One-Day Tour Diary Survey

Activity-Based Model One-Day Travel Survey

Submitted to ARC

By ETC Institute

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Overview

During the fall of 2019 ETC Institute recruited transit riders from each of the transit systems that were included in the on-board Origin-Destination survey to participate in a one-day tour diary survey. The purpose of the survey was to learn more about the types of locations transit riders visit during a typical day. The survey was designed to collect demographic information, activity information and location data from the various locations the respondent visited along with additional travel-related information. The survey was only meant for the individual respondent and was not intended to be a household travel survey.

Recruitment

Participants were recruited on-board bus/rail routes and at major transit agency locations utilized by each of the transit agencies that were a part of the on-board survey project. The Atlanta Regional Commission (ARC) was updated weekly during the collection process as to how many respondents had been recruited from each agency. If the respondents indicated they would be willing to participate, they were then asked whether they preferred to receive sms text or email communications for the duration of the survey. Those respondents who indicated they would prefer to communicate via email were emailed links to download either an Android or iOS version of a mobile app designed specifically for the project. They were also provided with a link to an online survey where they could enter in their stops manually for a typical day if they did not have access to a smartphone. Those who indicated they had a smartphone and preferred to receive text communications were texted a similar message.

Recording of Stop Locations

The mobile apps used the activity of the cell phone's inertial sensors along with time-based algorithms to determine the individual user's stops. The mobile app users were informed through the app that the survey required them to provide a 24-hour period of their travels from 3am to 3am the following day on a valid travel date (Monday through Thursday excluding holidays). The user was able to answer questions regarding their stops as the app collected them, or they could wait until the 24-hour period had ended and then answer all the stop-related questions. Some of the stop-related questions included how the respondent traveled to the stop location, the purpose of traveling to that stop along with how many household and non-household members traveled with them. Respondents were also able to review, edit, delete, or add stops in case the app had not perfectly captured all details of their stops correctly. Respondents who chose to participate online were asked to manually enter their stops for the previous valid travel date. A support number was also available for any respondents who had technical support questions.

Reminders

Participants that had downloaded the app but had not completed the survey, were sent reminders via email or text (depending on their communication preference) to complete the survey. Those that were recruited but had not yet downloaded the app, were sent reminders to download and participate in the survey. Users were able to opt-out of reminders at any time. If email and text reminders were not successful in getting the respondent to participate, a dedicated group of ETC Institute call center staff members assigned to the project would conduct phone call reminders where they would provide the

individuals the links to complete the survey themselves or they provided the option of filling out the survey over the phone using the online desktop platform of the survey. A prepaid gift card in the amount of $10 was available as an incentive to all participants who completed the survey.

The goal of 1,000 participants to complete a 24-hour valid travel date was reached as a total of 1,000 individuals completed a travel diary. Ultimately, 434 respondents completed the survey using one of the mobile apps, 360 entered their trip diaries themselves using the desktop tool and 206 provided their trips to an ETC Institute call center employee who entered their stop information into the online desktop tool.

Tours
There are references to "Tours" in the following report. A tour is defined in this report as starting when a respondent leaves home and ending when a respondent returns home. For example, if a respondent left home in the morning, went to work, and then returned home, that was considered the first tour. If that same person then left their home again to go spend the night at a relative's house, that was considered the second tour even though they did not return home on that travel date. If a respondent stayed at home all day or did not start their day at home on their travel day and correspondingly never returned home then they were indicated to have zero tours.

Major Findings
All of the transit systems that were included in the on-board Origin-Destination survey were represented in the completed travel diary data set. As seen in the table below, MARTA was the most represented transit agency in the data set while the lower volume systems had significantly fewer participants.

Table 1: Transit System Respondent was Using When Recruited

Transit System Respondent was Using When Recruited

	Count	Percentage
Cherokee	1	0.10%
Cobb	47	4.70%
Gainesville	4	0.40%
Gwinnett	48	4.80%
MARTA	422	42.20%
MARTA Rail	421	42.10%
SRTA	57	5.70%
Grand Total	**1000**	**100.00%**

Most respondents were between the ages of 25 to 44 (51.1%). Older demographics were also well represented with 15% of respondents being over the age of 55 as seen in the table below.

