

# The analysis of Building Evaluation Score

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## 0. Abstract

Apartment Building Evaluation datasets are important tools for determining and analyzing the scores and situations of buildings. However, biases relating to the registration of buildings and their types may affect the reliability of this information. This report utilizes data on apartment building evaluation scores in Toronto. It aims to assess the trends and patterns of scores, as well as the relating factors.

## 1. Introduction.

From the website Global News, it reports that: “Toronto is one of those lucky cities when it refers to buildings because we pull in so many different styles and so many different visions (Global News).” This displays that buildings play an important role in the development of Toronto. Thus, it is necessary to analyze the building evaluation scores in order to make better improvements in Toronto. The morning of Jan. 15, emergency crews responded to a fire at a apartment building at 828 Shaw St., north of Bloor Street (Abby Neufeld). In this accidents, eleven people were rescued from the burning building and four were transported to the hospital (Abby Neufeld). Security matters should be treated with the utmost seriousness, and regular maintenance of buildings guarantees the safety of residents. Earlier in this month, the displaced tenants of a Toronto apartment building damaged in a four-alarm fire feel angry (Abby Neufeld). Also, they stated that they’re unaware of any actions taken following a city inspection that identified 12 fire violations four days before the blaze (Abby Neufeld). The causing factors of this accident include relevant personnel lack of safety knowledge, safety consciousness and safety habits. When finding out hidden fire danger, institutions should inform relevant units or individuals in time to take measures and order to remove the hidden danger within a time limit. Charleen Edwards, who had lived at 828 Shaw Street for five years, stated that a fire accident left her without a home (Abby Neufeld). In her time there, she never met her landlord in person even before fire violations were found (Abby Neufeld). She says that :“maintenance issues often went unaddressed within the building (Abby Neufeld).” Despite this, it also reports that :“People in the building complained and still nothing changed,” based on CTV News Toronto (Abby Neufeld). Accidents related to buildings are all unstable factors for the society, so people must find a way to resolve these problems before it’s too late. Overall, the building evaluation scores play an important role in solving these problems. Also, it proves the scientific data for the security of residents and their quality of life. This dataset contains building evaluation scores for buildings registered with RentSafeTO (Apartment Building Evaluation). Buildings must undergo evaluation at least once every three years (Apartment Building Evaluation).

Apartment Building Evaluation has evolved beyond just reactively dealing with buildings’ issues, meaning a number of other complex factors contributing to potential threats of these buildings need to be considered. This dataset contains the statistics of the scores of common areas, mechanical and security systems, parking and exterior grounds in buildings (Apartment Building Evaluation). The scores of each item are used to calculate the overall score of buildings. Therefore, it is possible that there exists some relationships between the scores of each item and the total score. For example, the variable called “SECURITY” illustrates the condition of the security system(s) in a building (Apartment Building Evaluation). The variable is one of the most important characteristics of buildings and is closely related to people’s safety. It is also necessary to determine the factor that have the greatest influence on the overall score. In this way, governments would better identify problems as well as offer solutions in order to maintain urban development and promote

economy. From the website Emporis, it says that: “With nearly six million people in the metropolitan area, Toronto is the largest city in the country and has a skyline to match (Emporis).” All the people should work together to make great contributions to protecting residents’ daily lives and property, contributing to disaster relief and economic construction.

It is necessary to remove missing values in these important variables.

## **2. Data**

### **2.1 Data source.**

This report utilizes the building evaluation scores for buildings registered with RentSafeTO (Apartment Building Evaluation). From the website, it shows that :“Apartment Building Standards is a bylaw enforcement program established in 2017 to ensure that owners and operators of apartment buildings with three or more storeys or 10 or more units comply with building maintenance standards (Apartment Building Evaluation).” In this way, building owners and operators can comply with building maintenance standards . The program includes evaluation, auditing and enforcement of standards, so that Toronto residents living in rental buildings have clean, safe and secure homes (namara marketplace). The program includes evaluation, auditing and enforcement of standards (namara marketplace).The total scores dataset analyzed on this report was obtained in csv format from the City of Toronto Open Data Portal using the R package opendatatoronto (Gelfand 2020). The dataset is refreshed daily.

