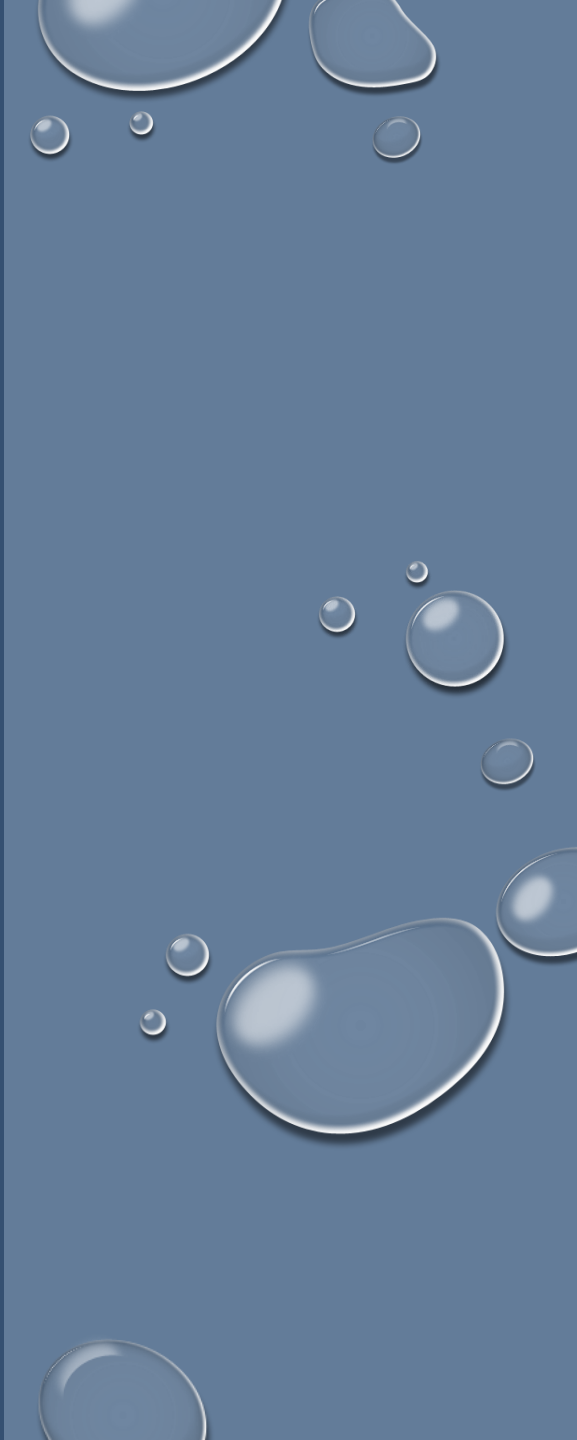# MTA TURNSTILE ANALYSIS

ZIMU SU

INTRODUCTION

- Motivation:
  - ➤ Improve staff/resource management for MTA at different weather condition and pandemic situations.

