

BAY AREA BIKE SHARE

The First and Last Commuter Mile

Sam Gutentag

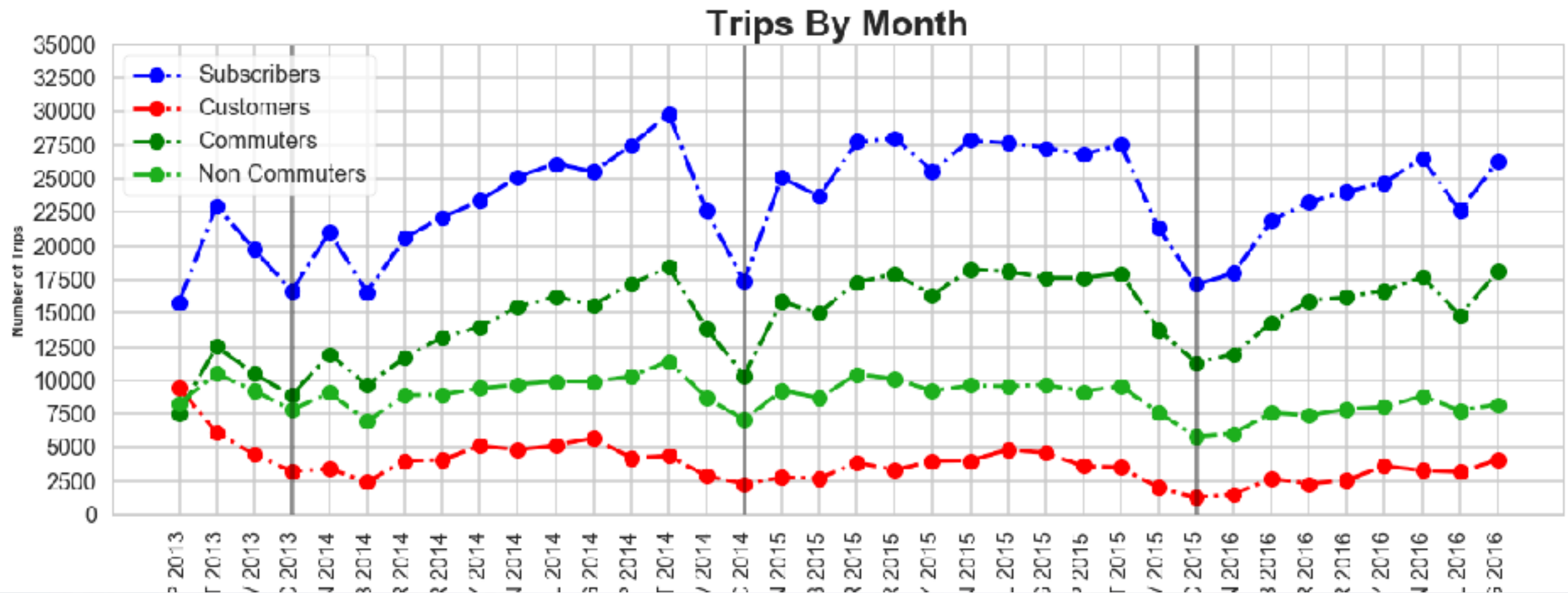
THE DATA

- Data provided by Bay Area Bike Share
- 983,648 Trip Records
- 3 years of minute by minute Status Data Records from 74 Stations
- Station information records and relocation/expansion notes
- Data is preprocessed with a series of python scripts in Jupiter Notebooks, available here gutentag.co/bayareabikeshare

THE BASICS

- Bay Area Bike Share provided nearly a million rides between august 2013 and August 2016
- 890,000 Rides taken in San Francisco
- 847,000 Rides taken by Subscription Plan Users
- 137,000 Rides taken by Casual Pay-As-You-Go Users

MONTHLY RIDERSHIP



FINDING NEW USER TIERS

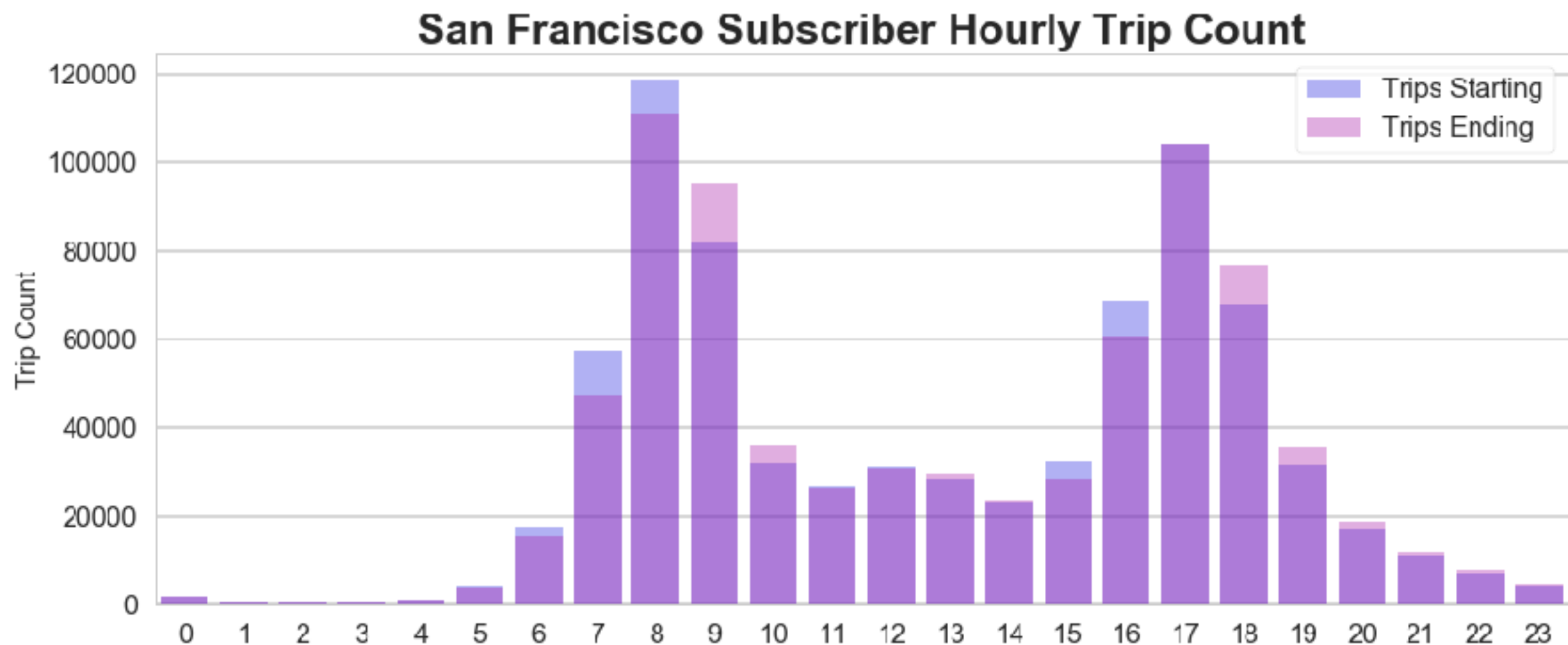
- 771,000 Total San Francisco Subscriber Rides
- 33.4% of rides between 7am and 10am weekdays
- 30.8% of rides between 4pm and 7pm weekdays
- A new 'Commuter' plan could spur program growth and interest

