Seasonal Rhythms: An Exploratory Analysis of Human Behavior

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Introduction

Human Behavior is multidimensional and is influenced by many things, including the environment. Seasonality appears to play a role in shaping human behavior, as evident by varying patterns of crime rates across different times of the year, also known as crime seasonality. Crime seasonality has been studied since the mid-nineteenth century as it is an important source for predictability of crimes (McDowall et al., 2011). This exploratory data analysis (EDA) investigated the relationship between the four seasons and crime incidences, seeking to uncover patterns that could offer insights into human behavior.

Method

Data was collected from two sources: Massachusetts's crime insight repository and the New Jersey Fatal Motor Vehicle Crash Report. Monthly reporting of fatal motor vehicle crashes were selected from 2018-2021. Monthly crime incidents of rape, murder, aggravated assault, and burglary were selected from 2018-2021.

Selected data was manually transferred into an Excel sheet. R and RStudio were chosen for EDA. The following libraries were used for analysis, exploration, and visualization: dplyr, tidyverse, readr, ggplot2, lubridate, and stringr.

Each dependent variable: fatal motor vehicle crashes, rape, murder, aggravated assault, and burglary were totaled. The months were categorized into four seasons. December-February were categorized as winter. March-May were categorized as spring. June-August were categorized as summer. September-November were categorized as autumn.

Results

Incidents of fatal motor vehicle crashes were higher in autumn (n= 681) (*figure 1*). Incidents of rape were higher in summer (n= 1705) (*figure 2*). Incidents of murder were higher in the summer (n= 144) (*figure 3*). Incidents of aggravated assault were higher in the summer (n=17038) (*figure 4*). Incidents of burglary were higher in the summer (n= 11460) (*figure 5*). Data for total incidents by season was created by selecting the dependent variables and constructing a full date using a fixed day and the year and month. Then, the total incidents for each dependent variable were summed up while removing NA values which showed that overall, crime was higher in the summer (*figure 6*).

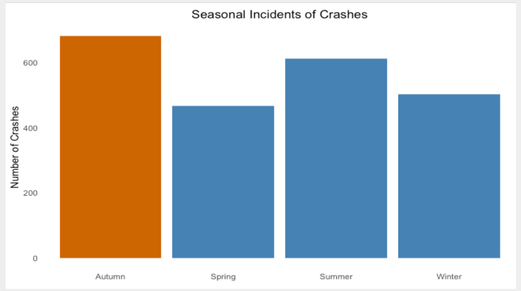

Figure 1: Bar graph showcasing incidents of fatal motor vehicle crashes from 2018-2021

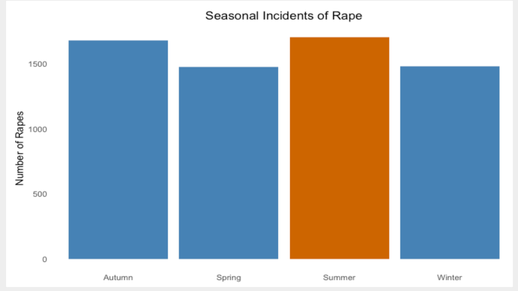

Figure 2: Bar graph showcasing incidents of rape from 2018-2021

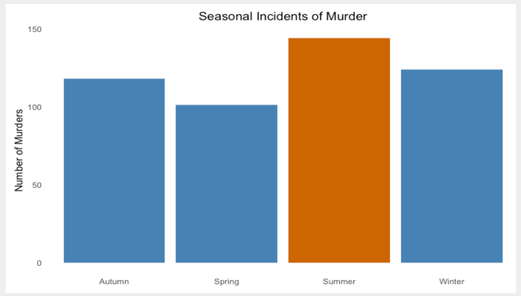

Figure 3: Bar graph showcasing incidents of murder from 2018-2021

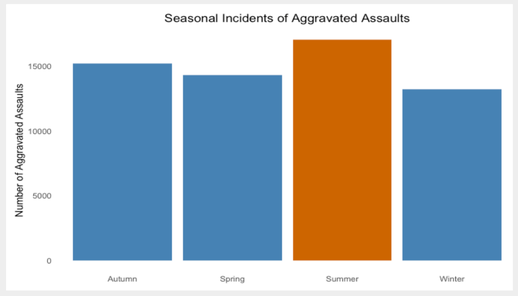

Figure 4: Bar graph showcasing incidents of aggravated assaults from 2018-2021

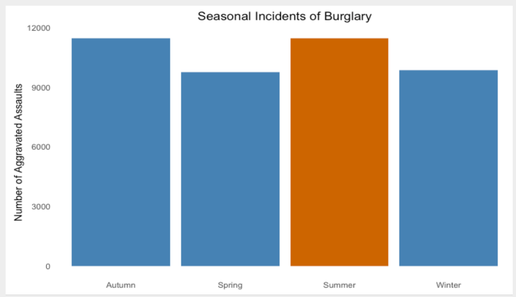

Figure 5: Bar graph showcasing incidents of burglary from 2018-2021

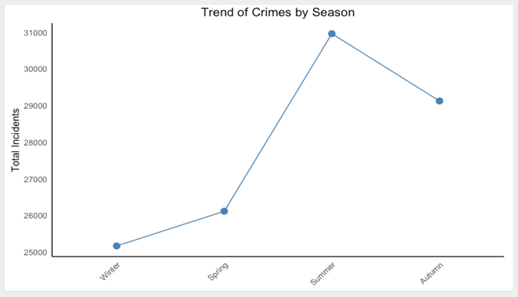

Figure 6: Line graph showcasing total incidents of crime from 2018-2021

Discussion

Overall, crime is higher in the summer (*figure 6*). Some factors that may explain this trend include weather conditions, daylight hours, and temperature. According to McDowall et al., warmer temperature plays a role in aggressive behaviors. This could explain violent crimes such as rape, murder, and aggravated assault being higher in the summer (*figures 2, 3 & 4*) (FBI, 2010). In addition, warmer weather and increased daylight encourages people to engage in activities outdoors. This creates absences from home which may increase the risk of property crimes (*figure 5*). Limited daylight and colder weather conditions may cause people to stay indoors which could explain lower crime incidents in colder seasons. However, fatal motor vehicle crashes were higher in autumn due to multiple reasons including lack of daylight and deer season (*figure 1*)(McDowall et al., 2011). The New Jersey Fatal Motor Vehicle Crash Report, stated accidents due to animals, objects, intoxicated drivers, weather conditions, and road characteristics (New Jersey State Police, 2021).

Future Directions

The results of the EDA can be used for further understanding of crime seasonality and serves as insight for law enforcement and policy makers to develop targeted strategies aimed at crime prevention and public safety enhancement, with the goal to improve community well-being.

References

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