- Objectives:
  - ➤ Explore the trend of entry/exit numbers at MTA station in New York city as response to local weather condition and daily COVID new cases.
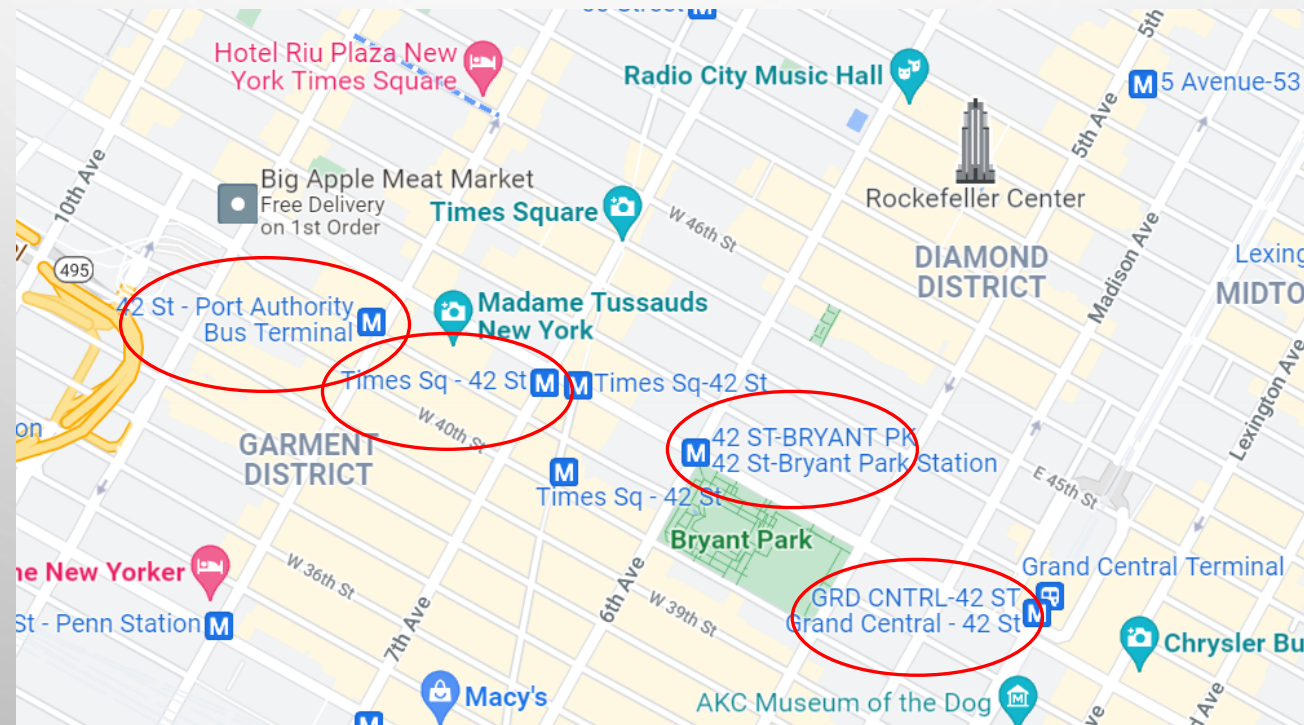
METHODOLOGY

- Data sources:
  - ➤ MTA Turnstile data (entries/exits number): http://web.mta.info/developers/turnstile.html
  - ➤ NOAA Climate Data (temperature, precipitation): https://www.ncdc.noaa.gov/cdo-web/
  - ➤ New York Times Covid statistics: https://github.com/nytimes/covid-19-data

