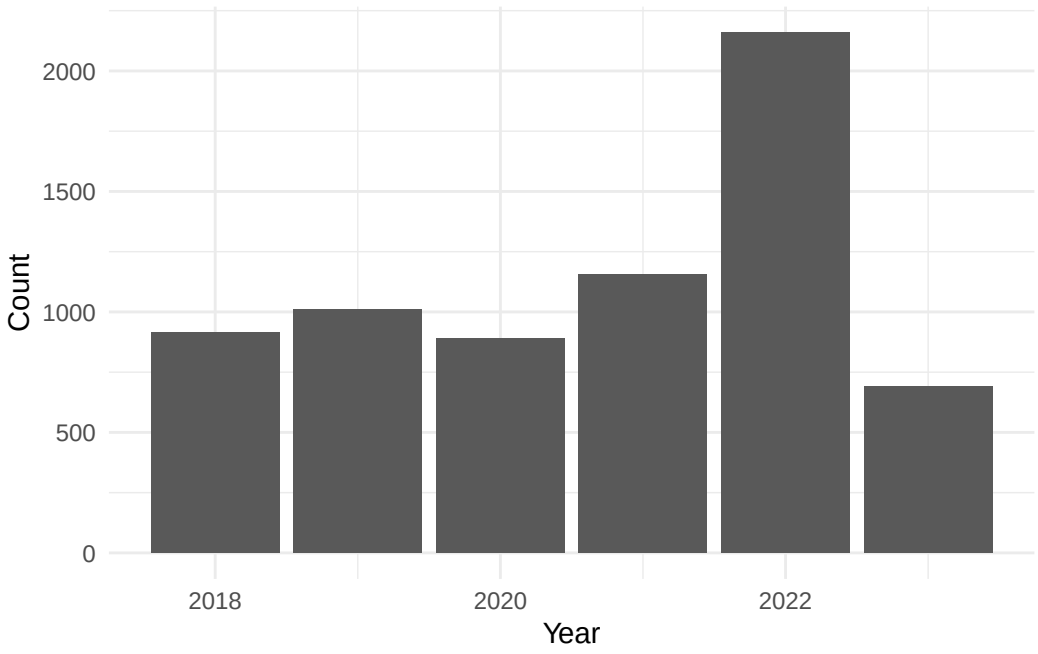


Figure 1: Average Auto Theft Crimes Reported in ottawa from 2018-2023

Figure 1 shows the average number of auto theft cases reported in Ottawa from 2018 to 2023. 2022 stands out with the highest number of cases, reaching a record high of 2,159. Conversely, 2023 saw the lowest number of cases, totaling 693. In 2018, 914 cases were reported, followed by 1012 in 2019. The number of reported auto theft cases decreased to 891 in 2020, but then surged to 1157 in 2021.

3.2 Top Brands Stolen from 2018-2023

Figure 2 presents six graphical representations showcasing the top 10 brands with the highest number of auto theft cases spanning the years 2018 to 2023. Across these six graphs, Toyota consistently emerges with the highest average of stolen cars, except for 2022, where Honda takes the lead in the number of cars stolen. A notable trend observed is the declining numbers for Ford, with a steady decrease in stolen cars over the years. Throughout all six graphs, the most frequently occurring brands include Toyota, Honda, Chevrolet, Dodge, Ford, Hyundai, and Nissan.

Figure 3 illustrates a scatter plot depicting the model year of stolen cars in Ottawa. The graph reveals that cars manufactured between 2000 and 2024 are predominantly targeted. Particularly, cars from the year 2021 are the most commonly stolen.

3.3 Recovery Rate

Figure 4 illustrates the number of cars recovered and unrecovered from 2018 to 2023. Overall, it is evident that more cars are recovered, except for 2023, where more cars were left unrecovered compared to those recovered. From 2018 to 2021, the number of cars recovered consistently surpassed those left unrecovered. Specifically, in 2018, 570 cars were recovered out of 914 (Figure 1), reflecting a 62% recovery rate. Similarly, in 2019, with a total of 1,012 cars stolen (Figure 1), 646 were recovered (Figure 4), maintaining a recovery rate of 63%.