### **2.2 Methodology and data collection**

The dataset contains information on the scores of evaluations in common areas, mechanical and security systems, parking and exterior grounds through Bylaw Enforcement Officers. Specifically, the score from one to five is assigned to each item, and one is the lowest and five is the highest. It also illustrates that if an item is not applicable to the building at the time of evaluation, the score will become a missing value (Apartment Building Evaluation). The evaluation is scheduled in a way that property owners, or designates can be present (RentSafeTO Building Evaluations & Audits). Then, they provide the bylaw enforcement officer access to locked common areas and/or facility amenities (RentSafeTO Building Evaluations & Audits). After officers completed an inspection of the apartment building, the bylaw enforcement officer will take notes and photographs, as well as upload to the City’s mobile investigation application (RentSafeTO Building Evaluations & Audits). After that, they calculate the total building evaluation score which is available to building owners and operators (RentSafeTO Building Evaluations & Audits). From the website “RentSafeTO Building Evaluations & Audits,” the overall evaluation score will determine next steps for City action. Specifically, buildings have scores less than 50 percent must undergo comprehensive inspections and audits of all common areas(RentSafeTO Building Evaluations & Audits). If buildings’ scores are less than 65 percent , then the next evaluation will take place within one year(RentSafeTO Building Evaluations & Audits). If their scores are between 66 and 85 percent, the next evaluation will happen in two years(RentSafeTO Building Evaluations & Audits). For buildings that have scores larger than 86 percent, the next evaluation will be within three years(RentSafeTO Building Evaluations & Audits).

While this dataset contains building evaluation scores for buildings registered with RentSafeTO, it is not an accurate representation of all the buildings in Toronto. There are established biases since scores are selectively reported. This is because there are some buildings that are not registered with RentSafeTO. Moreover, this dataset doesn’t record the evaluation scores for building of which the owners are not available at that time. The majority of buildings that are not registered with RentSafeTO include Condo buildings, town homes, or units in a private home such as basement or main floor apartment (RentSafeTO Building Evaluations & Audits). However, there are still many cases in which important items go unreported. For example, international students’ rental problems are serious in Toronto. Specifically, some Condos are not registered with RentSafe and they doesn’t have a perfect safety facilities and so on. Moreover, there is a portion of people living in basements, and their living environments are unreported. It is clear that basements can have problems with the lighting, temperature, pests, etc. Moreover, according to a website called “Dangers of basement living often overlooked” Realtor Jane Orvis is a ReMax Northwest Realtors. She stated:” I have seen illegal basement bedrooms used as a selling point, which are included in a house’s bedroom count

or acknowledged with phrases such as “2+ bedrooms (Dangers of basement living often overlooked).” The under-reporting of various cases leads to biased data which does not fully reflect the full situation of buildings in the city. The characteristics of building that are not registered may systematically differ from those that are registered, which leads to possible confounds in the data. This in turn can lead to inaccurate calculations of total scores.