- Tool: SQLalchemy, pandas, matplotlib, seaborn

- Data cleaning and manipulations:
  - ➤ Conversion to daily data;
  - ➤ Remove abnormal data caused by lost date data in subunit channel;
  - ➤ Reversed counted entries/exits value are removed.
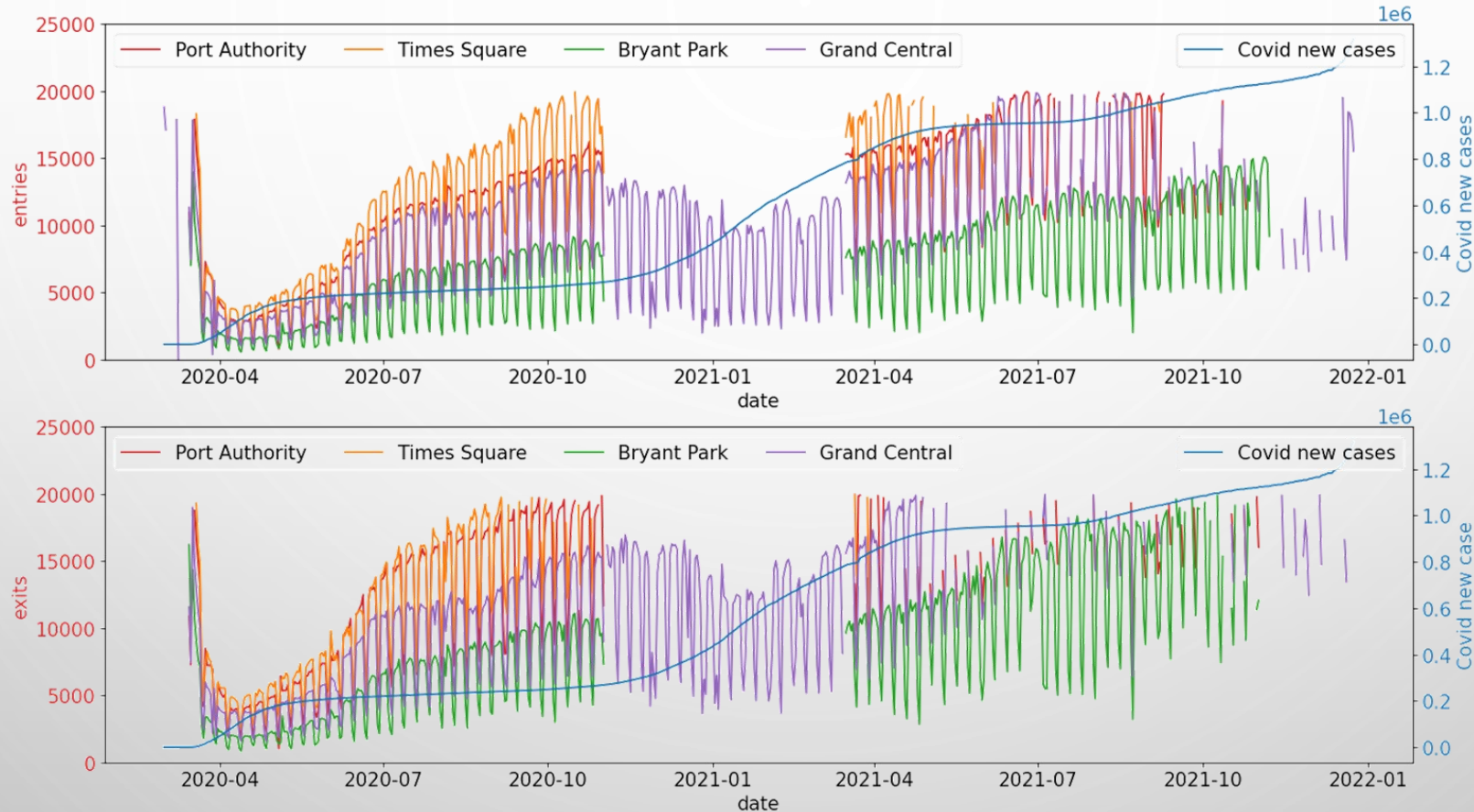 - ➤ Stratified analysis for weekdays/weekends.