In 2020, 529 out of 891 stolen cars were recovered, resulting in a 59% recovery rate. The following year, 2021, witnessed a slightly lower recovery rate of 53%, with 623 cars recovered out of 1,157 stolen. Notably, 2022 marked the highest number of both recovered and unrecovered cars, totaling 1,080 and 1,079 respectively. As per Figure 1, a total of 2,159 cars were stolen in Ottawa in 2022. Figure 4 indicates that 1,080 out of 2,159 were recovered, equating to a 50% recovery rate for 2022.

However, 2023 stands out as the only year where the number of cars recovered is fewer than those left unrecoverable. A total of 693 cars were stolen (as shown in Figure 1), and only 334 cars were recovered (as shown in Figure 4), resulting in a recovery rate of 48%. Figure 4 illustrates that between 2018 and 2023, the recovery rate averages roughly between 60% and 50%.

3.4 Top Neighborhoods

Table 1: Table of Top 5 Neighborhoods with Most Auto Thefts in 2018

Neighborhood	Total Number of Cases
Centretown	43

Neighborhood	Total Number of Cases
East Industrial	26
Edwards - Carlsbad Springs	25
Overbrook - McArthur	46
Sandy Hill	26

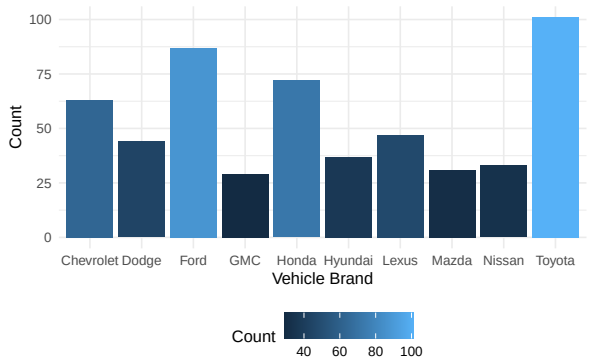
Table 2: Table of Top 5 Neighborhoods with Most Auto Thefts in 2023

Neighborhood	Total Number of Cases
Old Barrhaven East	28
Overbrook - McArthur	21
Portobello South	33
Stittsville	25
Stonebridge - Halfmoon Bay - Heart's Desire	26

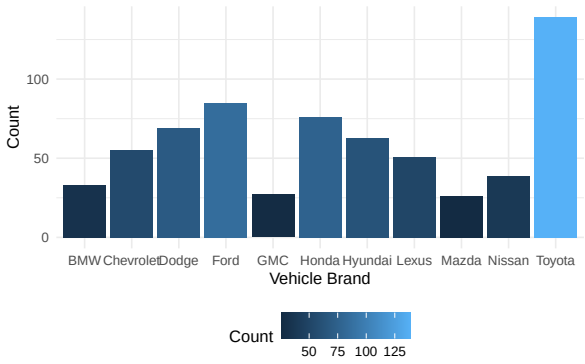
Table 3: Table of Top 5 Neighborhoods with Most Auto Thefts from 2018-2023

Neighborhood	Total Number of Cases
Centretown	298
East Industrial	182
Overbrook - McArthur	285
Portobello South	218
Stittsville	218

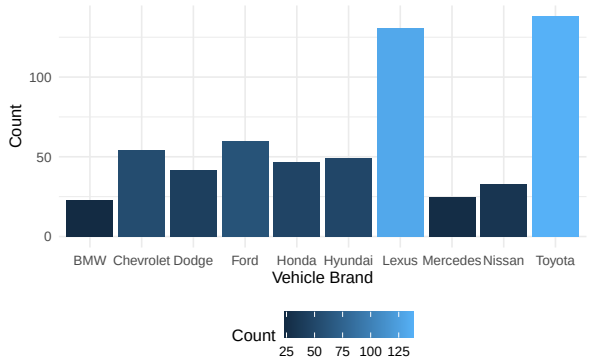
Table 1 displays the top 5 neighborhoods with the highest rates of auto theft in Ottawa in 2018. Among these, Overbrook – McArthur recorded the highest number of cases, totaling 46. Table 2 presents the top 5 neighborhoods with the highest rates of auto theft in 2023, with Portobello South leading with 33 reported cases. Notably, Overbrook – McArthur maintains its position in the top 5, reporting 21 cases of auto theft. Table 3 showcases the top 5 neighborhoods with the highest rates of auto theft cumulatively from 2018 to 2023. In this comprehensive view, Centretown emerges with the highest number of auto theft cases, totaling 298. Overbrook – McArthur follows closely with 285 cases, while Portobello South and Stittsville tie with 218 cases each, and East Industrial reports a total of 182 cases.