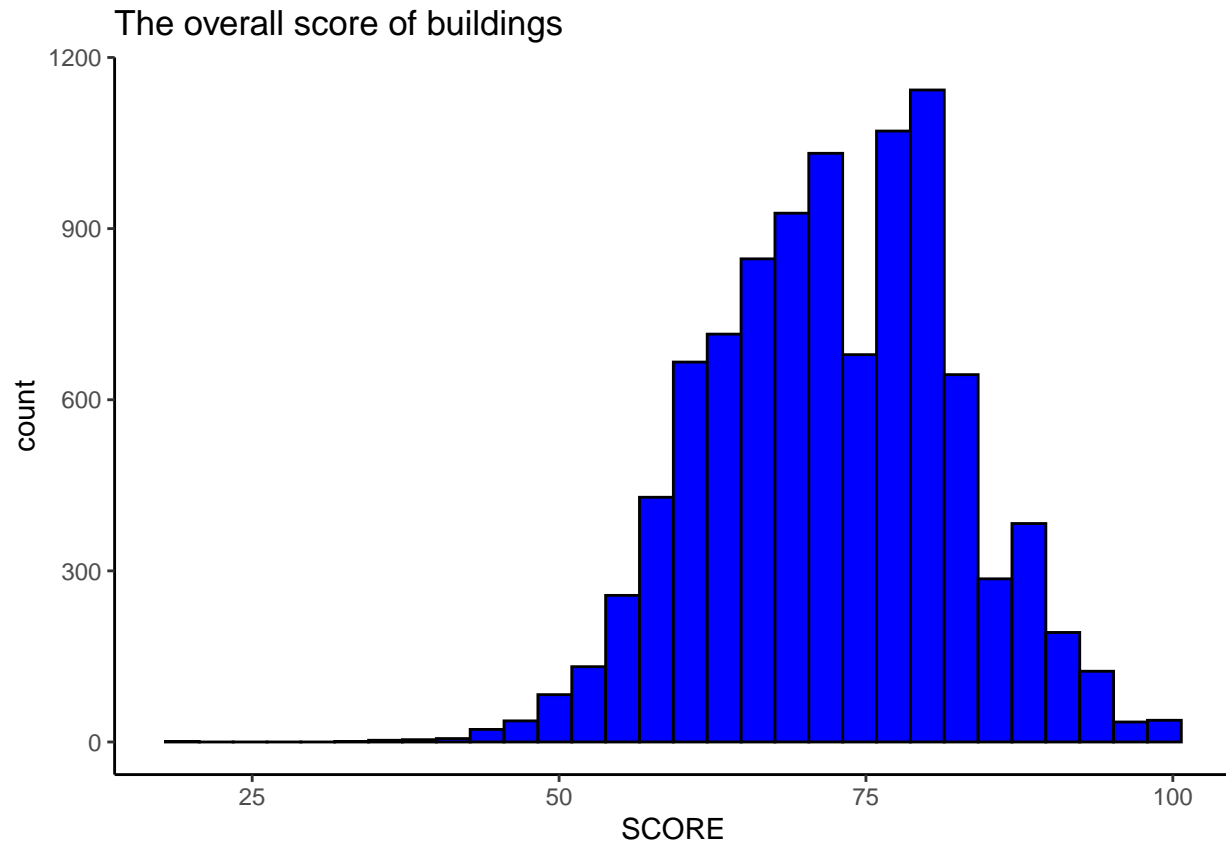
## 2.3 Data characteristics

This dataset contains building evaluation scores for buildings registered with RentSafeTO. There were 9759 observations of buildings in the dataset and 40 attributes: YEAR\_REGISTERED, YEAR\_EVALUATED, YEAR\_BUILT, PROPERTY\_TYPE, WARD, WARDNAME, SITE\_ADDRESS, CONFIRMED\_STOREYS, CONFIRMED\_UNITS, EVALUATION\_COMPLETED\_ON, SCORE, RESULTS\_OF\_SCORE, NO\_OF\_AREAS\_EVALUATED, ENTRANCE\_LOBBY, ENTRANCE\_DOORS, WINDOWS and so on. The most important variables should be the “SCORE.” It is defined as the final score of the building. To be specific, the score is the sum total of each item evaluated (Apartment Building Evaluation). The formula to calculate scores is: (sum of all assigned scores during the evaluation0 / (number of unique items reviewed \*5) (Apartment Building Evaluation). A sample view of the dataset is displayed below.