- MTA and climate information are collected from the stations in 42 street near Times Square. Covid new cases are collected from the whole New York City.
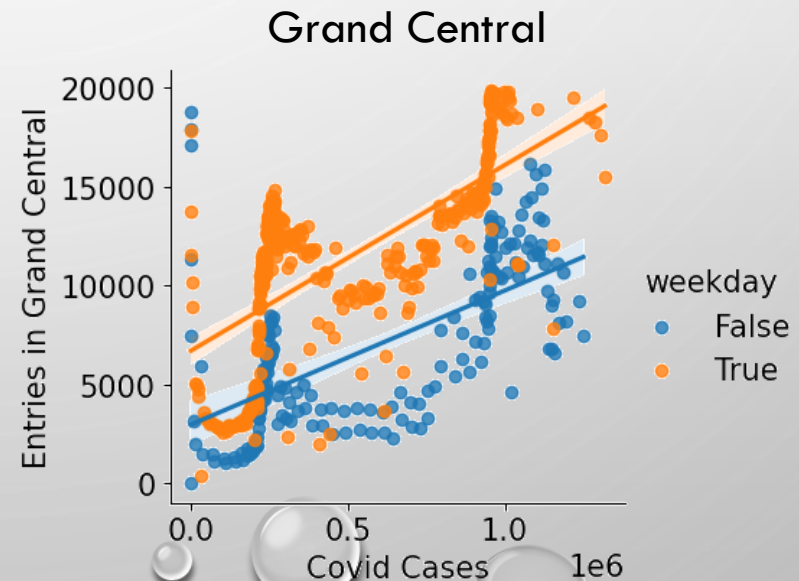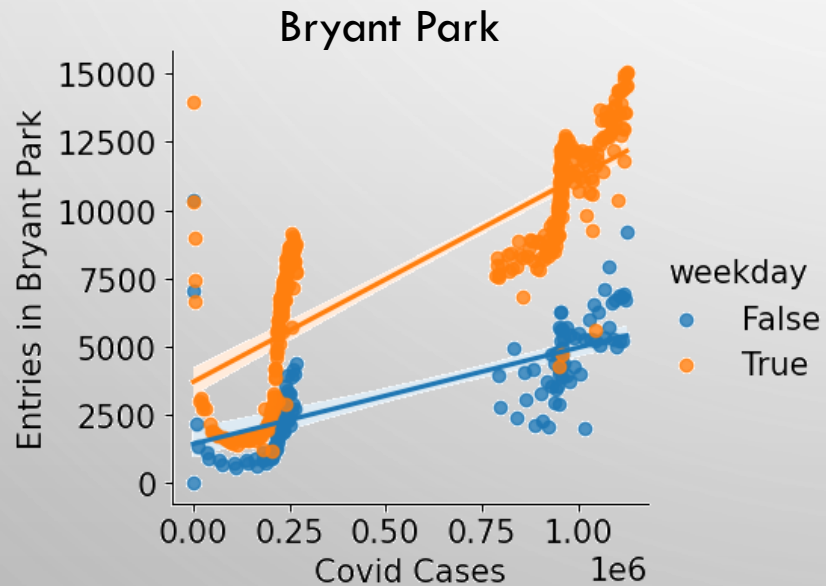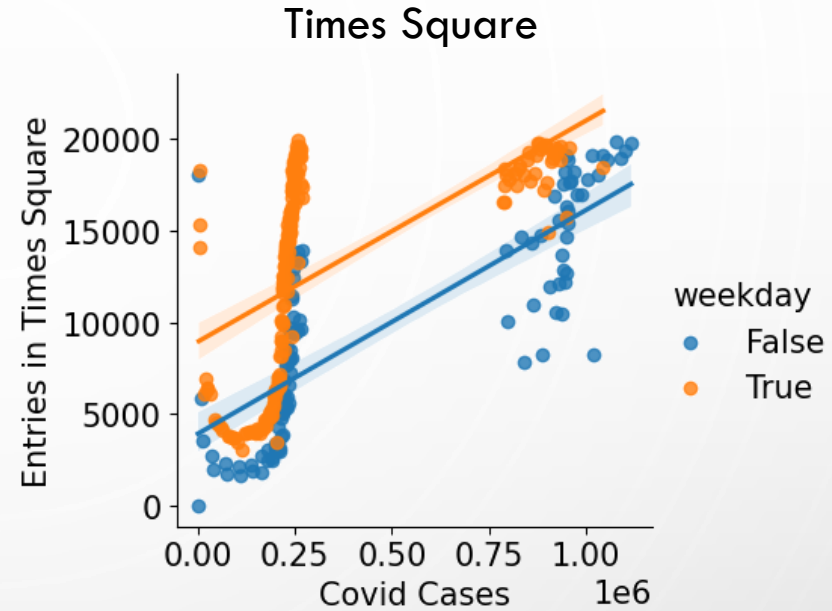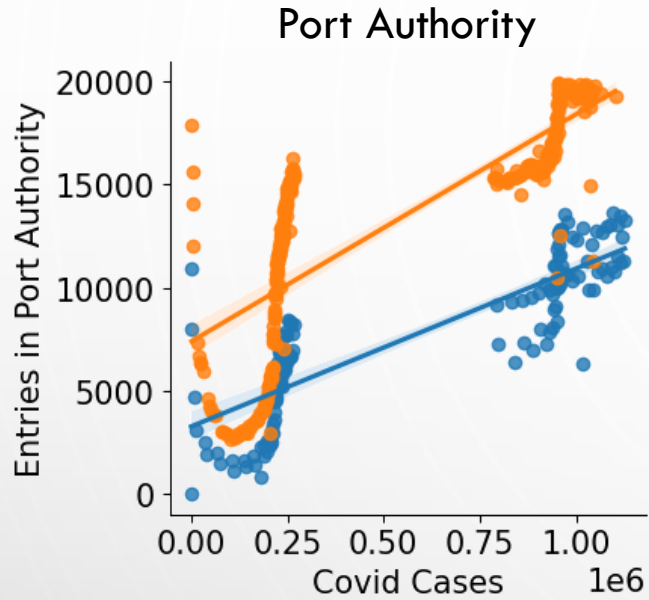
Station location