PROPOSAL: ADDITION OF A 'COMMUTER' TIER

- 7am-10am and 4pm-7pm Trip Start only
- Weekday Only
- 20 minute limit before extra fees
- Lower priced than 24/7 'Subscriber' Plan

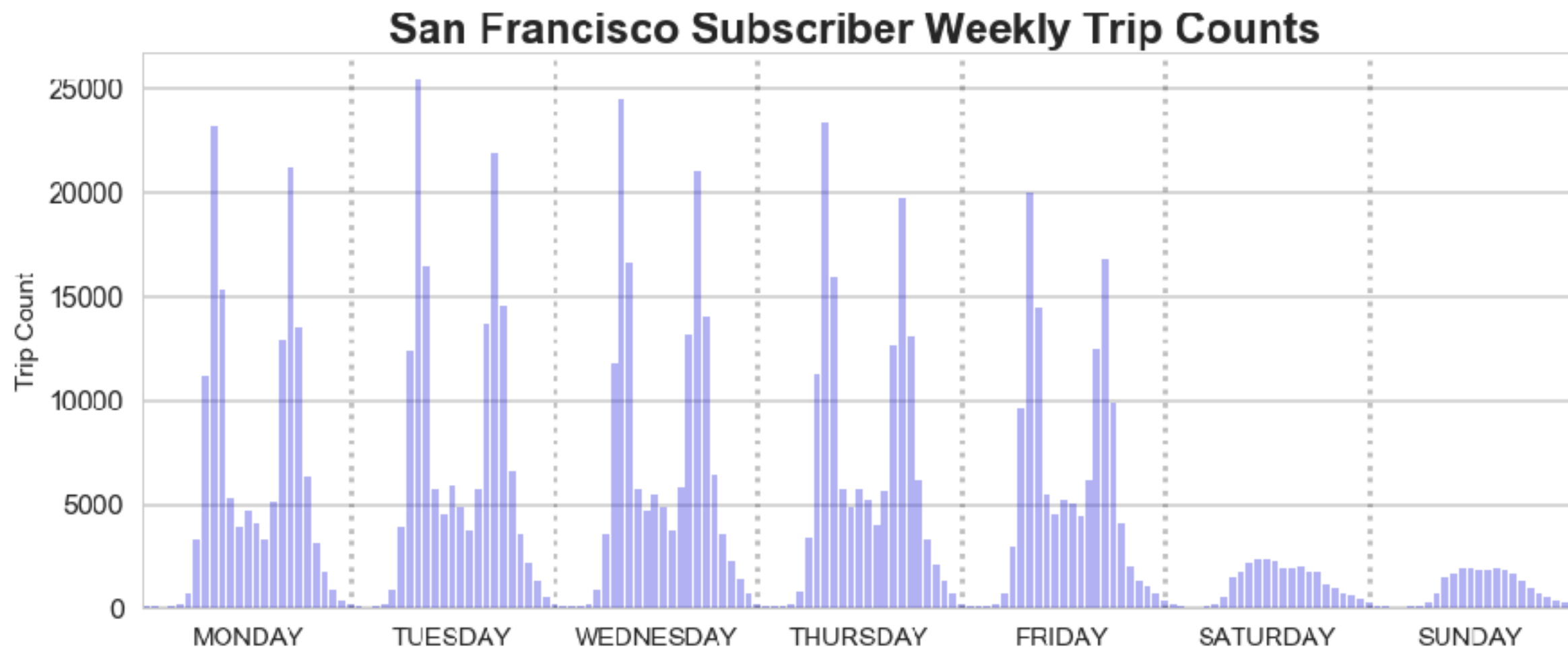
WHY ONLY THOSE HOURS?

- 33.4% of Subscriber rides between 7am and 10am
- 30.8% of Subscriber rides between 4pm and 7pm