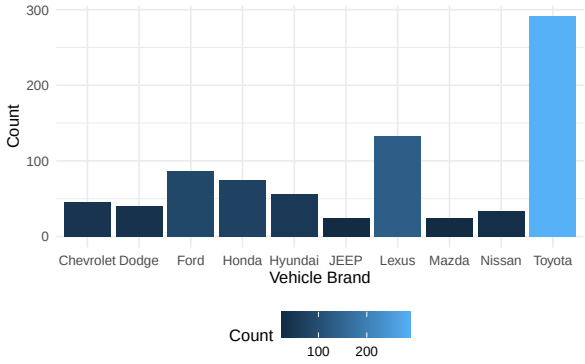
(a) Top 10 Brands Affected in 2018



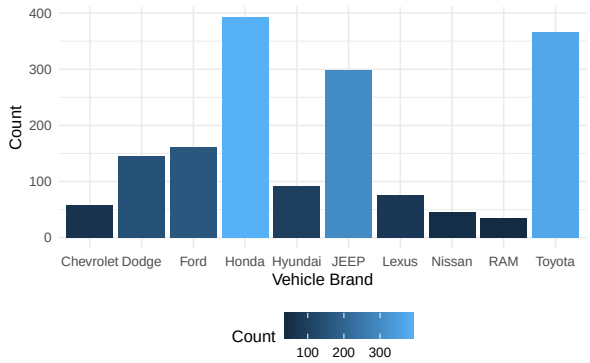
(b) Top 10 Brands Affected in 2019



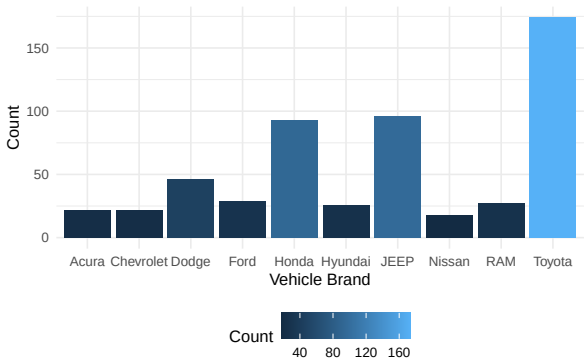
(c) Top 10 Brands Affected in 2020



(d) Top 10 Brands Affected in 2021



(e) Top 10 Brands Affected in 2022



(f) Top 10 Brands Affected in 2023

Figure 2: Top 10 Car Brands Stolen from 2018-2023

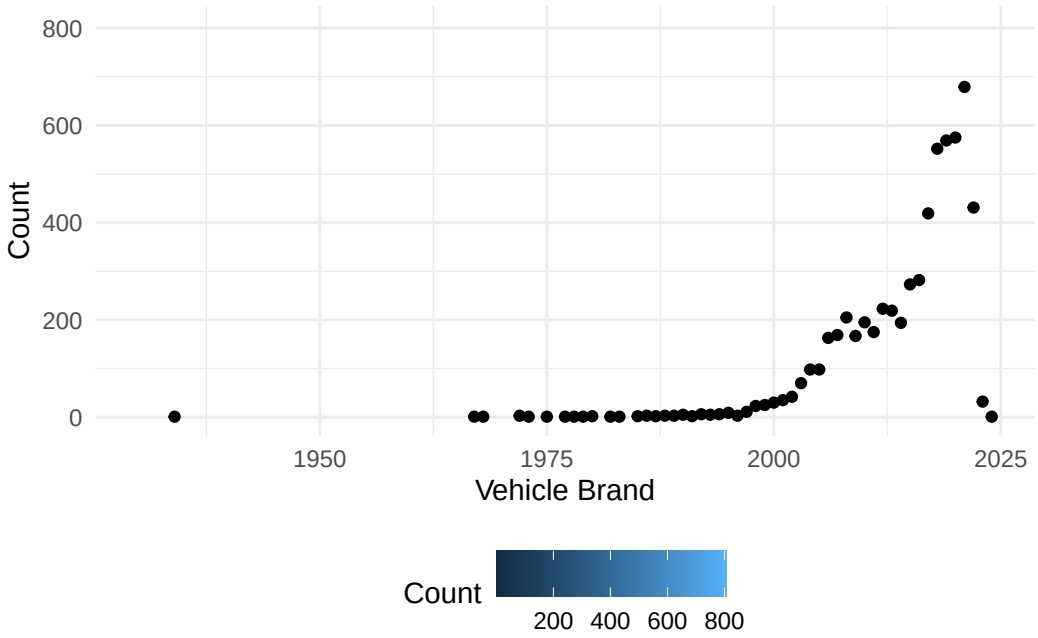


Figure 3: Vehicle Years Stolen from 2018-2023

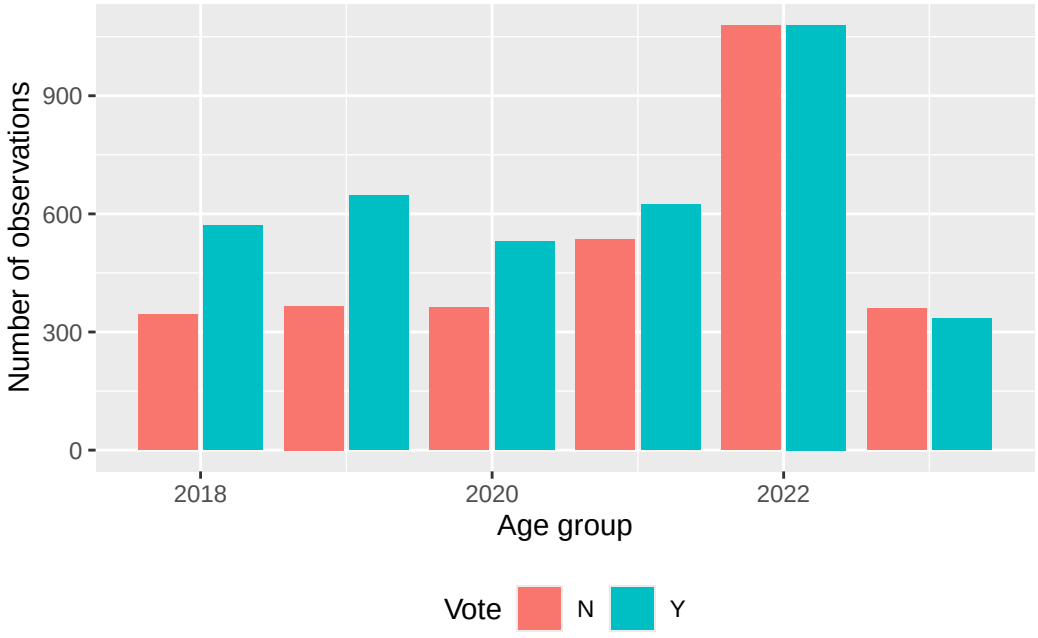


Figure 4: Recovery Rates from 2018-2023

4 Discussion

4.1 Possible Reasons for Increasing Auto Theft Rates

It is evident that auto theft reports are increasing. However, why are cases increasing and what happens to cars that are stolen? From Figure 3, we understand that vehicles made between 2000-2024, are most targeted for theft. Cars made in 2021 also had the highest rate of theft (Figure 3). A report by Equite, a not-for-profit organization that focuses on reducing and preventing insurance fraud and crime in Canada, states that the majority of stolen vehicles are new as organized crime rings focus their efforts on stealing new and luxury vehicles for maximum profit in overseas sales (Equite 2024b). Most newer vehicles also have a push button start, which makes it easier for criminals to steal. In fact, some criminals will target certain makes/models as they are already equipped to steal, either through hardware or software hacking (Equite 2024b). Criminals will also look for vehicles without anti-theft protection (video/audio devices, steering wheel locks, etc) as it is easier to steal.

4.2 Comparison to Ontario

Although this paper focuses specifically on auto theft rates in Ottawa, how different are the trends compared to Ontario? According to a report by Equite, the majority of vehicle thefts in Ontario were vehicles made in 2017 or newer (Equite 2024a). This can be seen in Figure 3 where newer vehicles made in 2017 or newer had a higher rate of theft in Ottawa.

4.3 Weaknesses and Next Steps

Some limitations of this paper include the reliability of the dataset. While the data originates from the Ottawa Police and relies on reports submitted by Ottawa residents, the accuracy of these reports may vary. The dataset excludes instances of stolen vehicle cases that went unreported, potentially skewing the overall picture of vehicle theft within the community. This absence of unreported cases could lead to an underestimation of the true extent of the issue, limiting the comprehensiveness of the findings presented in this paper.

