

FRESNO STATE®

Transportation Institute



2024 City of Fresno ATAC Meeting - February 2024

CITY OF FRESNO MOBILITY BEHAVIOR

Mobility Patterns using Cell-Phone Trace Data

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Outline

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Intro: Travel Survey Methods

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Data Validation: Fresno County
Mobility Patterns

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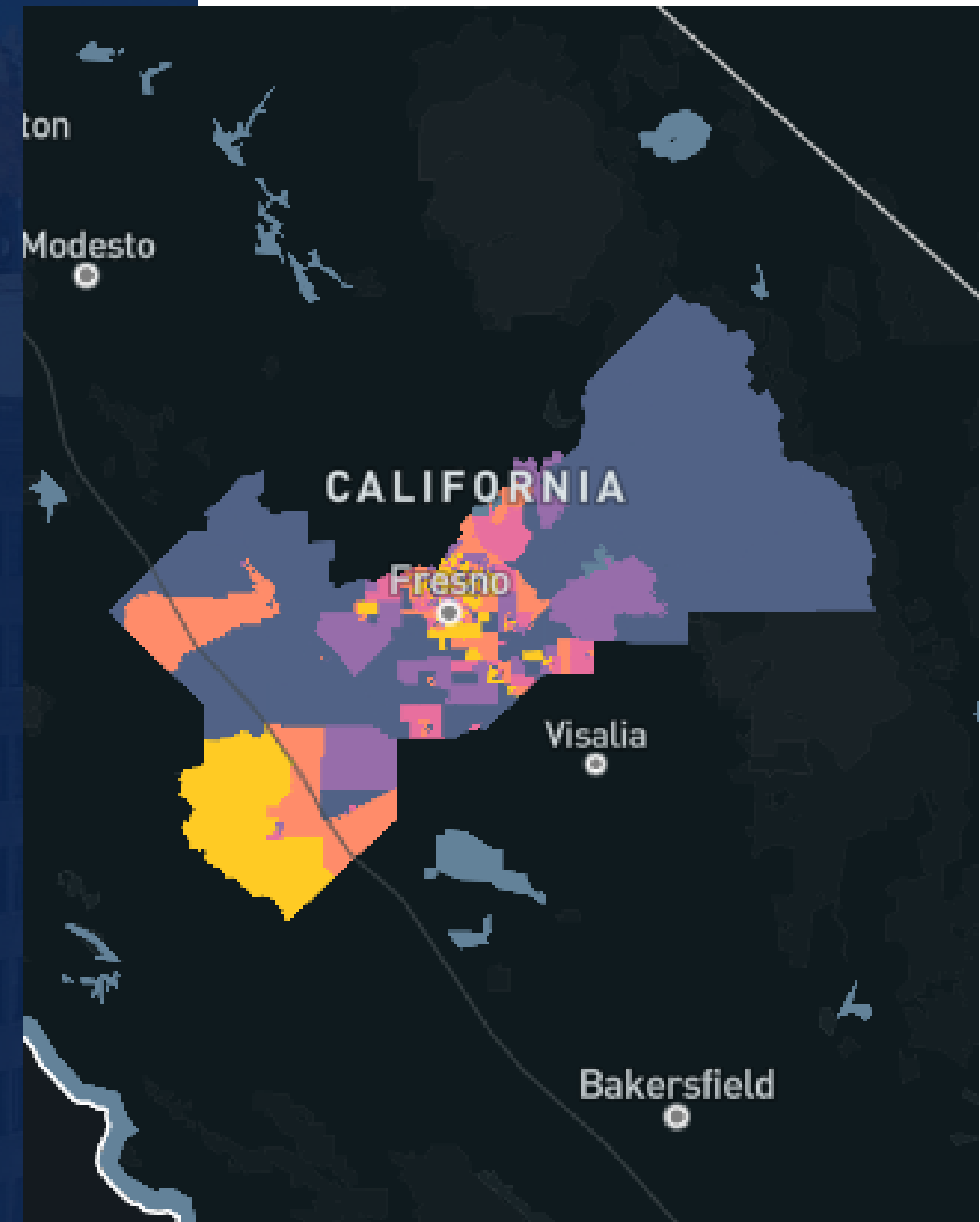
COVID Impact: Fresno City

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Mobility Patterns: Fresno City

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Key Findings



Intro: Travel Survey Methods

Traditional Methods vs.
Cell-Phone Trace Data

Household Travel Survey

Central CA HH Travel Survey

- **Sampling Methods**
 - Address-Based Sampling
 - Supplemental Sampling
- **Two-Part Survey:** demographic composition and travel behavior
- **Data Collection Methods:** smartphone app, website input, or call-in
- 8 Participating Counties in Central CA



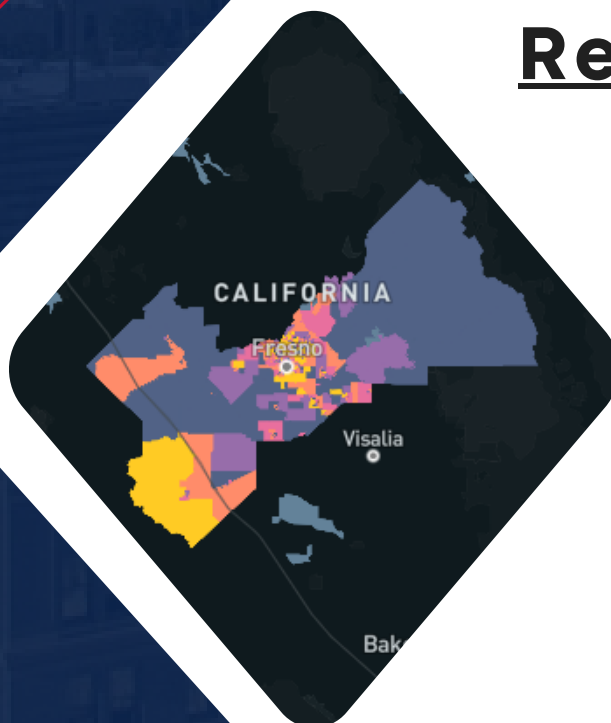
Cell-Phone Trace Data

Replica

- Utilizes “third-party data from **public and private-sector sources**” to create a “synthetic population that is **statistically representative of the actual population**”

1. **Mobile Location Data**
2. Consumer/Resident Data
3. **Built environment Data**
4. Ground Truth Data

- Only provides trip data for Fall and Spring periods



FRESNO COUNTY TRAVEL DATA VALIDATION

REPLICA VS. CENTRAL CA TRAVEL SURVEY

MODE DISTRIBUTION

	Mode Share (%)	
	Survey	Replica
Total # of Trips per Day	3,537,447	3,595,000
Private Auto	91.5%	87.9%
Walking	6.2%	10.0%
Biking	1.1%	1.5%
Public Transit	1.1%	0.5%
Taxi/TNC	0.1%	0.1%

Private Auto:

- Combined private vehicle + auto passenger (Replica)
- Combined Vehicle + Carshare (Travel Survey)

Biking:

- Bicycle or e-bike

Public Transit:

- Combined shuttle, school bus, and transit (Travel Survey)

Taxi/TNC:

- Combined Taxi + Smartphone-app ride hailing service (Travel Survey)