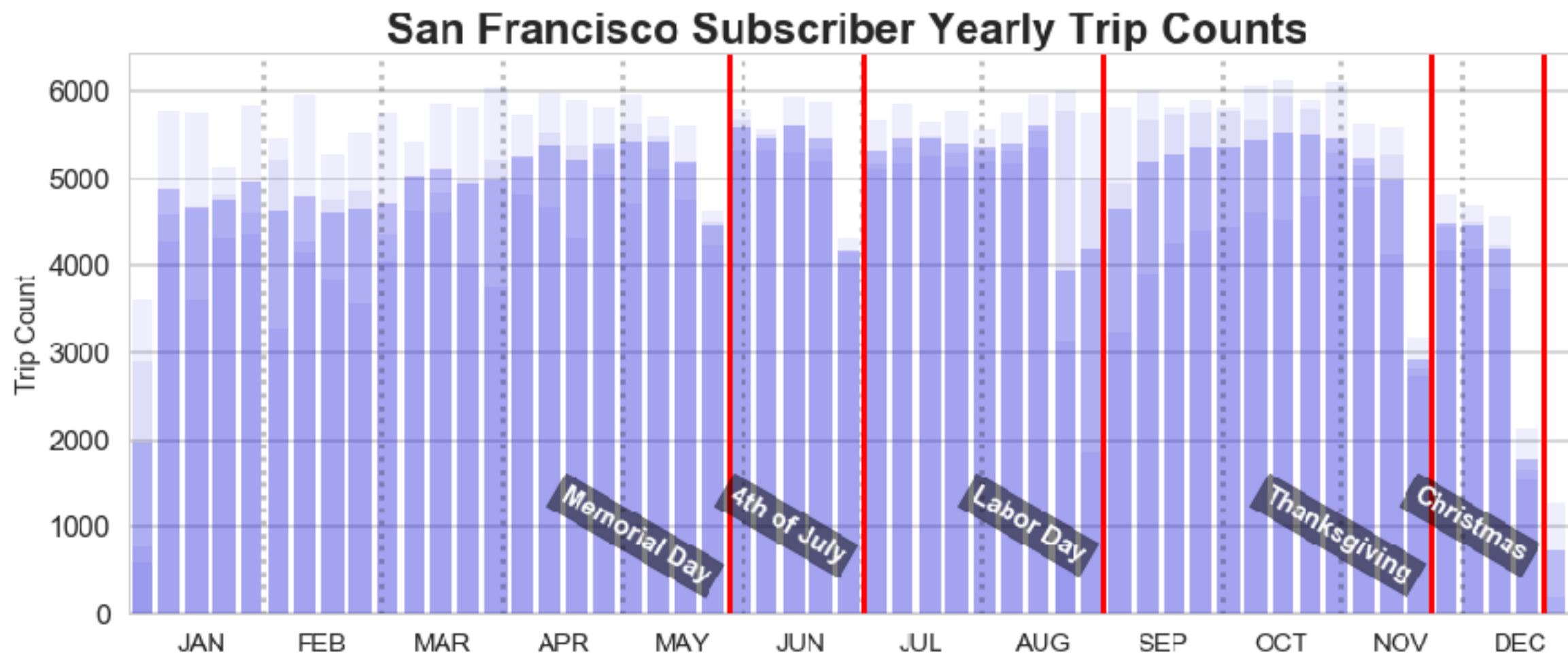
WHY WEEKDAYS ONLY?

- 96.7% of Subscriber rides on weekdays



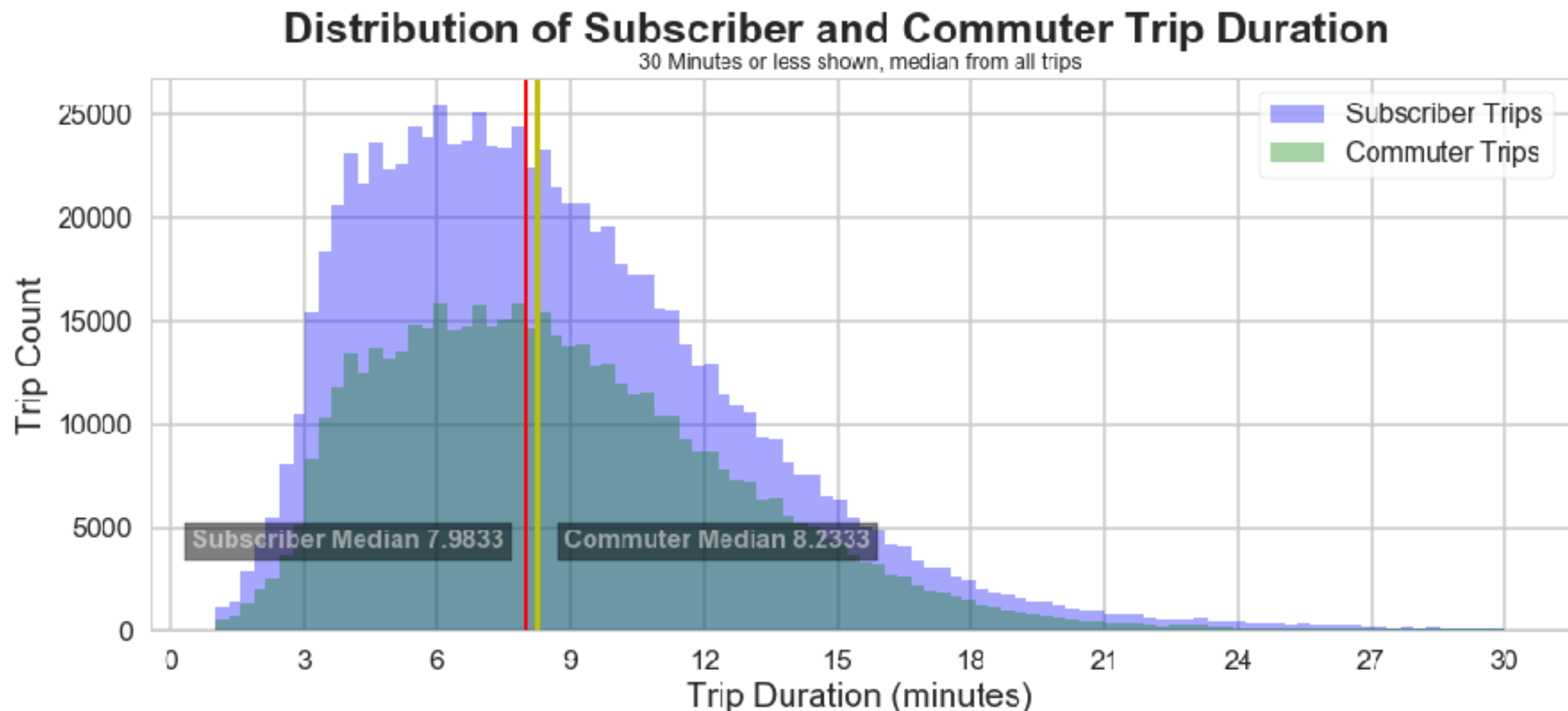
ARE YOU SURE THEY ARE COMMUTING?

- Year round, the same schedule, every day, every week
- Only meaningful dips are at predictable holidays



WHY ONLY 20 MINUTES?