5 Conclusion

In conclusion, the surge in auto theft incidents, both in Ottawa and across Canada, is a pressing issue that demands attention. The escalation in theft rates poses a significant threat to public safety, prompting concerns about the effectiveness of current preventative measures and law enforcement efforts. The analysis conducted in this paper sheds light on the auto theft landscape specifically in Ottawa, offering insights into the trends and patterns observed between 2018 and 2023. By examining variables such as the types of vehicles targeted, the

recovery rates, and the geographical distribution of thefts across different neighborhoods, this research provides a comprehensive understanding of the dynamics driving the escalating trend in auto theft. Moving forward, addressing the root causes behind the surge in auto theft requires a multifaceted approach that combines effective law enforcement strategies, community engagement initiatives, and technological solutions to deter criminals and protect vulnerable vehicles. By leveraging the findings of this study and collaborating with stakeholders, policymakers, and law enforcement agencies can develop targeted interventions to curb the rising tide of auto theft and safeguard the well-being of Ottawa residents.

References

CBC. 2024. *A Car Was Stolen Every 40 Minutes in Toronto Last Year, Police Chief Says*. https://www.cbc.ca/news/canada/toronto/car-thefts-2023-toronto-figures-1.7147387.

Equite. 2024a. *2023 Auto Theft Trend Report*. https://assets-global.website-files.com/614f811f9a079b223c5d23ab/65c12aa99124b66e078fe7d6_E%CC%81quite%CC%81%20Association%20-%202023%20Auto%20Theft%20Trend%20Report%20-%20EN.pdf.

———. 2024b. *Reasons Why Vehicles Are Stolen*. https://www.equiteassociation.com/educational-material/reasons-why-vehicles-are-stolen.

Firke, Sam. 2021. *Janitor: Simple Tools for Examining and Cleaning Dirty Data*. https://CRAN.R-project.org/package=janitor.

Müller, Kirill, and Hadley Wickham. 2022. *Tibble: Simple Data Frames*. https://CRAN.R-project.org/package=tibble.

Police, Ottawa. 2024. *Theft of Motor Vehicle Open Data*. https://data.ottawapolice.ca/datasets/e5453a203e2a4baeac32ac4e70ce852c_0/about.

Post, National. 2024. *Canada Has Become a Very Scary Place to Own a Vehicle Right Now*. https://nationalpost.com/news/canada/canada-auto-theft-crisis.

Pringle, Josh. 2024. *221 Vehicles Reported Stolen in Ottawa so Far in 2024: Here's the Hot Spots for Vehicle Thefts*. https://ottawa.ctvnews.ca/221-vehicles-reported-stolen-in-ottawa-so-far-in-2024-here-s-the-hot-spots-for-vehicle-thefts-1.6761505.

Richardson, Neal, Ian Cook, Nic Crane, Dewey Dunnington, Romain François, Jonathan Keane, Dragoș Moldovan-Grünfeld, Jeroen Ooms, Jacob Wujciak-Jens, and Apache Arrow. 2024. *Arrow: Integration to 'Apache' 'Arrow'*. https://github.com/apache/arrow/.

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

Wickham, Hadley. 2016. *Ggplot2: Elegant Graphics for Data Analysis*. Springer-Verlag New York. https://ggplot2.tidyverse.org.

Wickham, Hadley, Mara Averick, Jennifer Bryan, Winston Chang, Lucy D'Agostino McGowan, Romain François, Garrett Grolemund, et al. 2019. "Welcome to the tidyverse." *Journal of Open Source Software* 4 (43): 1686. https://doi.org/10.21105/joss.01686.

Wickham, Hadley, Romain François, Lionel Henry, and Kirill Müller. 2022. *Dplyr: A Grammar of Data Manipulation*. https://CRAN.R-project.org/package=dplyr.

Wickham, Hadley, Jim Hester, and Jennifer Bryan. 2022. *Readr: Read Rectangular Text Data*. https://CRAN.R-project.org/package=readr.

Xie, Yihui. 2014. "Knitr: A Comprehensive Tool for Reproducible Research in R." In *Implementing Reproducible Computational Research*, edited by Victoria Stodden, Friedrich Leisch, and Roger D. Peng. Chapman; Hall/CRC. http://www.crcpress.com/product/isbn/9781466561595.

Zhu, Hao. 2021. *kableExtra: Construct Complex Table with 'Kable' and Pipe Syntax*. https://CRAN.R-project.org/package=kableExtra.