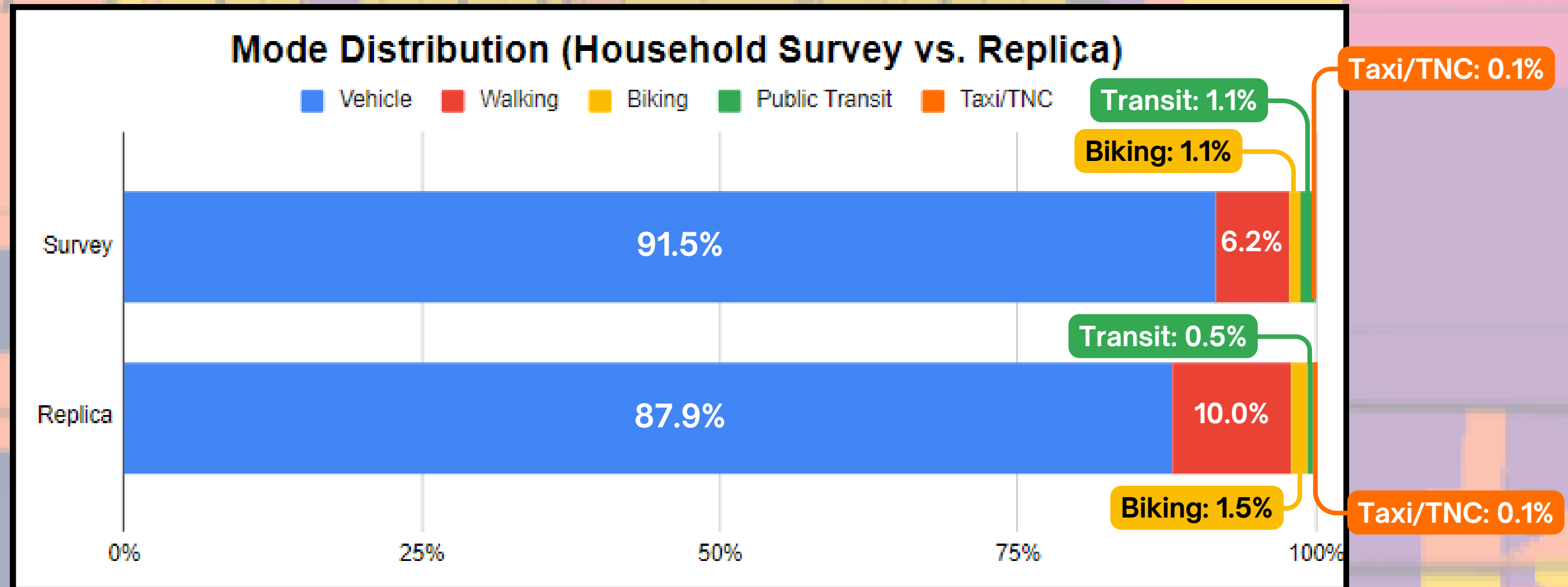
**Household travel survey data for weekdays in entire year of 2022*

**Replica data is recorded for weekday average of 2022 Fall + 2023 Spring*

FRESNO COUNTY TRAVEL DATA VALIDATION

REPLICA VS. CENTRAL CA TRAVEL SURVEY

MODE DISTRIBUTION



Key Findings:

1. Both methods provide similar results in mode distribution
2. Differences in data sets are not significant and could be due to differences in the time frame of each data set

FRESNO COUNTY TRAVEL DATA VALIDATION

REPLICA VS. CENTRAL CA TRAVEL SURVEY

MEDIAN TRIP LENGTHS

	Median Duration (minutes)		Median Distance (miles)	
	Survey	Replica	Survey	Replica
Total # of Trips per Day	3,537,447	3,595,000	3,537,447	3,595,000
Private Auto	12.0	14	2.9	4.4
Walking	11.0	8	0.4	0.4
Biking	I/S	10	I/S	2.0
Public Transit	40.0	38	3.5	5.1
Taxi/TNC	I/S	15	I/S	5.8

Private Auto:

- Combined private vehicle + auto passenger (Replica)
- Combined Vehicle + Carshare (Travel Survey)

Biking:

- Bicycle or e-bike

Public Transit:

- Combined shuttle, school bus, and transit (Travel Survey)

Taxi/TNC:

- Combined Taxi + Smartphone-app ride hailing service (Travel Survey)

(Median Values for Household Travel Survey taken from survey report (RSG))

*I/S = Insufficient Sample Size

- Weighted trips is (<150) OR # of Households is (<30)

CITY OF FRESNO - COVID IMPACT

Total # of Trips

Total # of Trips by Mode							
	Season	2019 Fall	2019 Fall	2022 Fall	2022 Fall	2023 Spring	2023 Spring
	Typical	Thursday	Saturday	Thursday	Saturday	Thursday	Saturday
	All Modes	1,800,000	1,530,000	2,120,000	1,810,000	1,970,000	1,780,000
	Private Auto	1,160,000	981,000	1,260,000	1,160,000	1,200,000	1,080,000
	Auto Passenger	414,000	390,000	617,000	505,000	376,000	409,000
	Walking	171,000	129,000	197,000	127,000	201,000	168,000
	Biking	25,200	20,400	28,400	8,580	35,200	9,950
	Public Transit	24,000	9,890	16,900	6,750	15,000	6,980
	Taxi/TNC	3,390	5,320	3,490	3,420	2,660	2,550

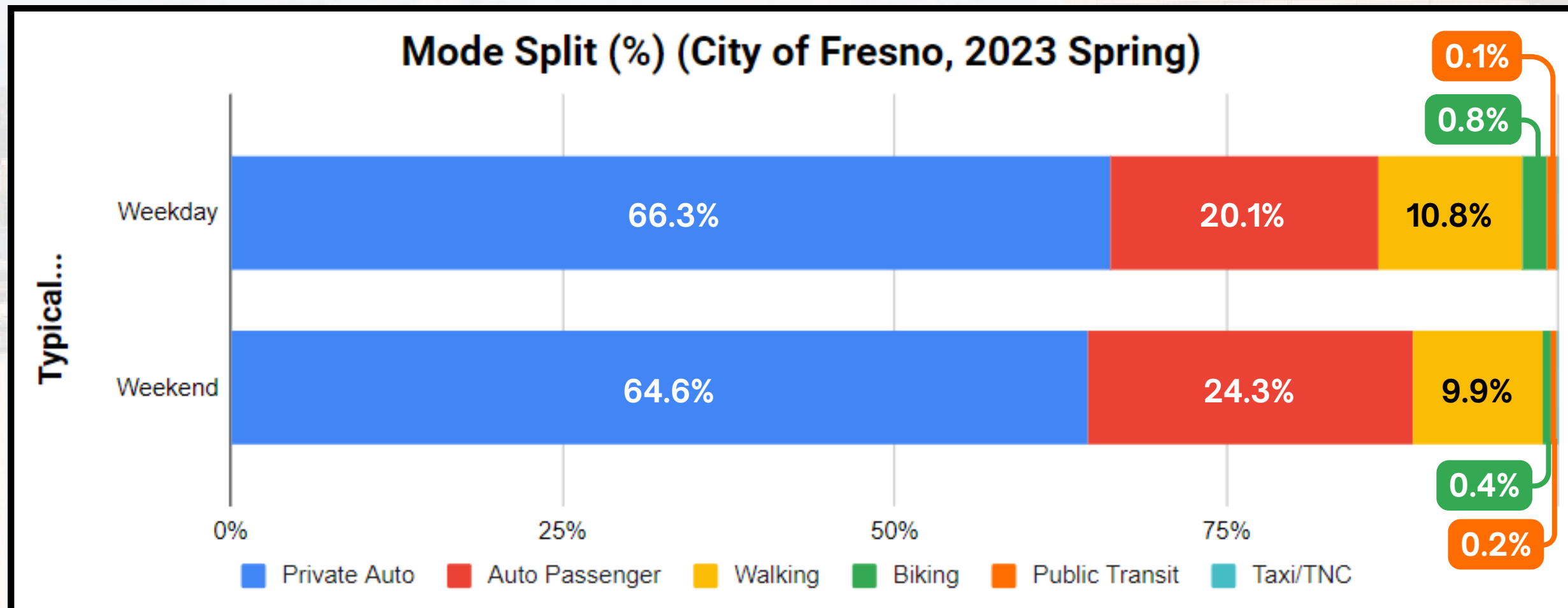
Key Findings:

1. Travel behavior and trips have rebounded back
2. Trips now higher in 2022 and 2023 compared to pre-COVID (2019 Fall)
3. Less trips in Spring 2023 compared to Fall 2022
4. Active Transportation (Walking, Biking): All are higher on weekdays than weekends
5. Public transit, biking and TNC have not recovered compared to pre-COVID, which is in-line with the national trend of transit ridership post-COVID
6. Cars are being used more on weekends than pre-COVID (new car owners during pandemic time?)