- 7.98 Minutes - Subscriber Median Ride Duration
- 8.23 Minutes - Subscriber Median Ride Duration in Commute Hours



COMMUTER CONNECTIONS

- Green Stations are within 1 block of a Caltrain Station (commuter trains)
- Blue Stations are directly above BART stations (Local Subway system, all at transbay locations)
- Red Stations are within one block of MUNI stations (Local Bus and Light rail system)
- Yellow Stations are along San Francisco's Embarcadero (flat, wide paved avenue friendly to bikers)

Morning Commutes

Outbound Trips			Inbound Trips		
ID	Station	Share	ID	Station	Share
70	San Francisco Caltrain	14.978	70	San Francisco Caltrain	8.037
69	San Francisco Caltrain 2	11.691	61	2nd at Townsend	6.621
50	Harry Bridges Plaza Ferry Building	7.511	65	Townsend at 7th	6.427
55	Temporary Transbay Terminal	7.471	77	Market at Sansome	4.975
74	Steuart at Market	5.668	69	San Francisco Caltrain 2	4.206
61	2nd at Townsend	4.124	51	Embarcadero at Folsom	4.114
73	Grant Avenue at Columbus Avenue	3.980	60	Embarcadero at Sansome	4.141
77	Market at Sansome	2.971	63	Howard at 2nd	3.996
67	Market at 10th	2.940	74	Steuart at Market	3.918
54	Embarcadero at Bryant	2.865	55	Temporary Transbay Terminal	3.796

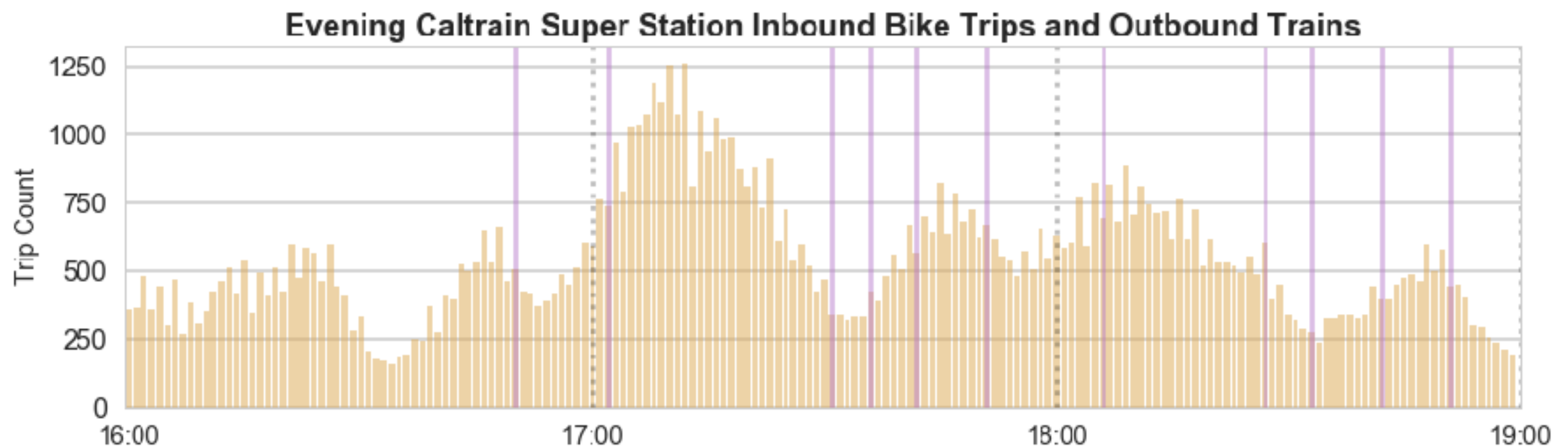
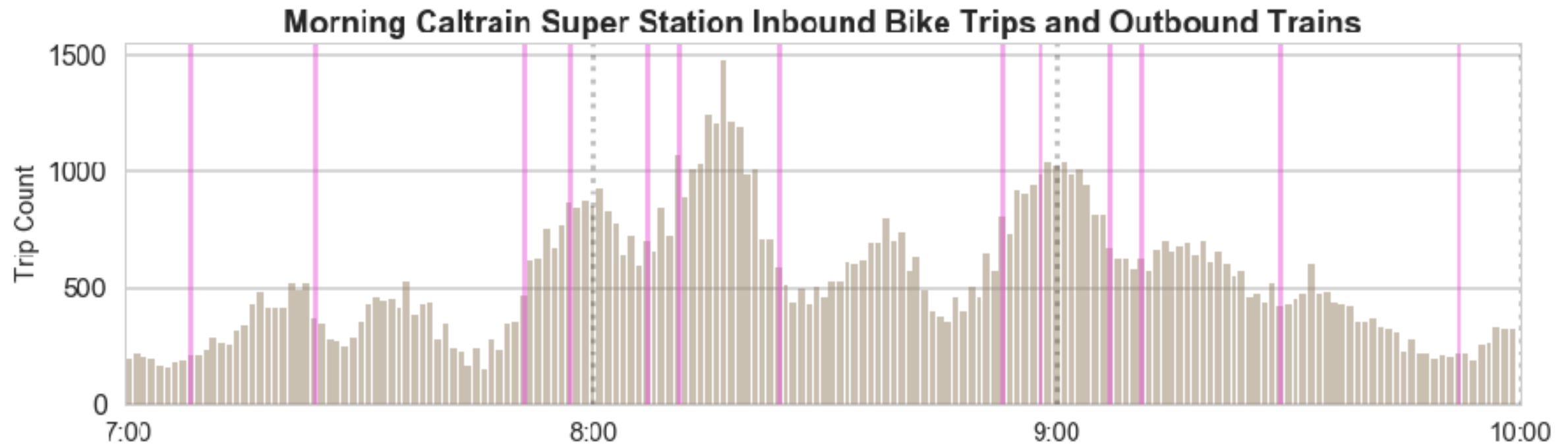
Evening Commutes

Outbound Trips			Inbound Trips		
ID	Station	Share	ID	Station	Share
65	Townsend at 7th	5.825	70	San Francisco Caltrain	19.316
70	San Francisco Caltrain	5.427	69	San Francisco Caltrain 2	12.999
61	2nd at Townsend	5.399	50	Harry Bridges Plaza Ferry Building	7.230
77	Market at Sansome	4.474	55	Temporary Transbay Terminal	6.190
64	2nd at South Park	4.294	74	Steuart at Market	6.034
60	Embarcadero at Sansome	4.228	77	Market at Sansome	4.350
74	Steuart at Market	4.147	61	2nd at Townsend	3.676
55	Temporary Transbay Terminal	4.107	65	Townsend at 7th	2.908
69	San Francisco Caltrain 2	4.012	39	Powell Street BART	2.820
51	Embarcadero at Folsom	3.941	72	Civic Center BART	2.723