Table 2: Age of Respondents

Age of Respondents

	Count	Percentage
16-17	6	0.60%
18-24	171	17.10%
25-34	288	28.80%
35-44	223	22.30%
45-54	159	15.90%
55-64	117	11.70%
65-75	32	3.20%
76 and older	4	0.40%
Grand Total	**1000**	**100.00%**

It was not anticipated that the demographics of those who participated in the one-day travel diary survey would necessarily match up with demographics of the on-board destination survey, but for comparison, 51.2% of respondents in the origin-destination on-board survey (based on secondary linked weight factors – excluding "dummy records") were between the ages of 25 to 44, and 13.8% were over the age of 55.

Females had a slightly higher percentage of participating in the travel diary at fifty-two percent compared to male participants (47.0%).

Table 3: Gender of Respondents

Gender of Respondents

	Count	Percentage
Female	522	52.20%
Male	470	47.00%
Other	8	0.80%
Grand Total	**1000**	**100.00%**

For comparison, 52.6% of respondents in the origin-destination on-board survey were male (based on secondary linked weight factors – excluding "dummy records").

Over sixty percent (64.3%) of respondents were employed full-time (35 hours or more per week) and 20.3% were employed part-time.

Table 4: Employment Status

Employment Status

	Count	Percentage
Employed full time (35 hours or more per week)	643	64.30%
Employed part time (1 to 34 hours per week)	203	20.30%
Homemaker	5	0.50%
Not currently employed and not seeking work	32	3.20%
Not currently employed but seeking work	41	4.10%
Not Provided	62	6.20%
Retired	14	1.40%
Grand Total	**1000**	**100.00%**

The figure below shows the percentage of employed (combined full-time and part-time) respondents by income. Not surprisingly, as the income level of the respondent increased, so did the likelihood that the respondent was employed.

Figure 1: Employed Full or Part-time by Income
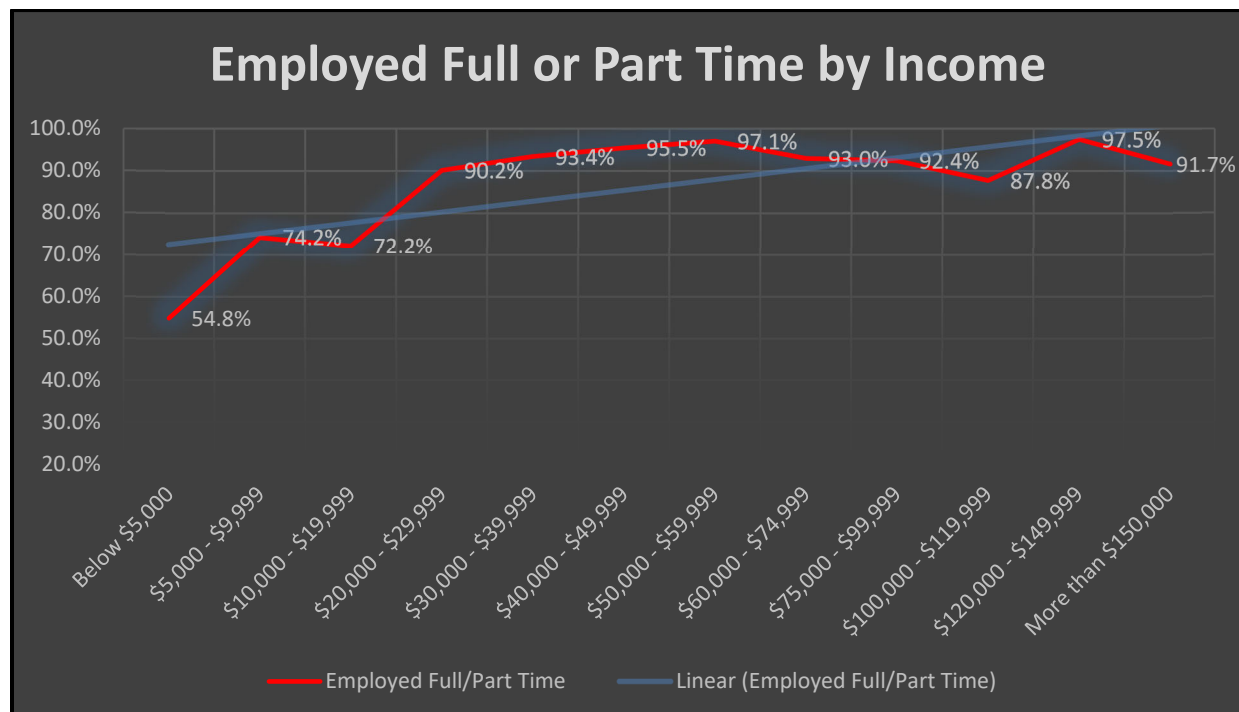
For comparison, 71.8% of respondents in the origin-destination on-board survey were employed full-time and 14.6% were employed part-time (based on secondary linked weight factors – excluding "dummy records").