RESULTS

Time trend of entries/exits number and daily covid new cases:

- Trend of entries and exits number are very similar;
- Riders at four station increases before 10/2020 and after 02/2021. Decreases between 10/2020 and 02/2021.
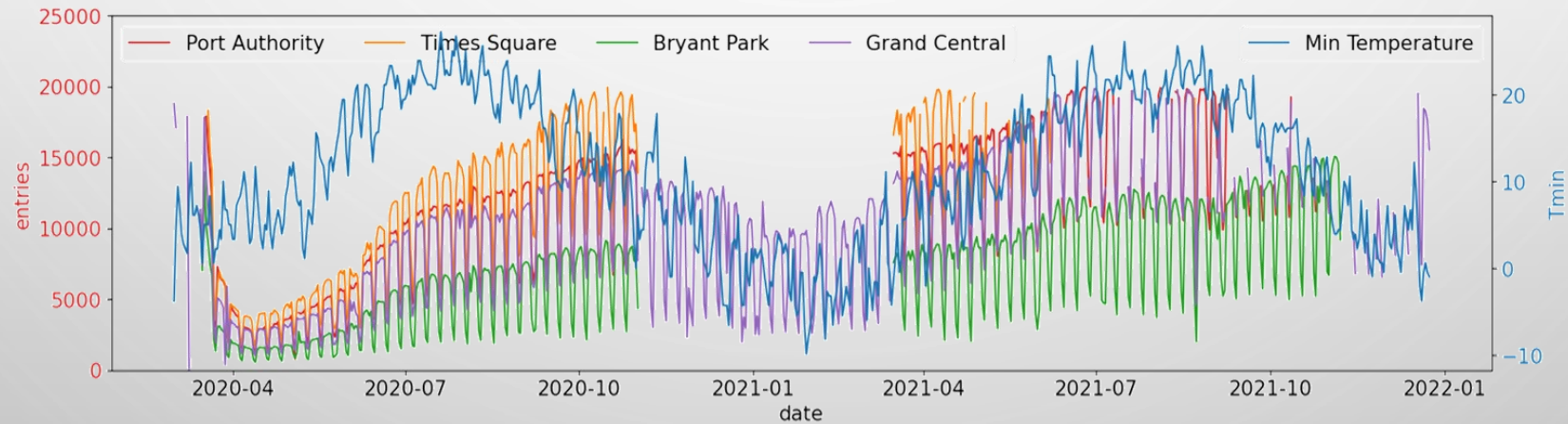