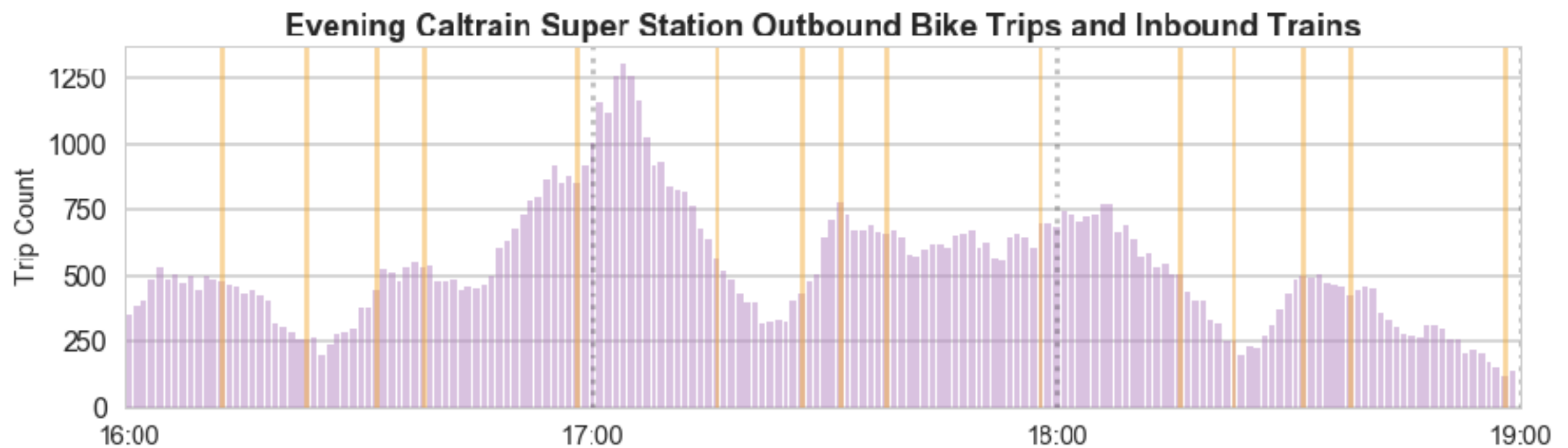
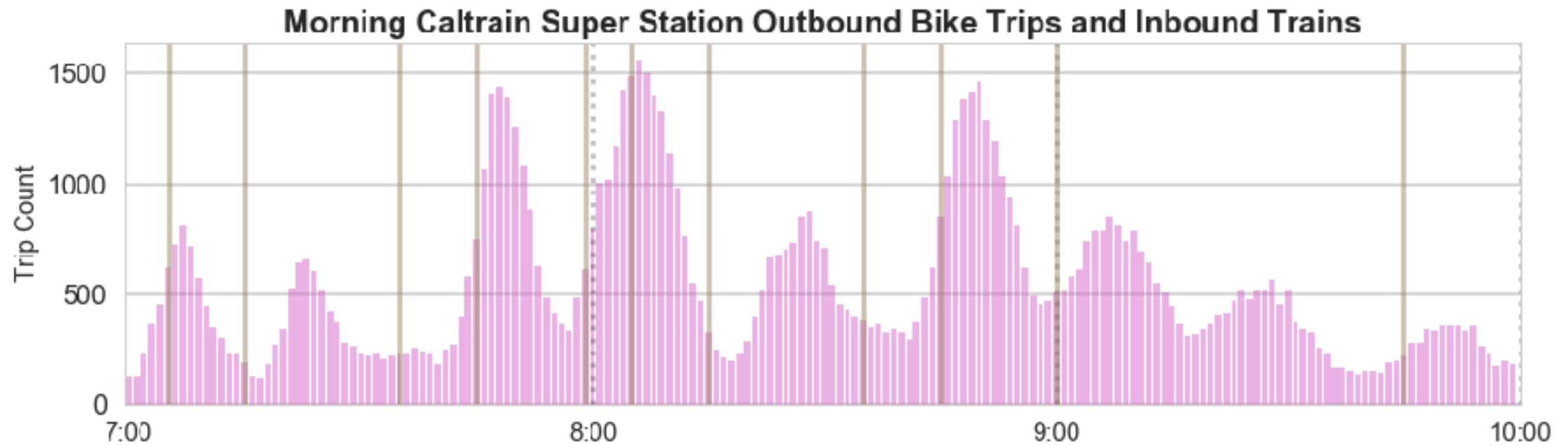
CALTRAIN IS BEST TRAIN

- Morning and Evening usage peaks around Arrival and Departure times for commuter trains.
- Stations 69 and 70 are directly across the street from the Caltrain station.
- Stations 61 and 65 are one block in either direction from the Caltrain station, one 61 is North and 65 is South.
- 35% of Morning Commuter rides start at these stations (25% end there)
- 40% of Evening Commuter rides end at these stations (20% start there)

- Bike Rides arriving at Caltrain Locations
- Compared to Caltrain Train Departures



- Bike Rides departing from Caltrain Locations
- Compared to Caltrain Train Arrivals