Over twenty percent (20.6%) of all respondents who completed the travel diary indicated they were a student of some kind. Of the eighteen percent (17.7%) of respondents who indicated they were either part-time or full-time college/university students, just under half (44.6%) attend Georgia State University.

Table 5: Student Status

Student Status

	Count	Percentage
Not a student	794	79.40%
Full time College / University	125	12.50%
Part time College / University	52	5.20%
9 - 12th grade	9	0.90%
Other type of Student	20	2.00%
Grand Total	**1000**	**100.00%**

Table 6: University Attended (Part/Full-Time College/University Students)

University Attended (Full/Part-Time Students)

	Count	Percentage
Georgia State	79	44.63%
Other	75	42.37%
Georgia Tech	17	9.60%
Emory College	6	3.39%
Grand Total	**177**	**100.00%**

For comparison, 85.4% of respondents in the origin-destination on-board survey were not students (based on secondary linked weight factors – excluding "dummy records").

Respondents were asked to indicate all the races or ethnicities that best describe them. Seventy percent (70.30%) of respondents indicated they were "Black/African American" while the next highest category was "White/Caucasian" at just over one-quarter (26.0%). *Note: Multiple responses were allowed.*

Table 7: Race/Ethnicity (Multiple Response Allowed)

Race/Ethnicity (Multiple Responses Allowed)

	Count	Percentage
American Indian/Alaska Native	20	2.00%
Asian	32	3.20%
Black/African American	703	70.30%
Native Hawaiian / Pacific Islander	6	0.60%
White/Caucasian	260	26.00%
Other	37	3.70%

Respondents were asked their total annual household income. Nearly one-third (29.4%) of the respondents indicated that their household income was less than $20,000 a year as seen below.

For comparison, 69.6% of respondents in the origin-destination on-board survey indicated being "Black/African American" and 23.3% indicated being "White/Caucasian" (based on secondary linked weight factors – excluding "dummy records").

Table 8: Total Household Income

Total Household Income

	Count	Percentage
Below $5,000	84	8.40%
$5,000 - $9,999	66	6.60%
$10,000 - $19,999	144	14.40%
$20,000 - $29,999	132	13.20%
$30,000 - $39,999	122	12.20%
$40,000 - $49,999	66	6.60%
$50,000 - $59,999	68	6.80%
$60,000 - $74,999	57	5.70%
$75,000 - $99,999	66	6.60%
$100,000 - $119,999	49	4.90%
$120,000 - $149,999	40	4.00%
More than $150,000	48	4.80%
No answer	58	5.80%
Grand Total	**1000**	**100.00%**

For comparison, 14.2% of respondents in the origin-destination on-board survey indicated making less than $20,000 a year (based on secondary linked weight factors – excluding "dummy records"). However, it should be noted that the percentage of those who did not provide an answer to the income question on the origin-destination on-board survey was 18.0% compared to just 5.8% of respondents in the travel diary data set. Respondents to the travel diary data set were possibly more comfortable with the question since many of them had participated in the origin-destination on-board survey previously and/or they felt more comfortable answering the question since it was self-administered.