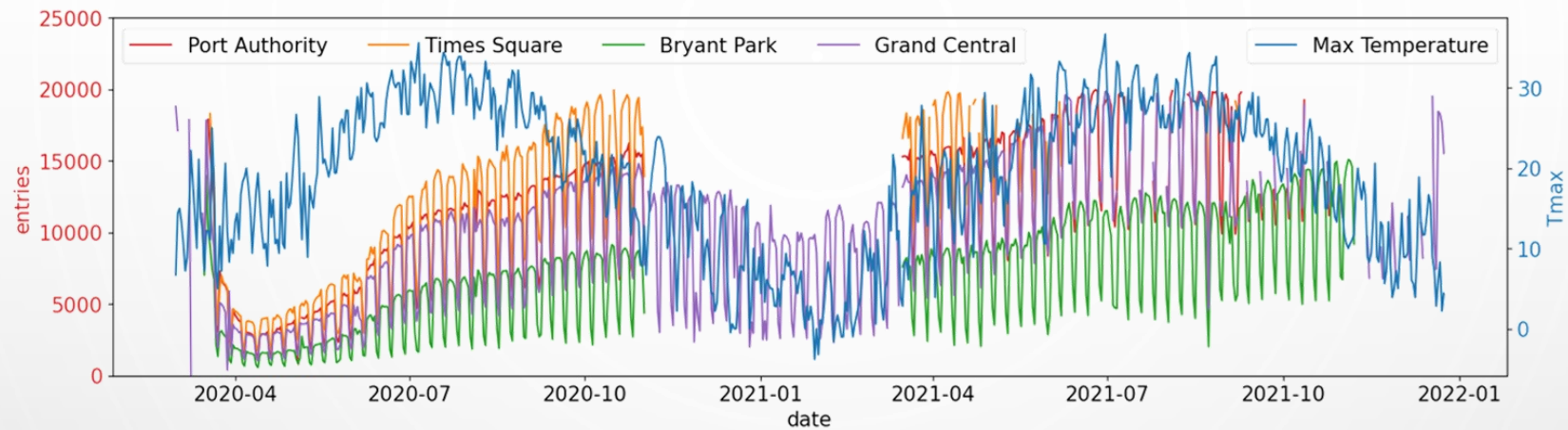- Covid new cases continue growing in New York city.

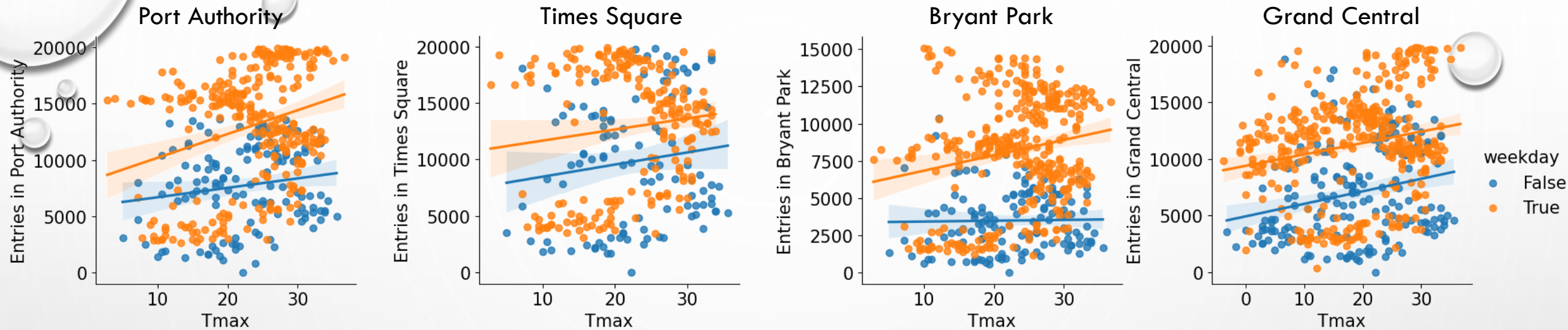# Entries vs. covid new cases at four stations at weekdays and weekends

- There are positive relationship between entries and covid new cases.