WHY COMMUTERS ARE IMPORTANT

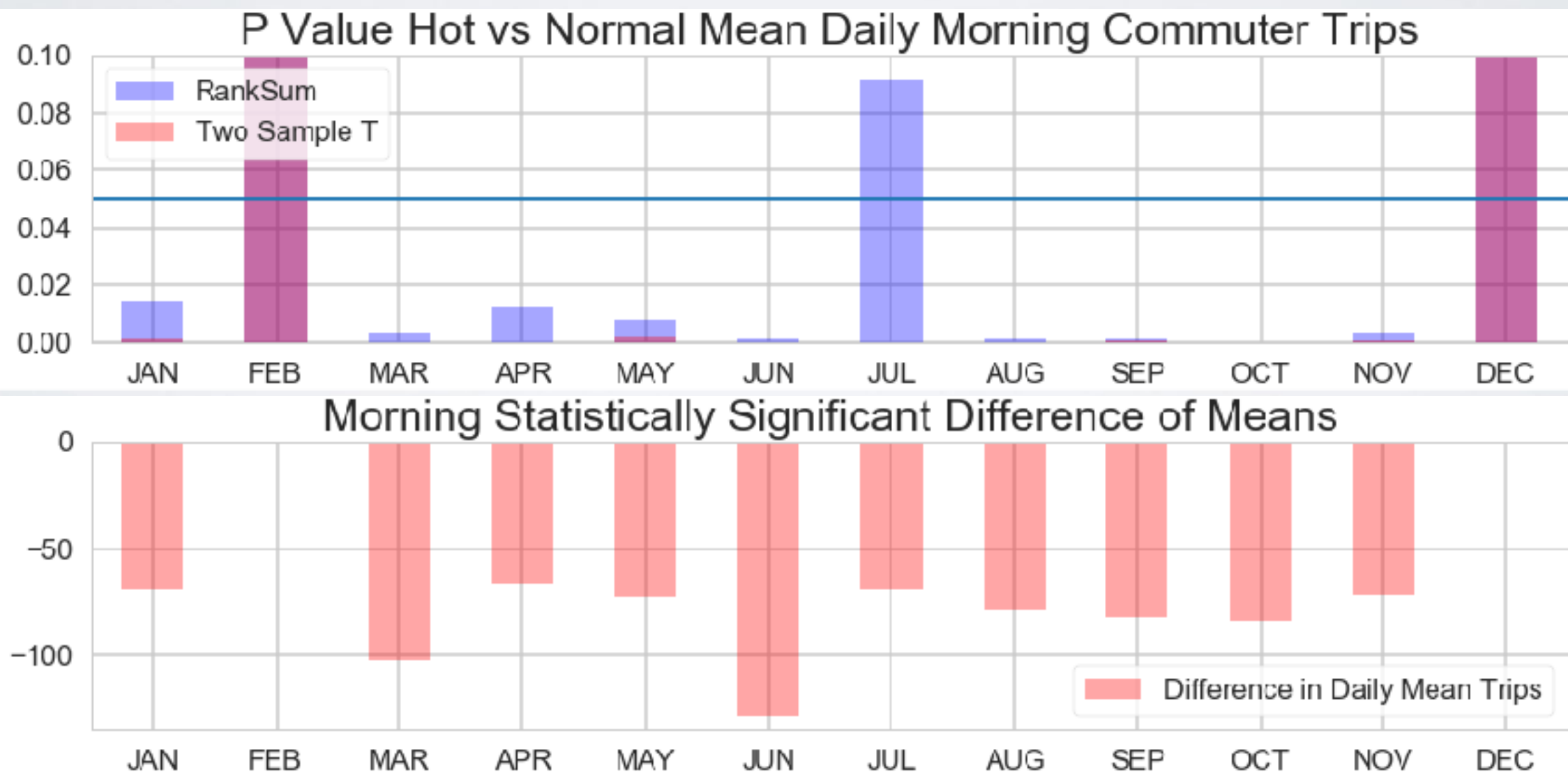
- Account for more than 60% of program usage
- Locked in a predictable usage routine
- Resilient to most the elements

“Gotta Pay the Bills”

–Every Bay Area Bike Share Commuter

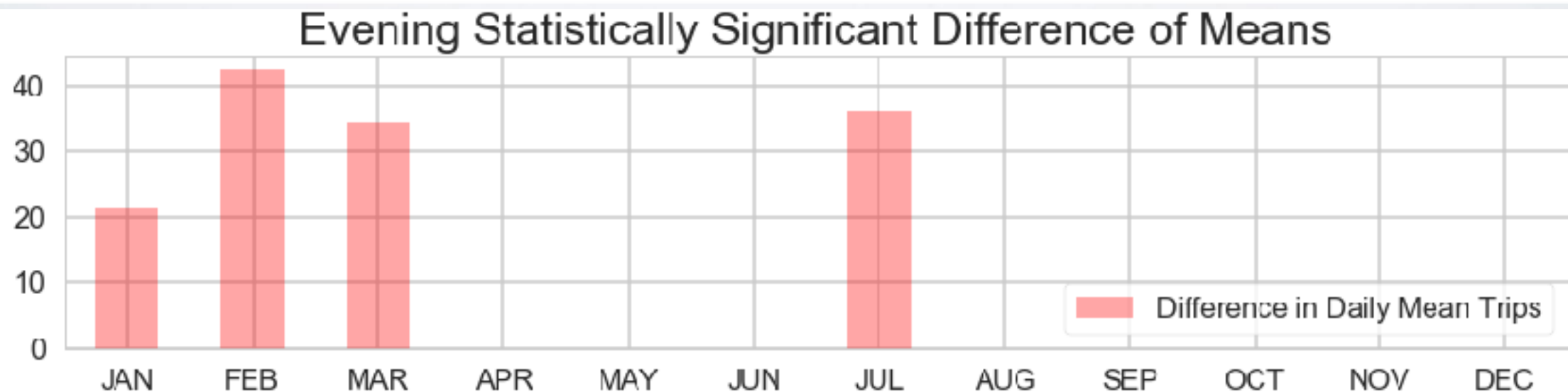
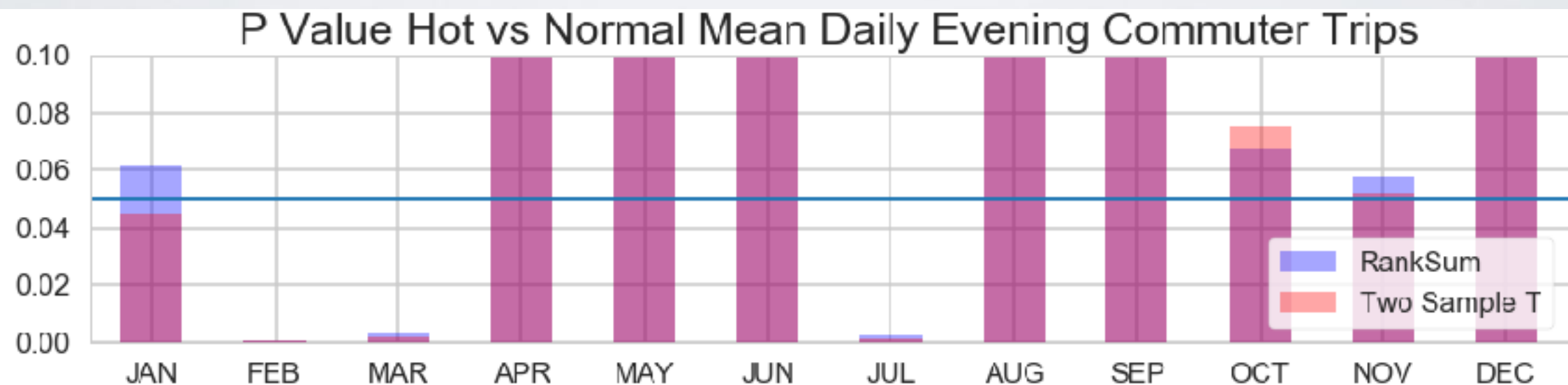
MORNING DETERRENT: HEAT