The average number of tours for all respondents was 0.99 tours and the average number of stops per tour for all respondents was 4.44. The figure below shows that as income level increases, there is a slight increase in the number of tours a respondent is likely to make.

Figure 2: Average Number of Tours by Income
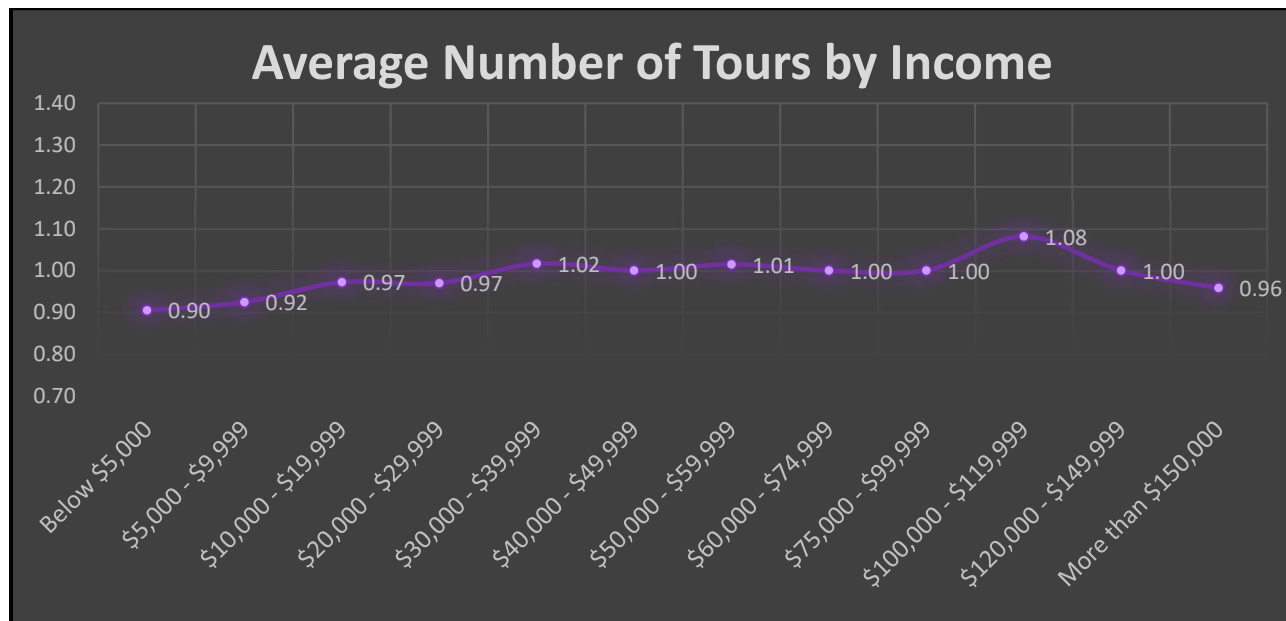
Including the base stop location, the average number of stops for a respondent was 4.4 stops. The figure below shows that as income increases, on average so does the number of stops an individual is likely to make on a typical day.