CITY OF FRESNO - MODES

Mode Split in the City of Fresno

Season	2023 Spring	2023 Spring
Typical	Thursday	Saturday
Total # of Trips	1,970,000	1,780,000
Total # of Trip Takers	662,000	537,000

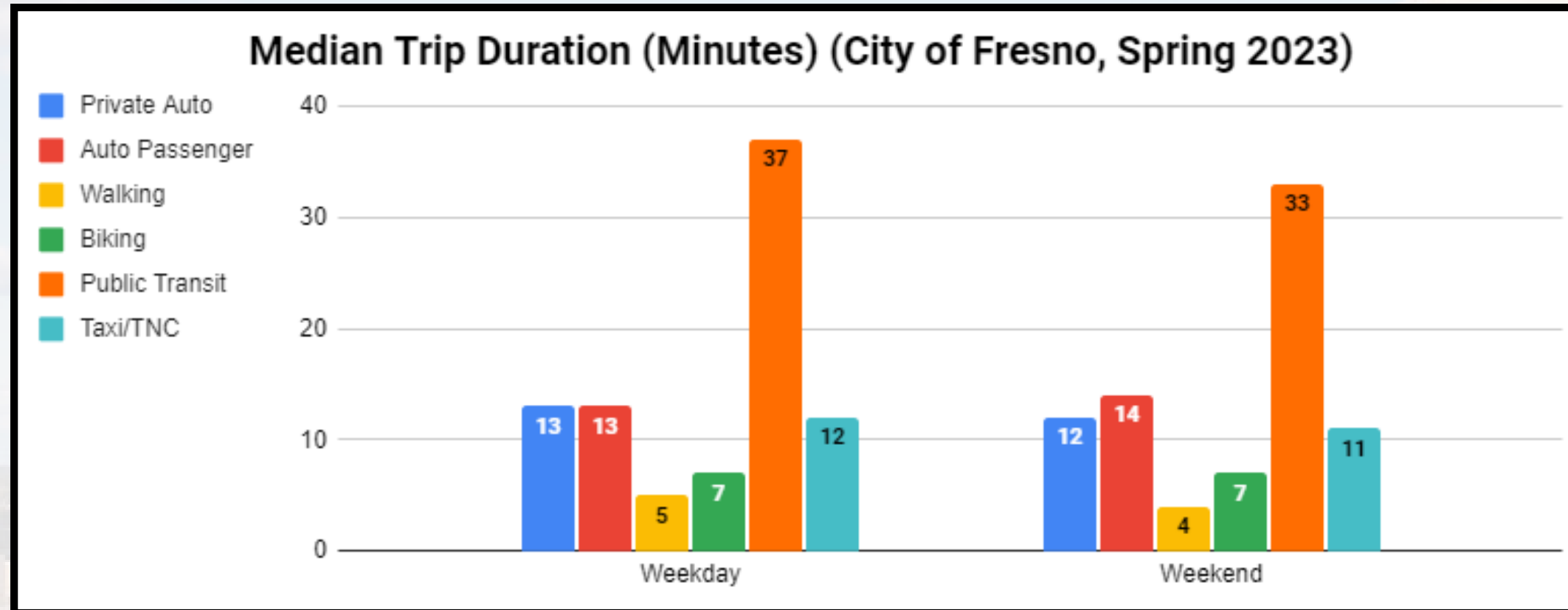


Key Findings:

1. Mode split is similar on both weekends and weekdays
2. After car trips, walking is the 2nd most common mode of transport
3. Biking continues to be less than 1% of all trips as of 2023 Spring

CITY OF FRESNO - DISTANCE

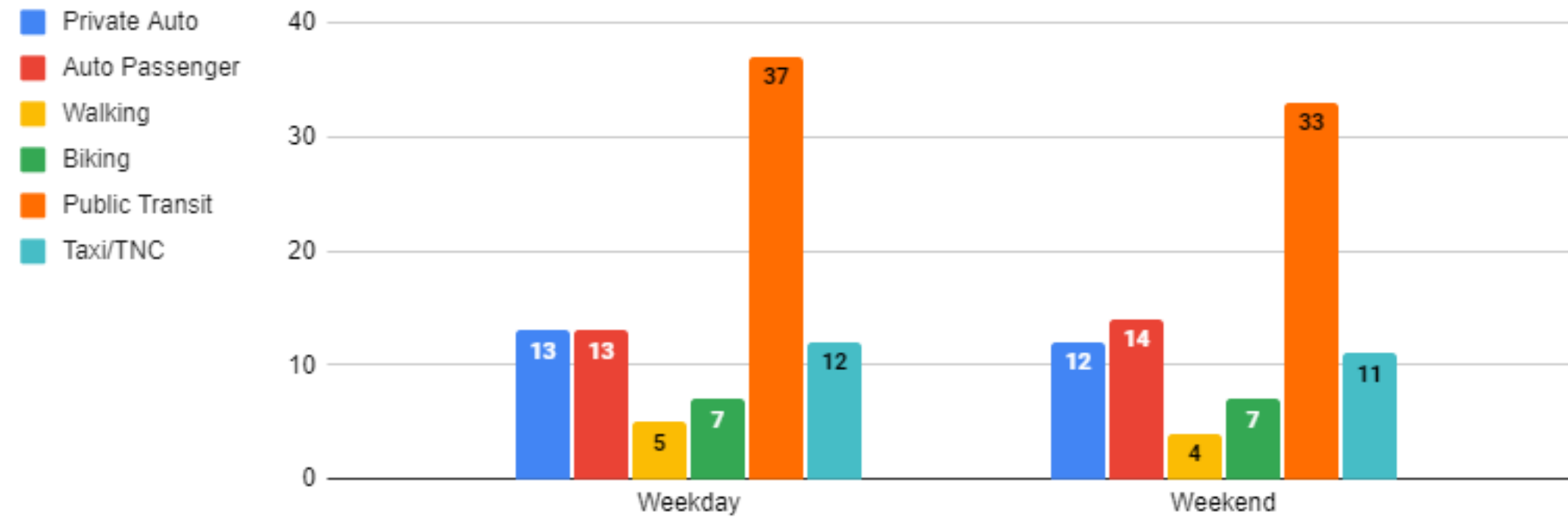
Median Trip Lengths (minutes and miles) by Mode



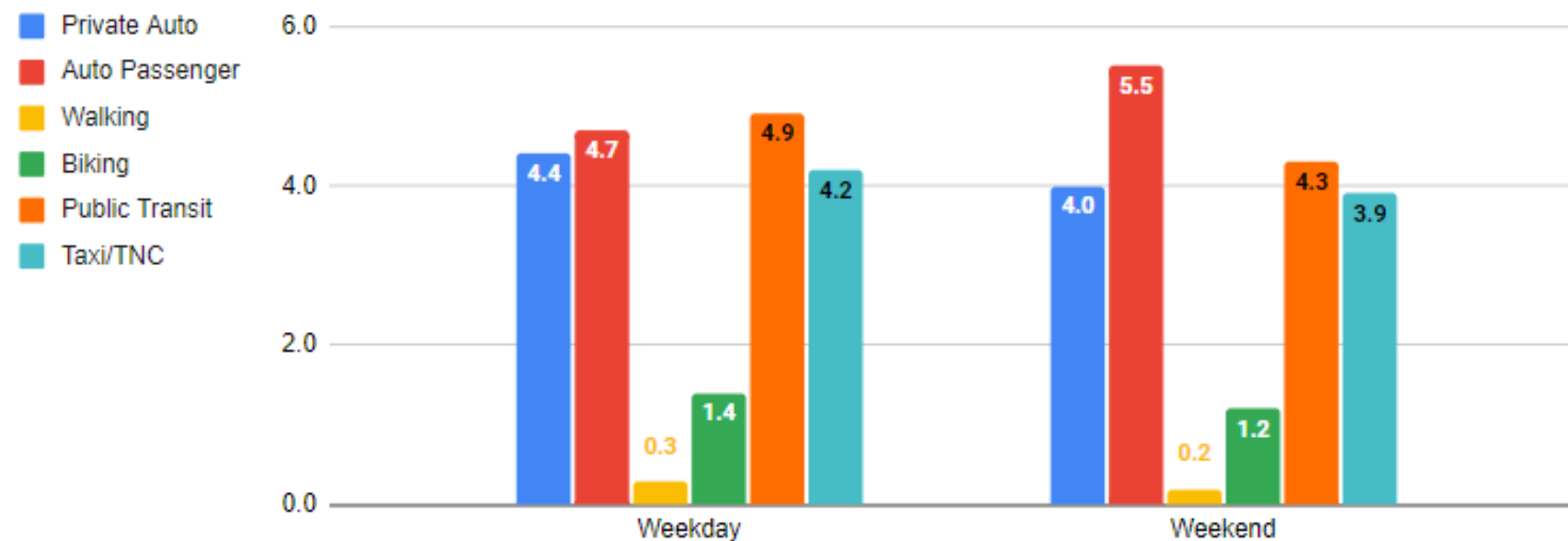
CITY OF FRESNO - DISTANCE

Median Trip Lengths (minutes and miles) by Mode

Median Trip Duration (Minutes) (City of Fresno, Spring 2023)