- Two Sample T Test and RankSum test for significant ridership dips on Hot Mornings
- In nearly every month, ridership dips by half on hot mornings
- Hot: more than one standard deviation above mean for the month (ranges from 60-65) averages just 2 days each month
- Summary: nobody wants to get to work sweaty



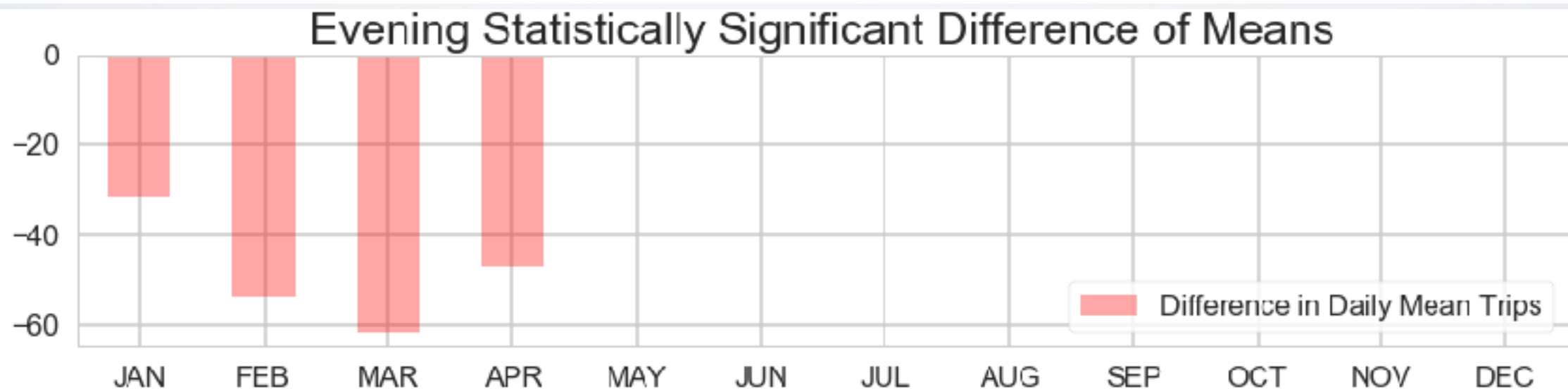
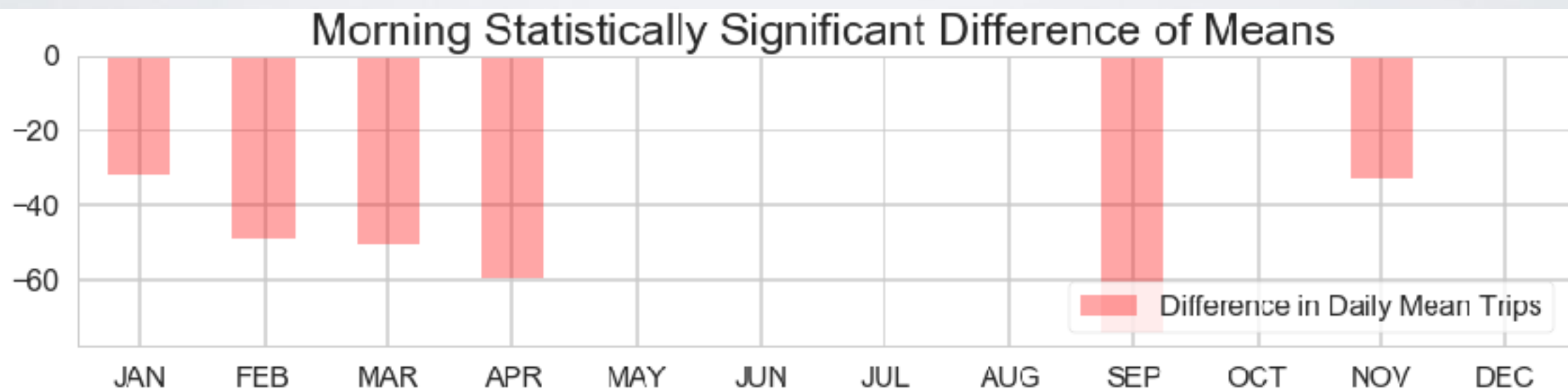
EVENING BOOSTER: ALSO HEAT

- Two Sample T Test and RankSum test for significant ridership boosts on Hot Evenings
- In winter months, users take advantage of good weather with bike rides
- Summary: Users like riding on warm days