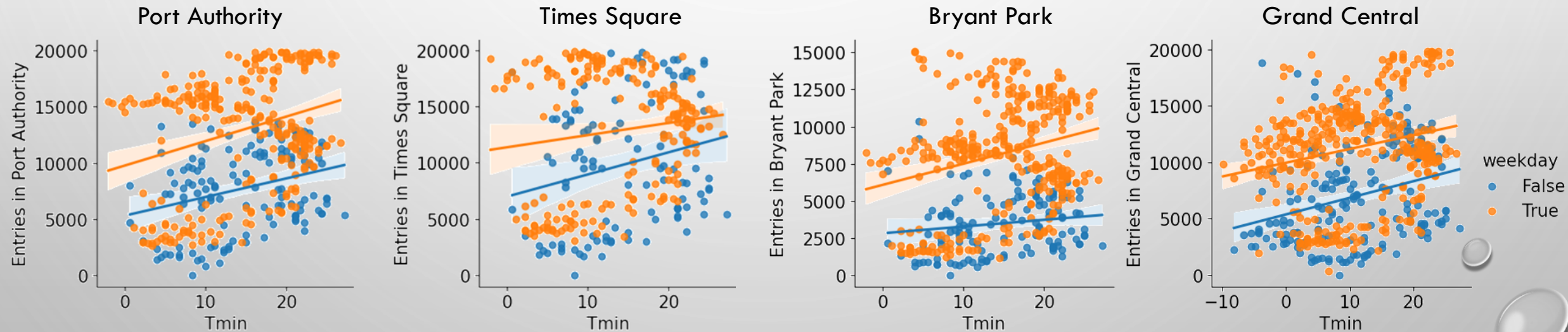# Time trend of entries and maximum/minimum temperature within the day