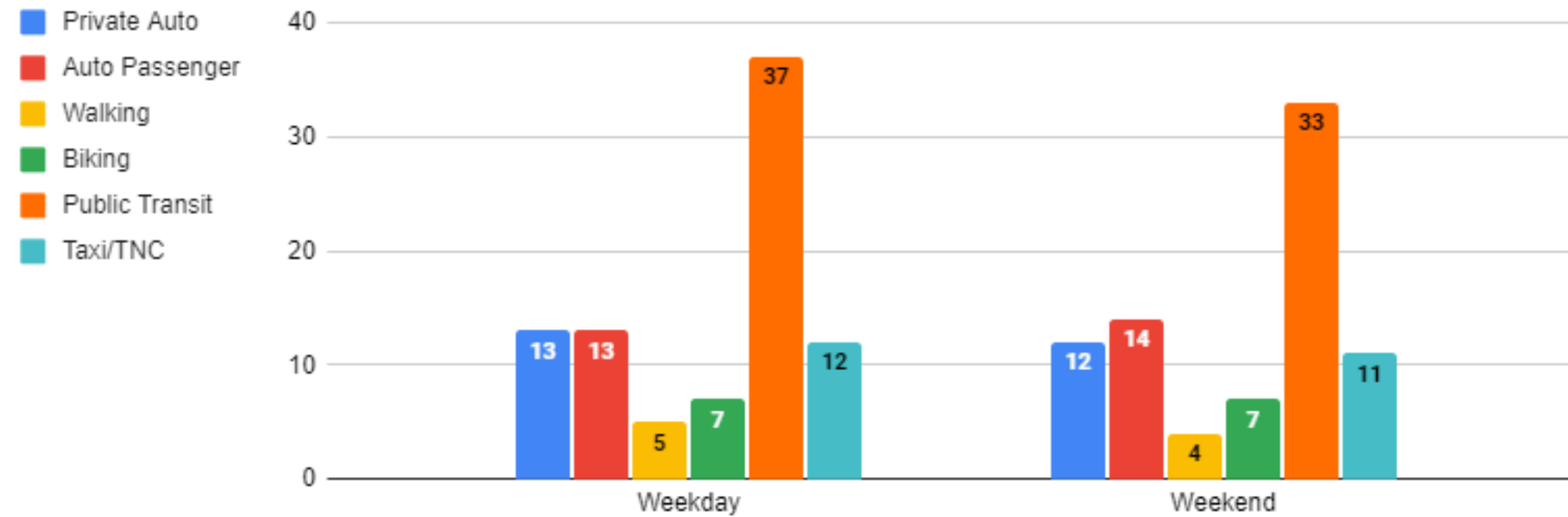
Median Trip Distance (Miles) (City of Fresno, Spring 2023)



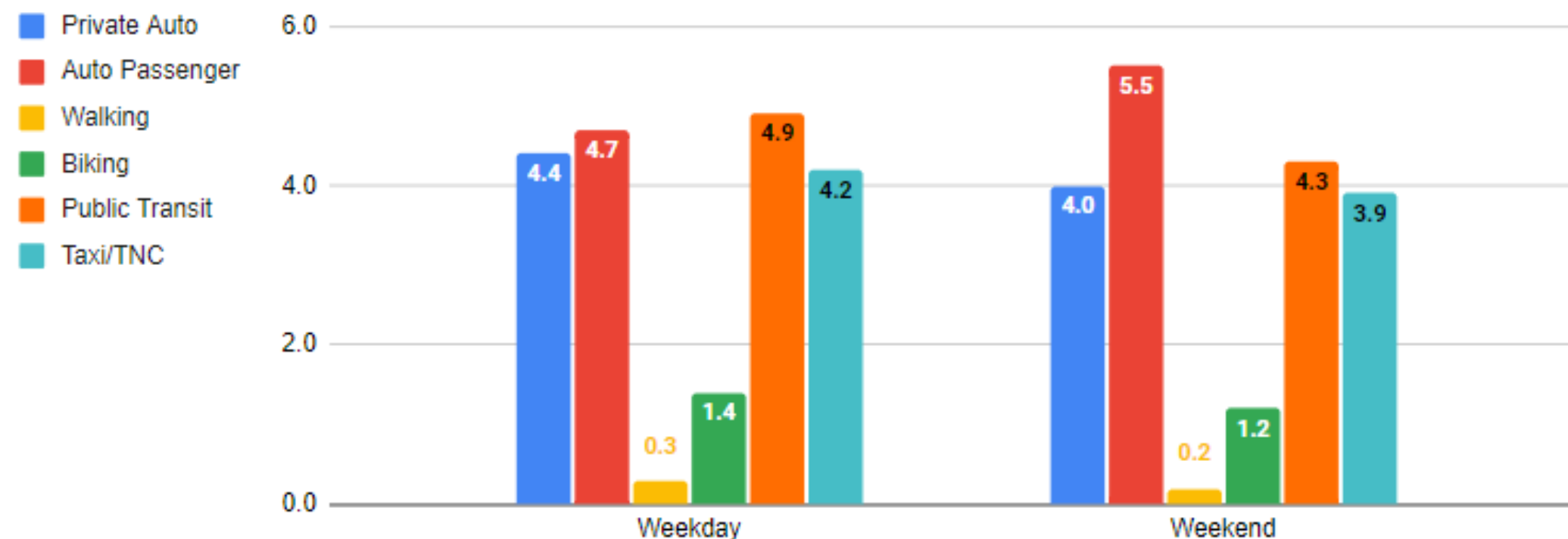
CITY OF FRESNO - DISTANCE

Median Trip Lengths (minutes and miles) by Mode

Median Trip Duration (Minutes) (City of Fresno, Spring 2023)



Median Trip Distance (Miles) (City of Fresno, Spring 2023)

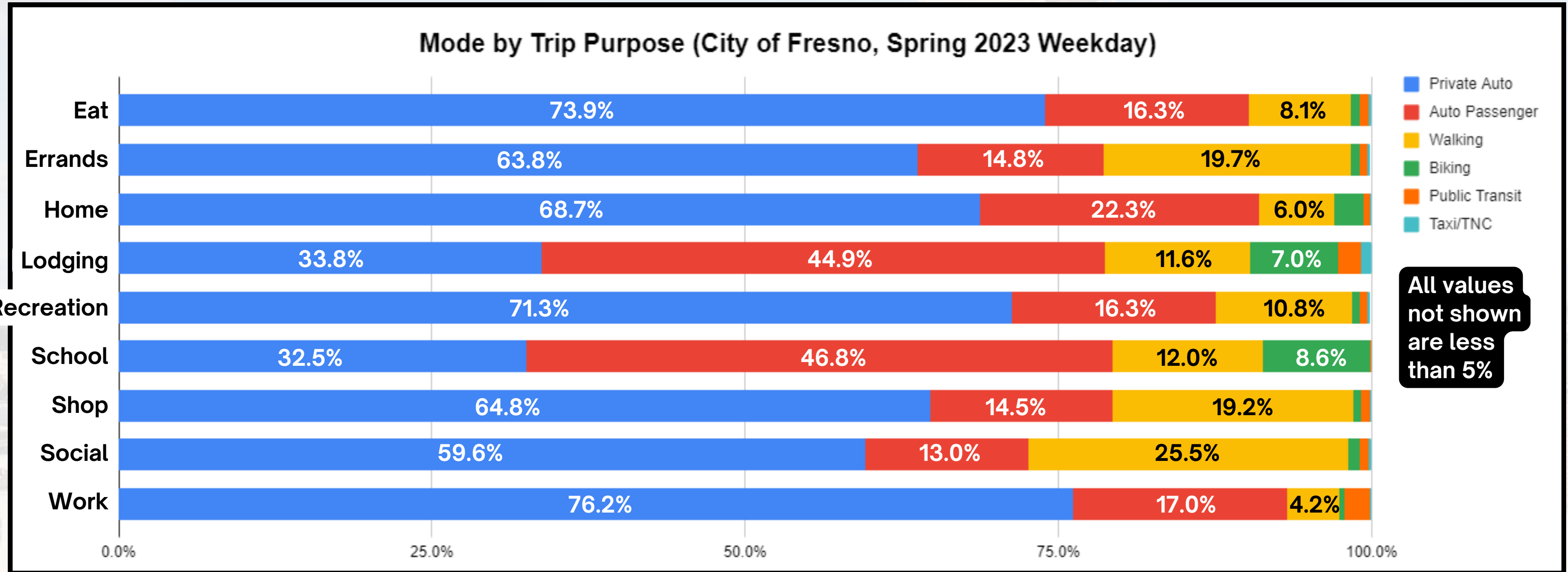


Key Findings:

1. Biking trips are generally between 1.0 - 1.5 miles in length, and 7 min in duration
2. Car is generally used for long-distance trips about 4 miles
3. Public transit, on average, takes significantly longer than all other modes, around 30-40 minutes per trip
4. Walking has the lowest trip duration, which correlates with walking only being done for very short distances (< 1 mile)

CITY OF FRESNO

Mode by Trip Purpose - Spring 2023 Weekday



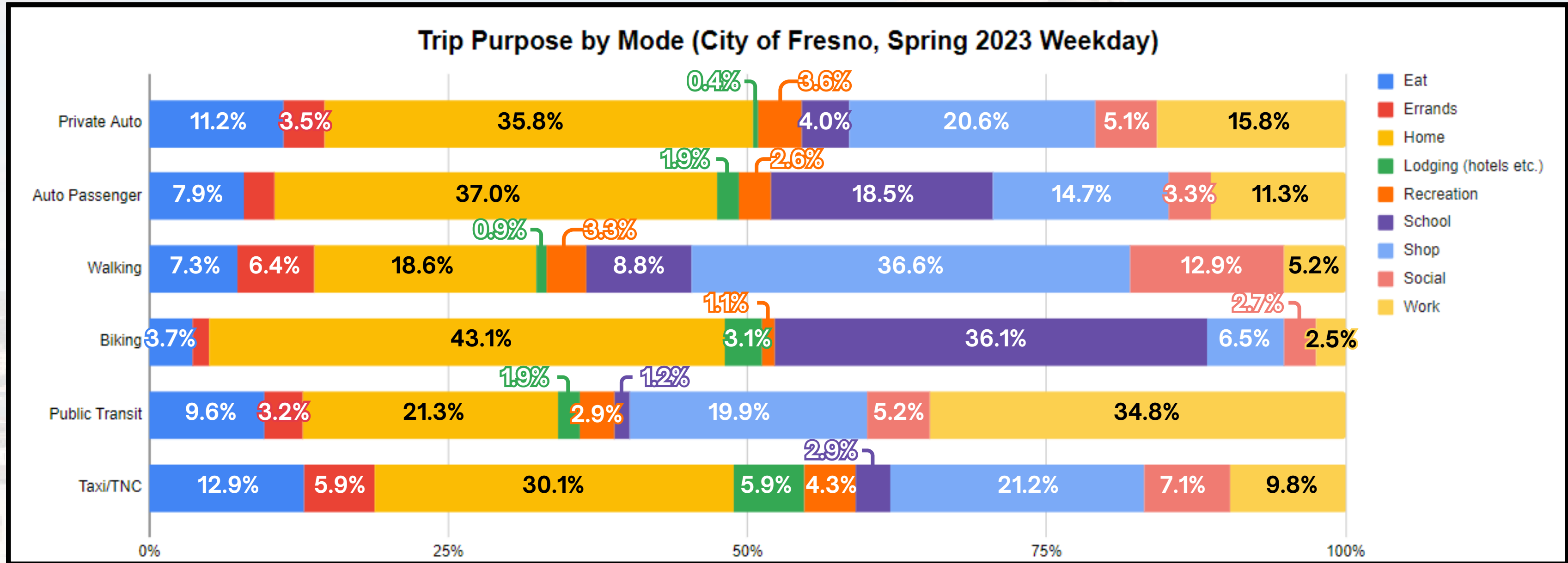
Key Findings:

1. The purposes with the highest portion of cyclists are School (8.6%) and Lodging (7.0%)
2. Lodging may be focused on tourists or possibly including homeless

10 shelters

CITY OF FRESNO

Trip Purpose by Mode - Spring 2023 Weekday

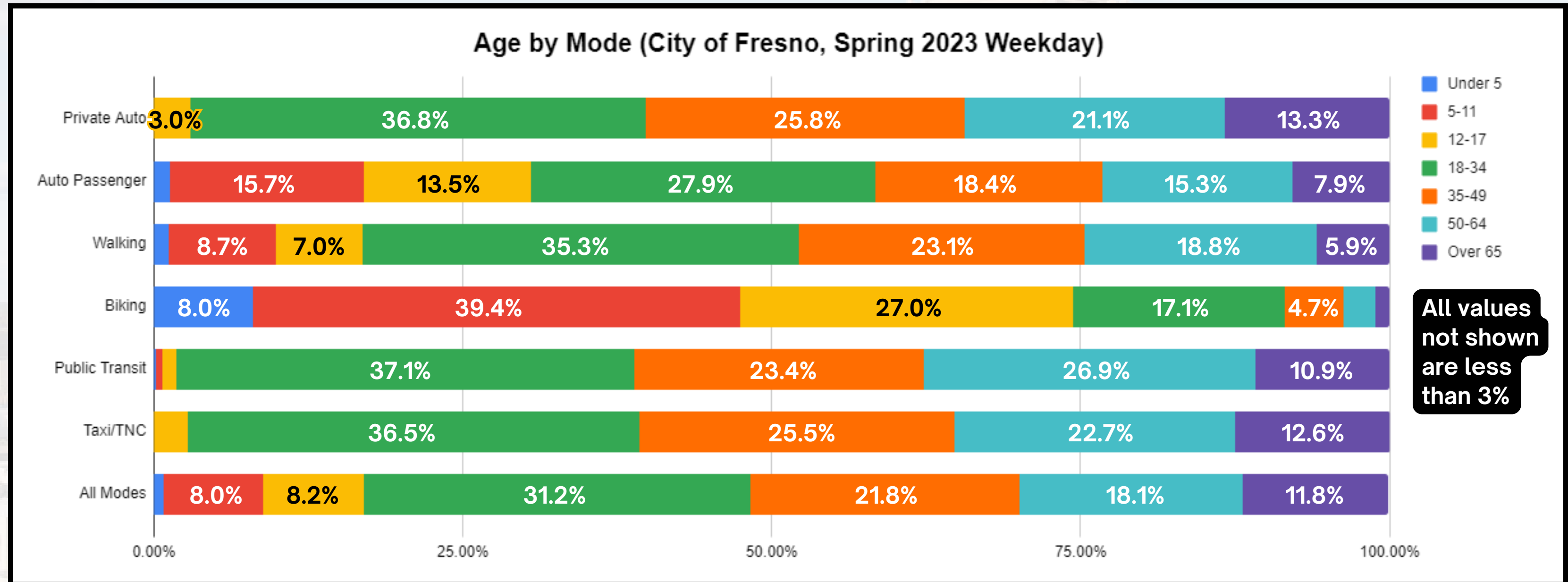


Key Findings:

1. Bicycles are primarily used (~80%) for commuting purposes (to and from home/school)
2. A large portion of transit riders (34.8%) rely on transit to get to work or home