## PLots

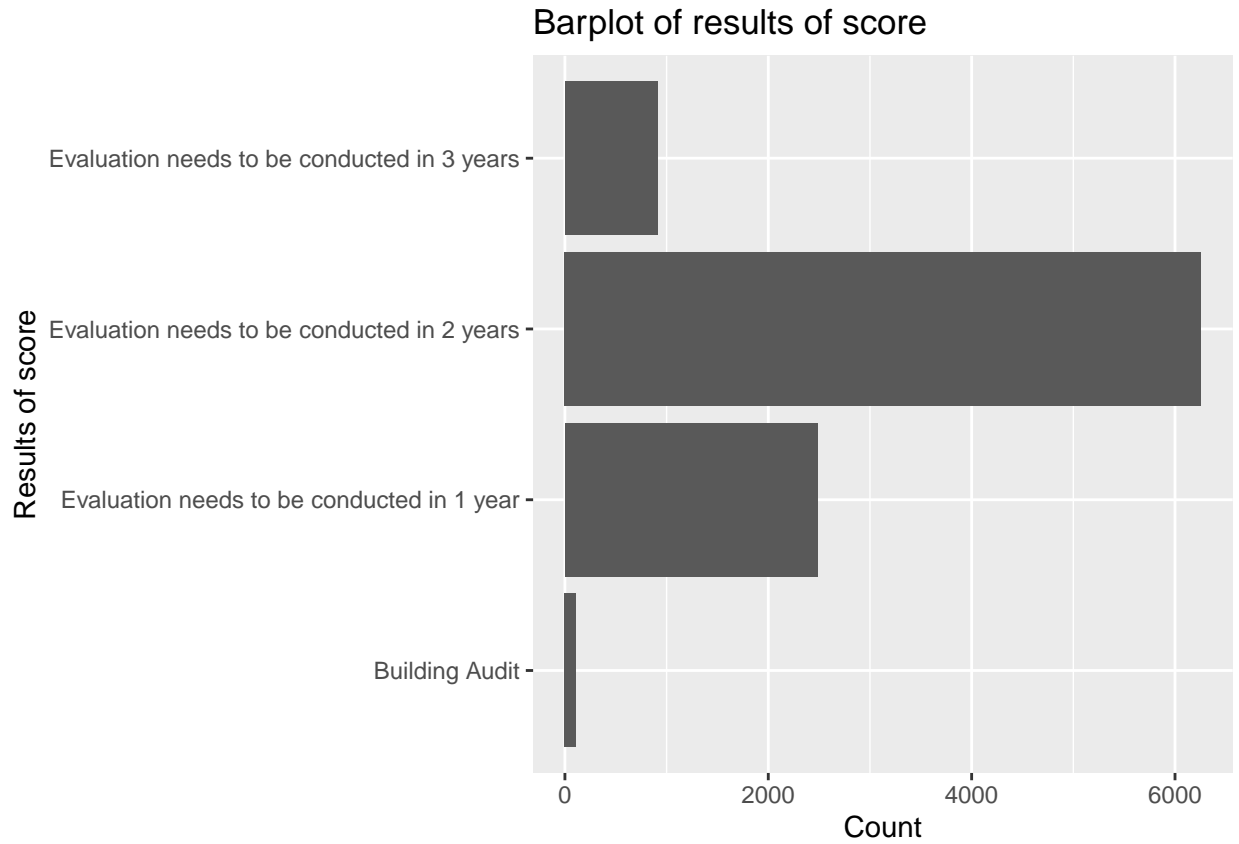
Here is the histogram of the most important variable: SCORE. It is defined as the overall score of buildings, which is the sum total of each item that was evaluated.