- Consistent trend between entries and temperature after 11/2020.
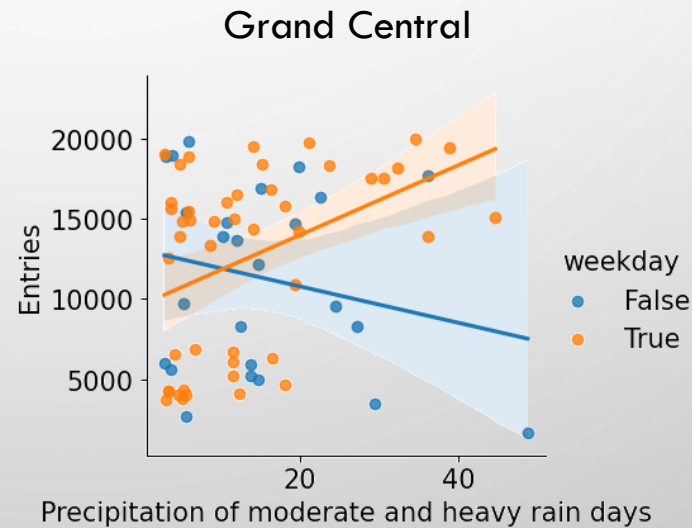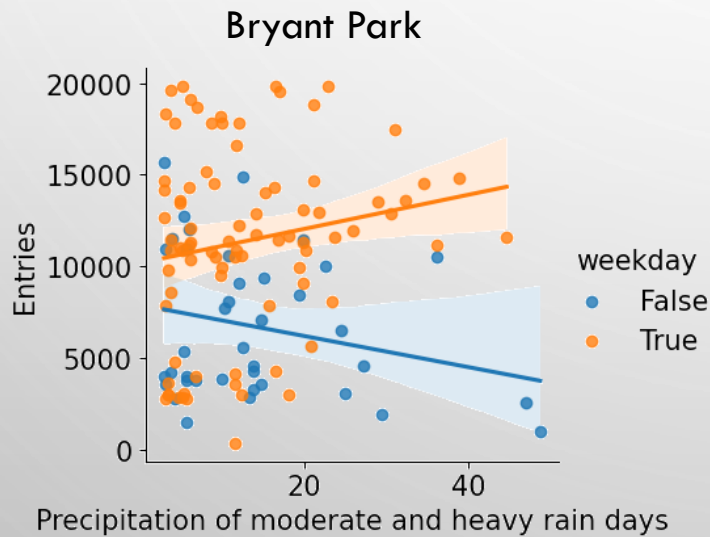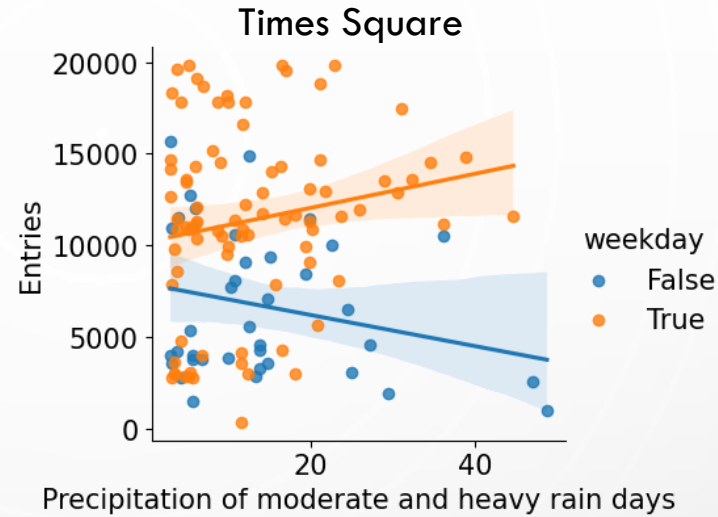
Entries vs. maximum temperature

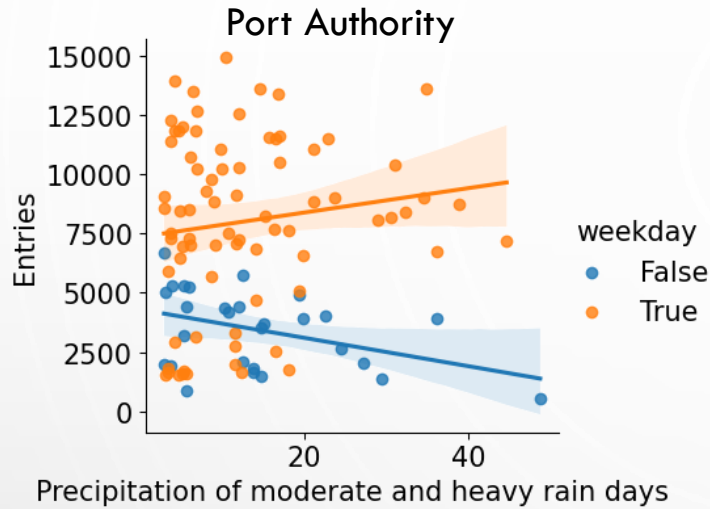
Entries vs. minimum temperature

- More likely to take MTA for higher temperature;
- The positive trend is more obvious on weekdays compared to weekends, except times square station.

Entries vs. precipitation in moderate and heavy rain days

- People are more likely to take MTA in heavy rain on weekday, not on weekends.

PRELIMINARY CONCLUSIONS

- MTA rider number and covid new cases are positively related;

- MTA may distribute more staff resources for warm and hot days;

- More staff can be deployed in heavy rain day at weekday, but less on weekends.