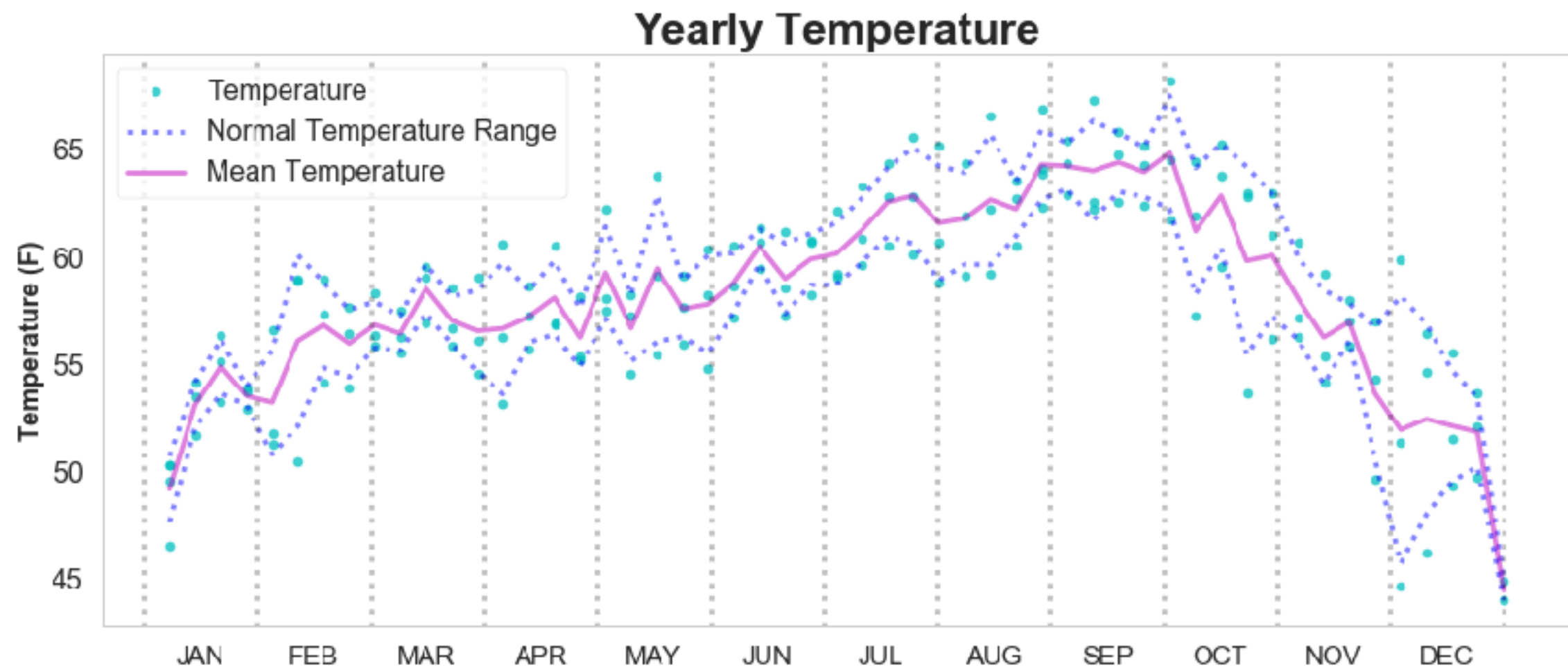
UNIVERSAL DETERRENT: RAIN

- Summary: nobody rides in the rain
- Silver Lining, it rarely rains when it matters
- 83% of rainy days are in December, when ridership is already otherwise lower than normal



WEATHER ONLY MATTERS, WHEN IT MATTERS

- Bay Area has a notoriously mild climate
- 'Hot' or 'Cold' days are too few and far between to have meaning full impact on overall ridership



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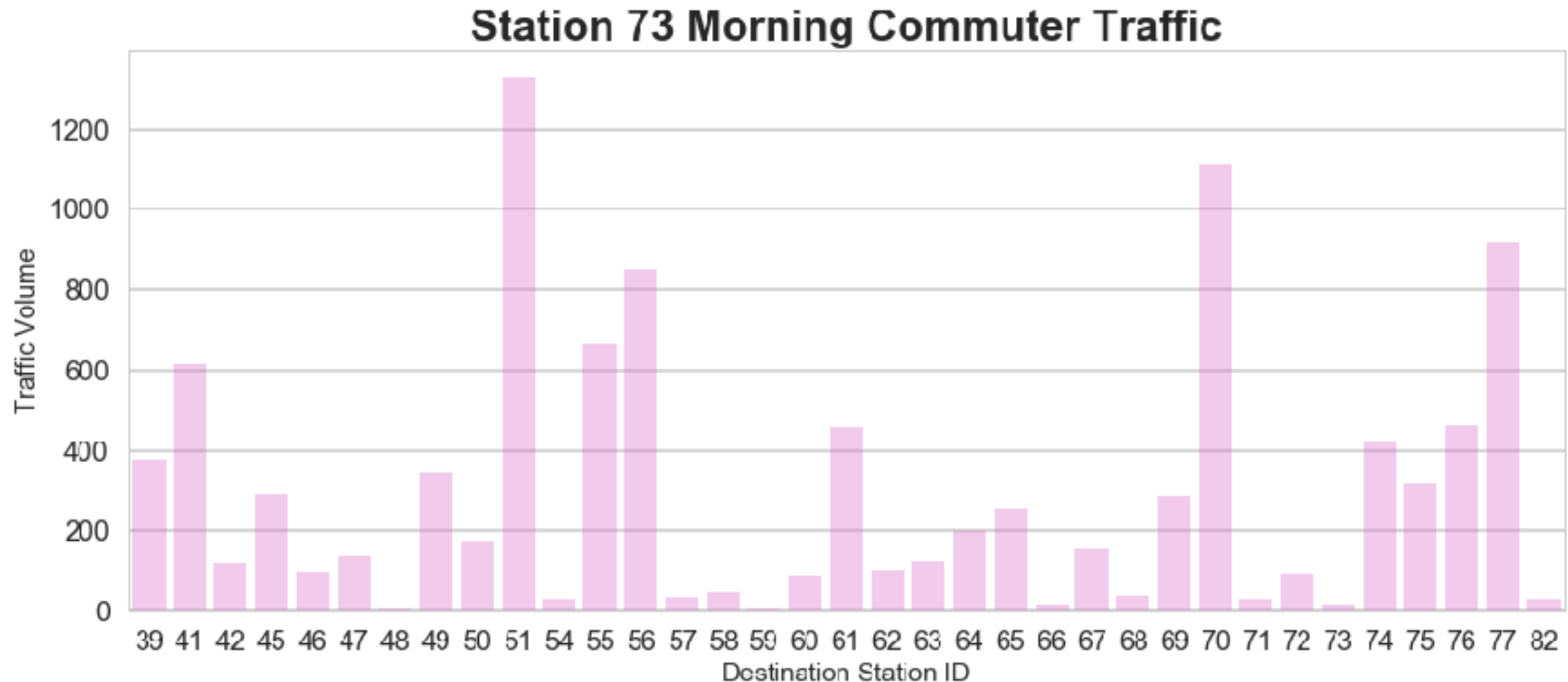
- Account for more than 60% of program usage
- Resilient to the elements
- Locked in a predictable usage routine

- Commuter Plan encourages new riders with lowered price.
- Program Managers given more time to balance the system and perform repairs
- Ridership has been stable, adding more options is likely to add more users

TRIVIA: GRANT AVENUE AT COLUMBUS AVENUE

Station 73 is the 7th most popular morning commute start station but is nowhere near any other transit system. Seems odd...

BUT is the highest elevation in the program and with the top 6 destinations for trips starting at station 73 also all being in the bottom 10 elevation stations, a conclusion is obvious: Riders love coasting downhill. Especially if it saves them from pedaling in the morning.



Visit gutentag.co/bayareabikeshare for more
information and supporting analysis code

Sam Gutentag - Jan 13, 2018