CITY OF FRESNO

Age by Mode - Spring 2023 Weekday

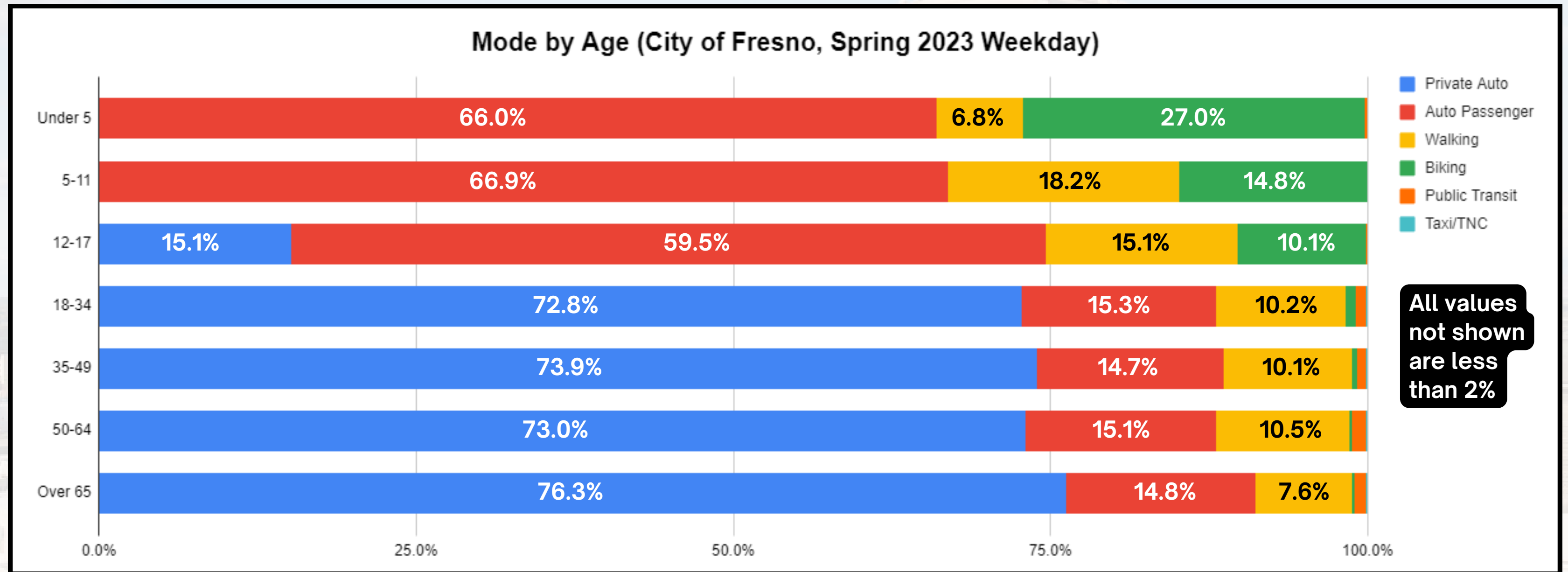


Key Findings:

1. The largest portion of cyclists in the City of Fresno is ages 5-17 y/o (~66%)
2. Walking trips for the same age group (5-17 y/o) is about 15%
3. Most walking trips are by those over 18 y/o (~83%)

CITY OF FRESNO

Mode by Age - Spring 2023 Weekday

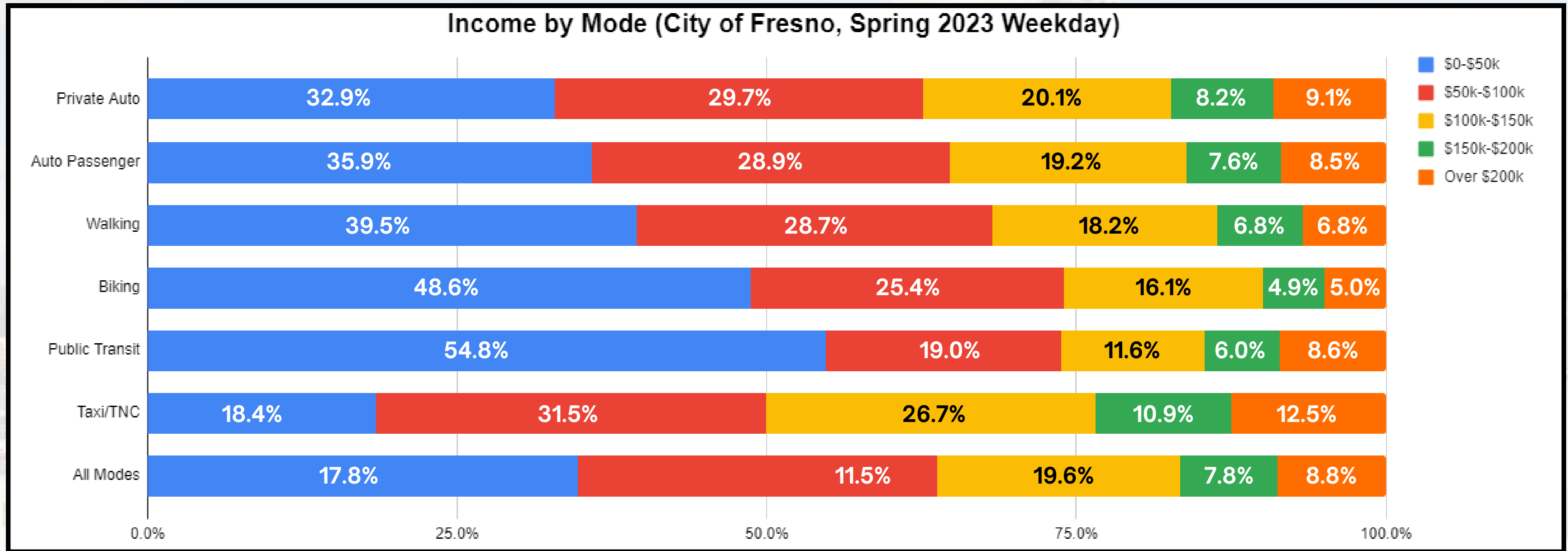


Key Findings:

1. Under 18: Primary mode - Auto Passenger (~66%)
2. About 25-35% of trips by minors (under 18) use active transportation
3. 18 and over: Large majority of vehicular travel (>85%)

CITY OF FRESNO

Income by Mode - Spring 2023 Weekday

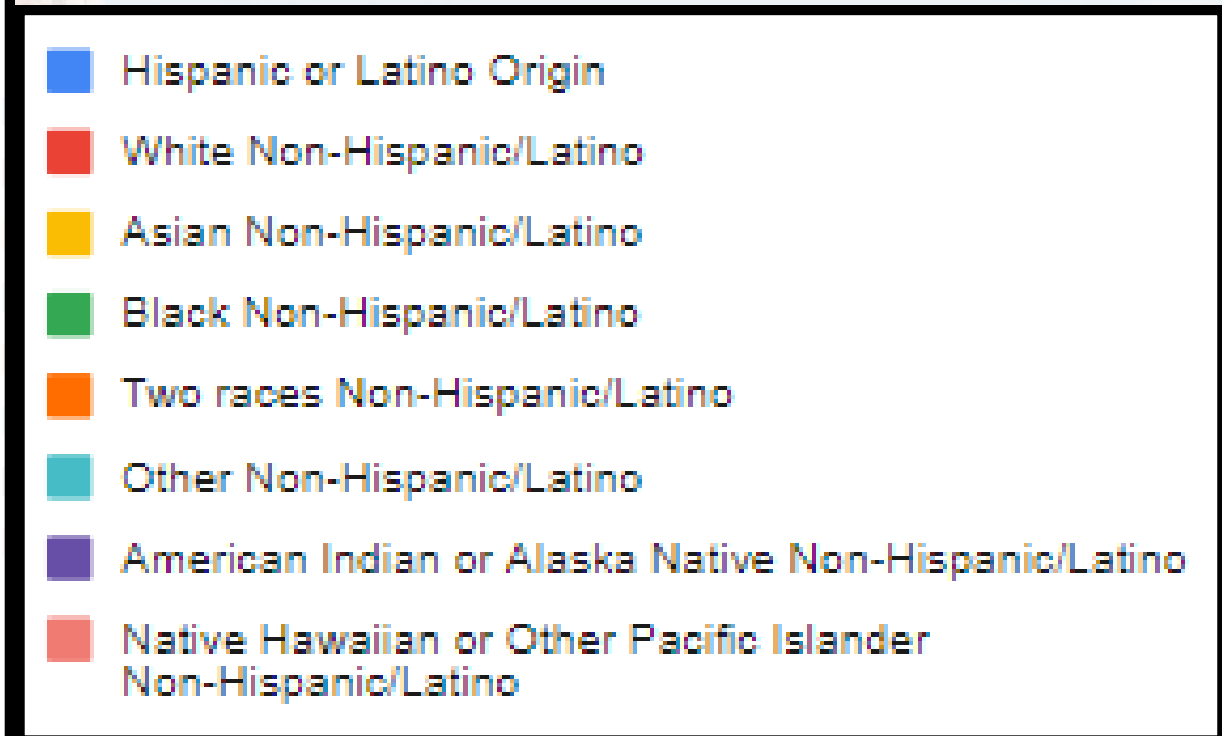
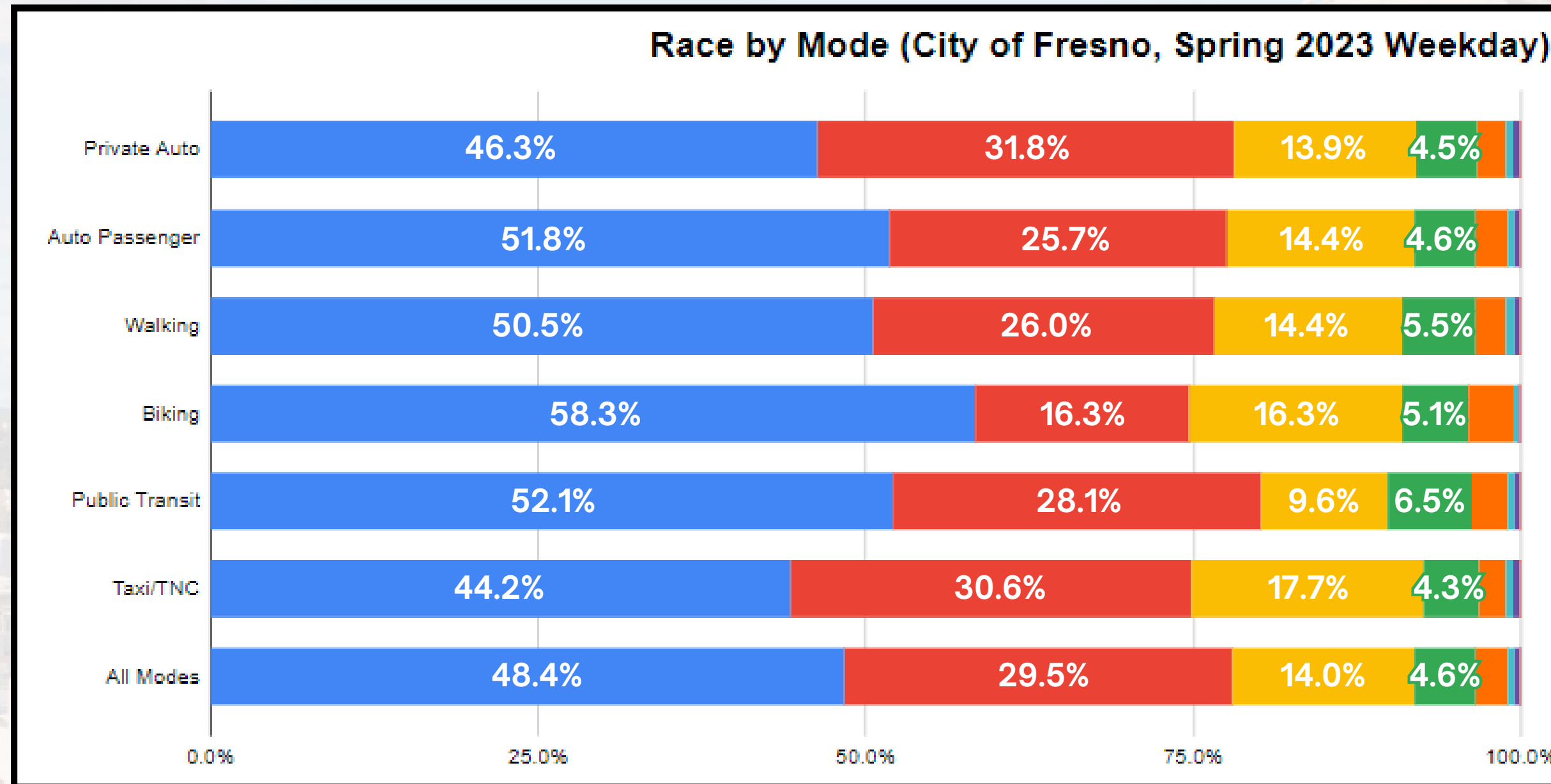