Figure 3: Average Number of Stops by Income
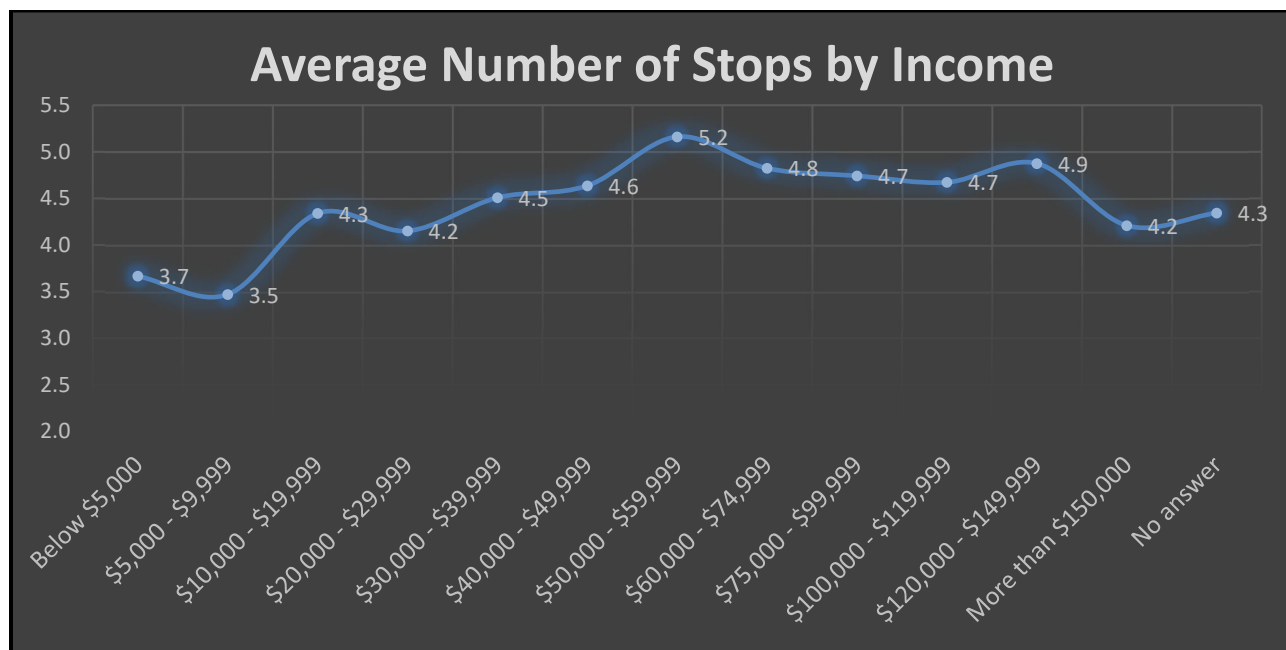
The figure below shows the number of tours by income groupings of at least 125 participants. This figure shows that as income level increases there also tends to be a slight increase in the number of tours a respondent is likely to make. Even when the income levels are regrouped into 250 or more participants like in Figure 5, a similar relationship is still visible.