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## `stat_bin()` using `bins = 30`. Pick better value with `binwidth`.
```



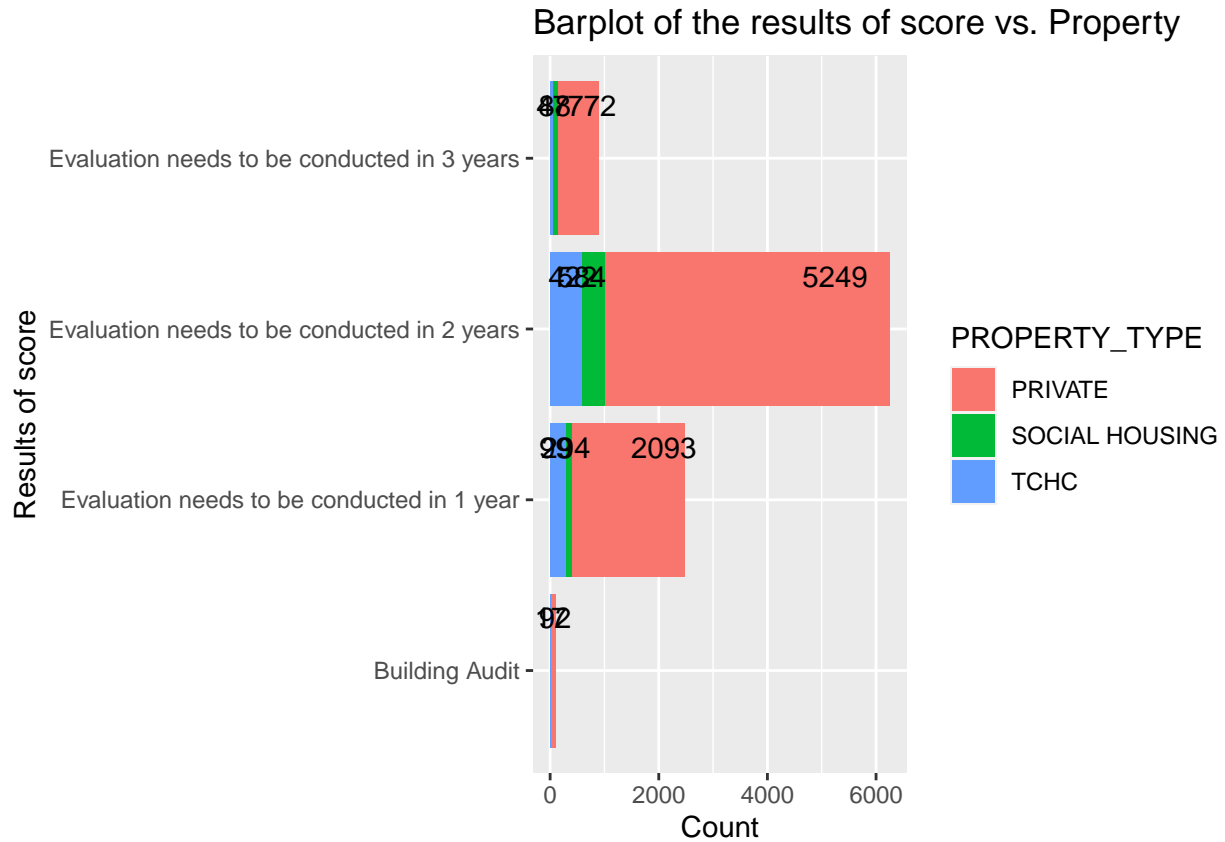
The histogram of the overall score of buildings shows that it is symmetric, with some extreme values on both sides. It shows a almost uniform distribution, and the center is around 75%. Overall, buildings in Toronto seem to be fine and things are not too bad.

Then, I make a bar plot of the variable RESULTS\_OF\_SCORE. An audit is a comprehensive examination of the building. The score is used to determine whether an audit takes place or whether another evaluation will be conducted in one, two or three years.



The bar plot of the results of score shows that most buildings' evaluations are needed to be conducted in 2 years, which is consistent with the histogram above. Most buildings' scores are between 66 and 85 percent.

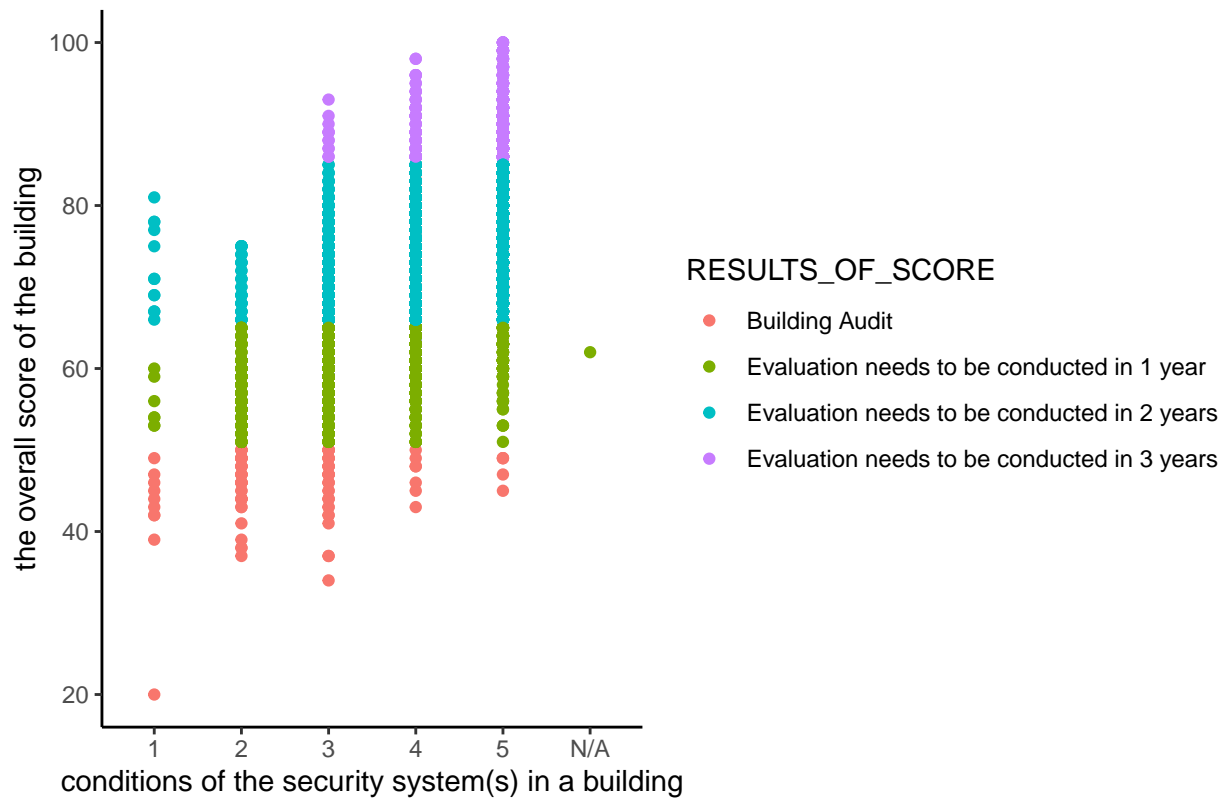
After that, I make a bar plot of the variable RESULTS\_OF\_SCORE vs. PROPERTY\_TYPE. This field informs users of whether a building is owed privately, by Toronto Community Housing Corporation or another assisted, social or supportive housing provider.



The bar plot of the variable RESULTS\_OF\_SCORE vs. PROPERTY\_TYPE displays that most of the buildings are owned privately. Also, most private buildings' evaluations are needed to be conducted in 2 years.

The next step is to make a scatter plot of the relations between SCORE and SECURITY. This is because security is a very important part when considering a building.

The scatterplot of the relations between SCORE and SECURITY



The scatter plot shows a linear relationship between the conditions of the security system(s) in a building and the overall score of the building. It illustrates that most buildings' evaluation are needed to be conducted in 1 or 2 years.

1

<sup>1</sup><https://github.com/jilbjpb/Fengyuan>

Wickham et al. (2019)

Çetinkaya-Rundel et al. (2021)

Zhu (2021)

Gelfand (2020)

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*Open Data Dataset: Apartment Building Evaluation* (2021)

*City of Toronto RentSafeTO Building Evaluations & Audits* (2021)

*Namara Marketplace apartment Building Evaluation* (2021)

*Seattlepi dangers of Basement Living Often Overlooked* (2022)

*Global News more Than 150 Buildings Will Be Open to the Public as Part of Doors Open Toronto - Toronto* (2022)

*Toronto tenants of Toronto Apartment That Burned down Say No Actions Were Taken After Fire Violations Found Days Prior* (2022)

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