Key Findings:

1. Greater % of lower income trip takers for non-vehicular modes
2. The majority of those taking public transit are near or under poverty level
3. Taxi/TNC: highest % of trip takers with over \$100k

CITY OF FRESNO

Race by Mode - Spring 2023 Weekday



All values not shown are less than 4%

Key Findings:

1. All Modes: Largest % Race = Hispanic or Latino Origin
2. Biking: (>50%) of Hispanic or Latino Origin; the mode share of whites is lowest (16%)
3. Individual modes of transportation are similar to “All Modes”

CITY OF FRESNO - TRIP TIMES

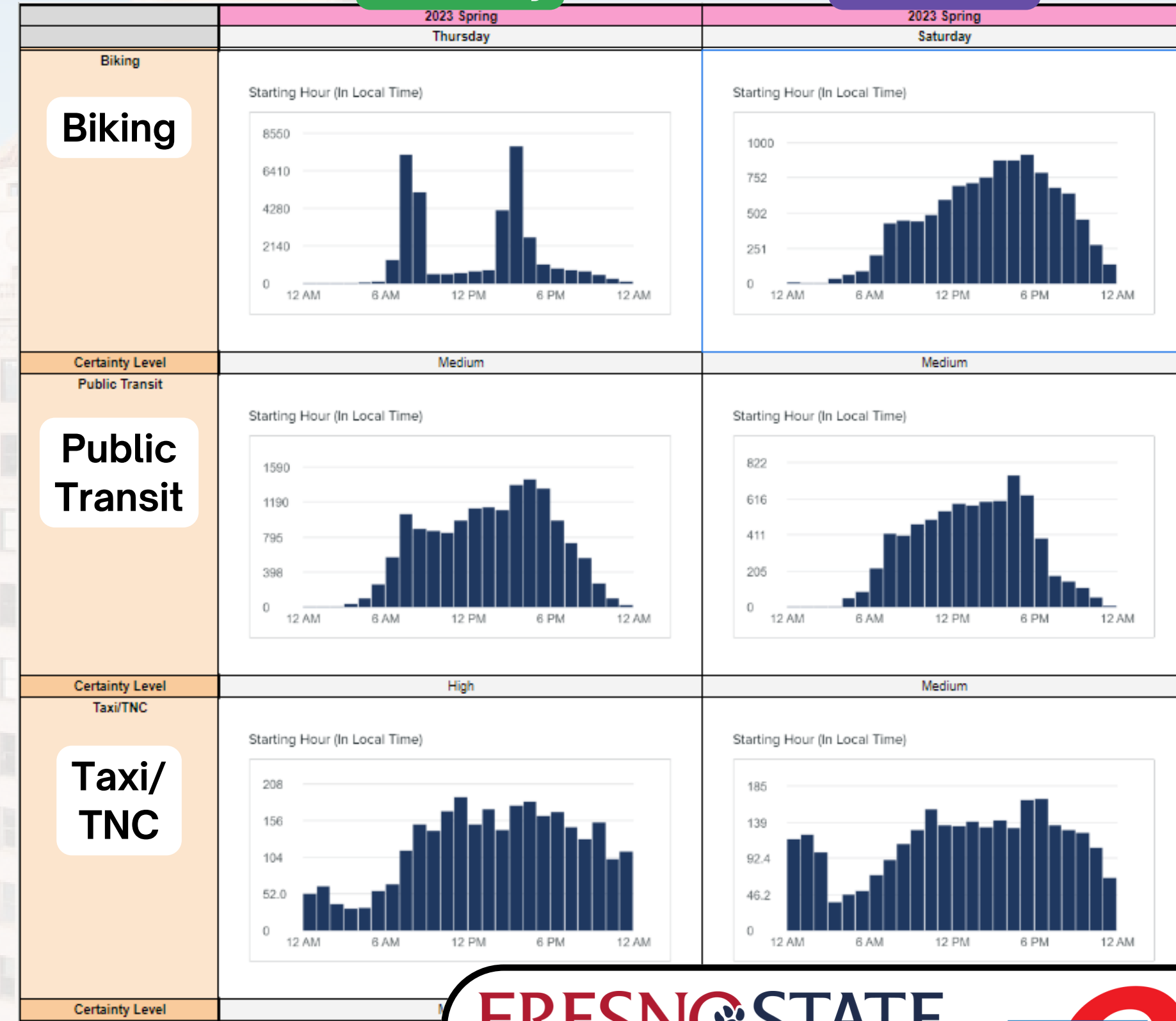
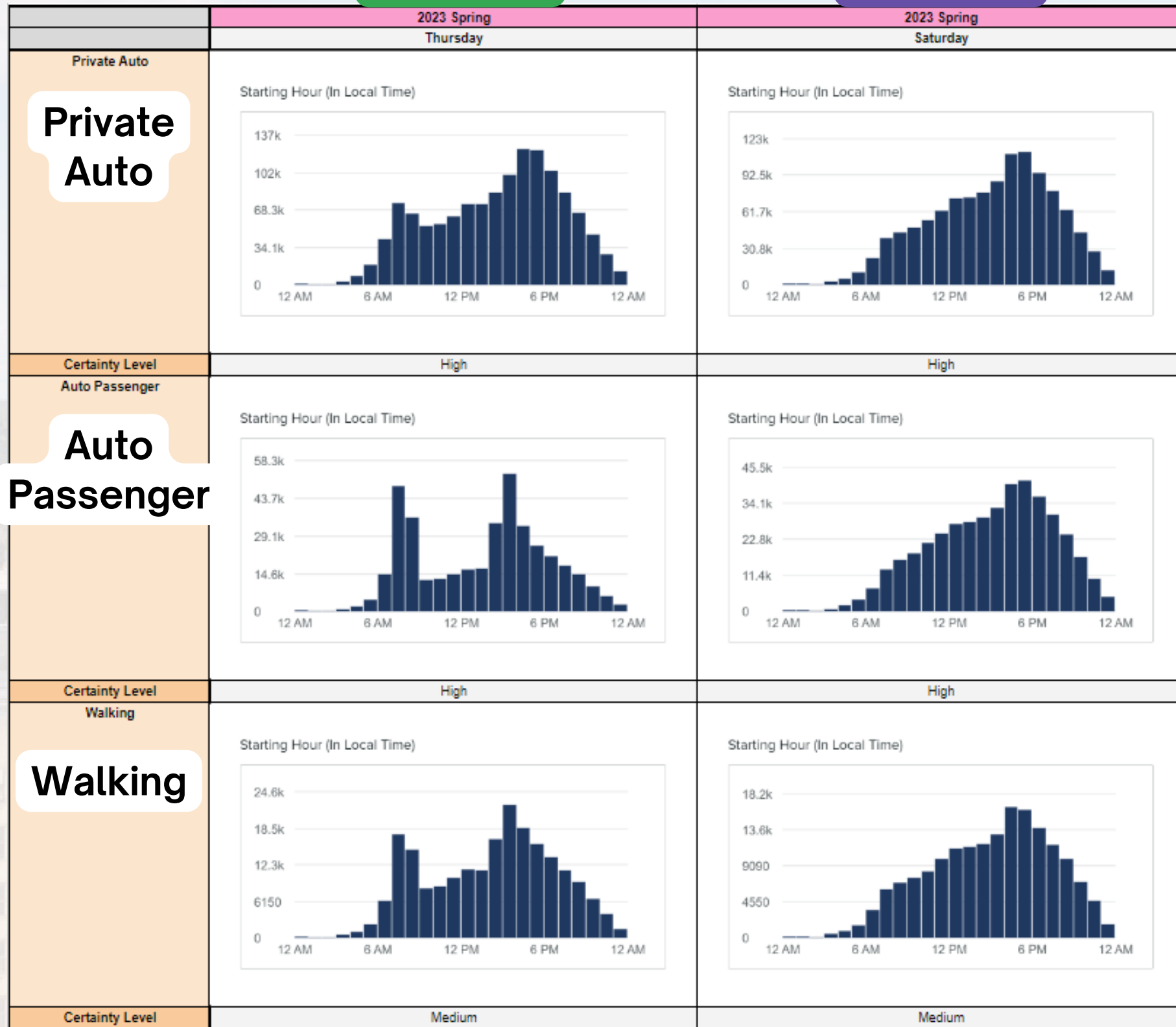
Temporal Distribution of Trip Start Times by Mode

Weekday

Weekend

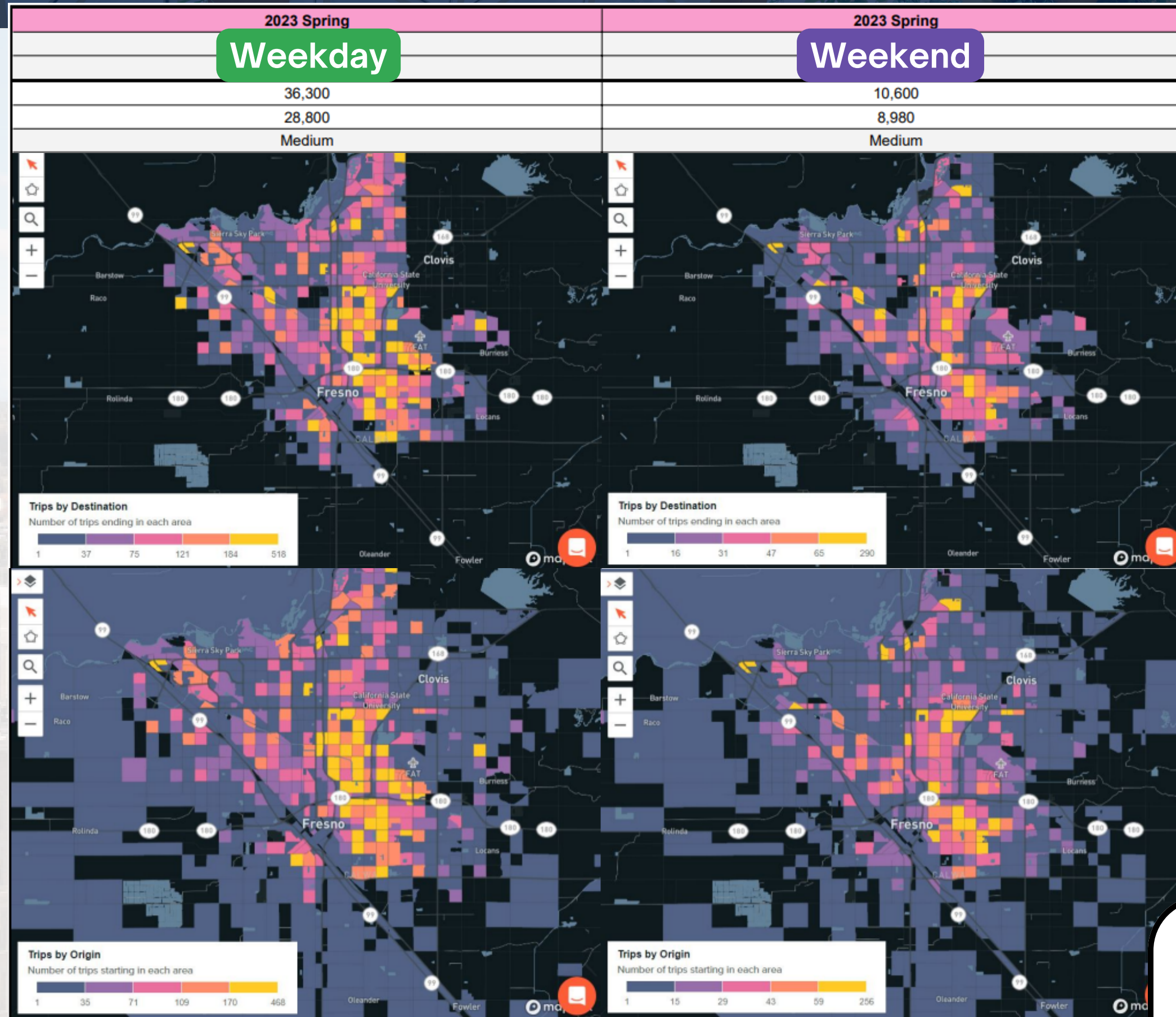
Weekday

Weekend



CITY OF FRESNO - TRIP TIMES

Spatial Distribution of Biking Trips



Trip Destinations in Fresno, CA

Trip Origins in Fresno, CA

Key Findings:

1. Concentration of cyclists in the east/southeast Fresno region
2. Concentration of biking trips around Fresno State

Summary of Key Findings

What does this data mean for the future of the City of Fresno? What does it mean for about our current travelers?



Data Validation

- Replica vs. HH Travel Survey
- Trips, Mode Split, Distance, Duration

COVID-19 Impact

Rebounded - all modes EXCEPT transit, Taxi/TNC, and biking on weekends

Mode Split

- Fresno County & City
- Automobile (~90%); walking (~8%), other (<2%)

Trip Distance & Duration

- Walking trips: ~1/4 mile | ~5 min
- Biking trips: ~1.5 miles | ~7 min

AT Mobility Patterns

- 80% Biking trips are to/from home/school
- 66% of Biking trips are 5-17 y/o

Income

- Income: (TNC) > (auto) > (walking) > (biking) > (transit)
- Bike trips: only 16% whites

AT Origins/Destinations

- High share of cyclists in east/southeast Fresno
- High share of biking around Fresno State

THANK YOU

Questions?

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