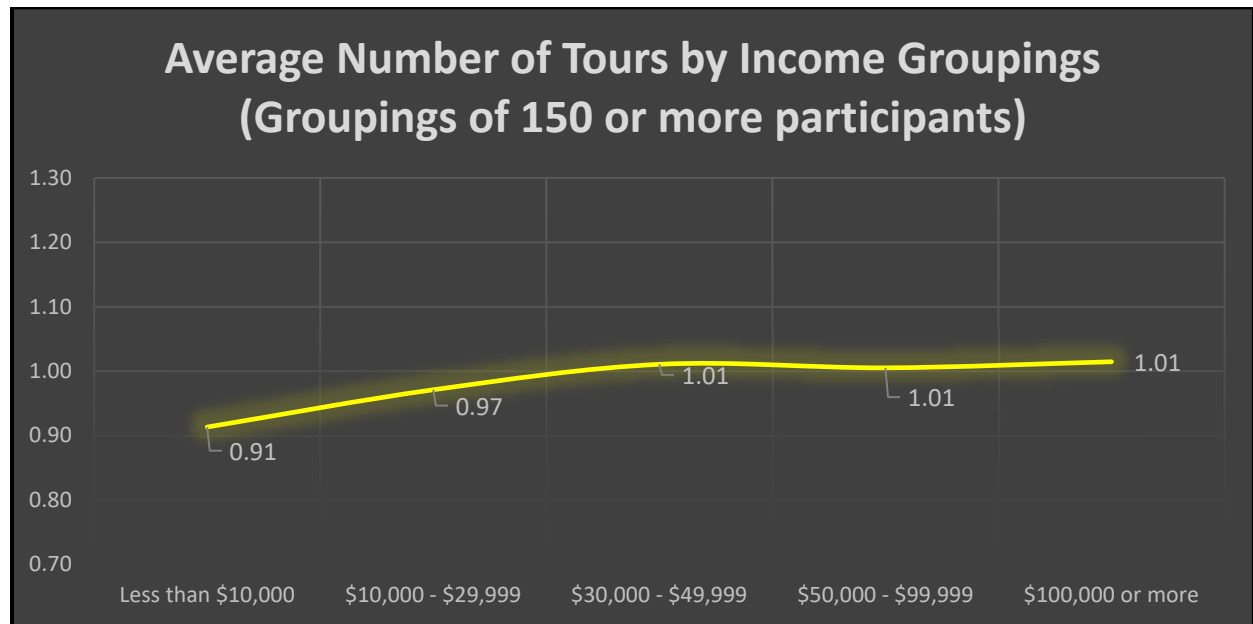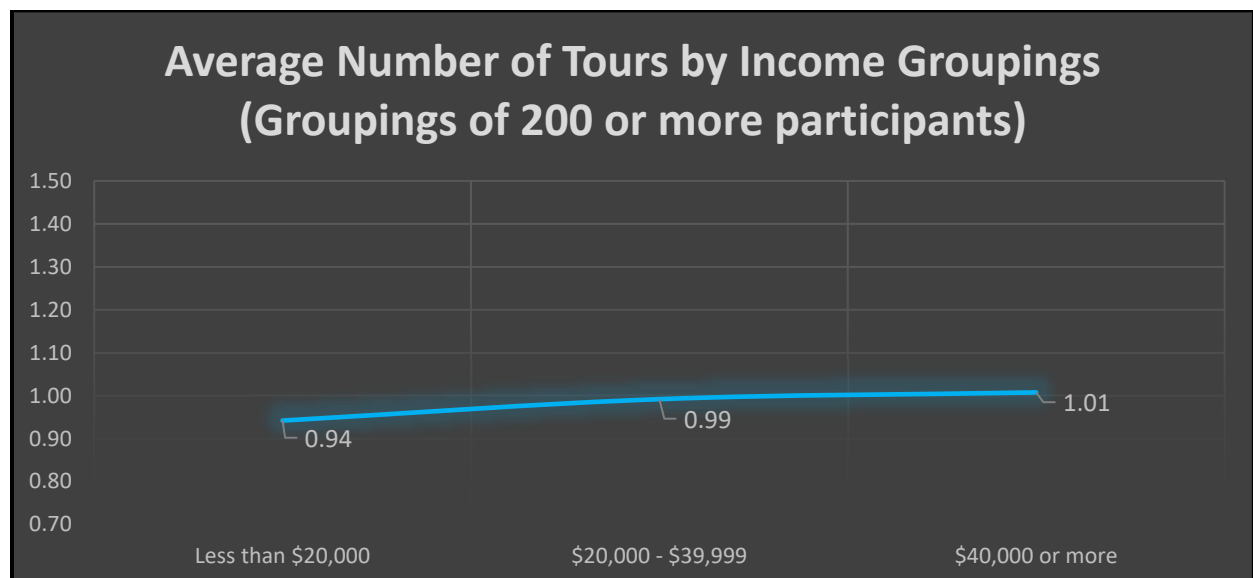*Figure 4: Average Number of Tours by Income Groupings (N > 125)*

Figure 5: Average Number of Tours by Income Groupings (N > 250)

The figures on the following page show the number of stops by income groupings of at least 125 participants and then by income groupings of at least 250 participants. Both figures show that as income level increases so does the number of stops a respondent is likely to make.

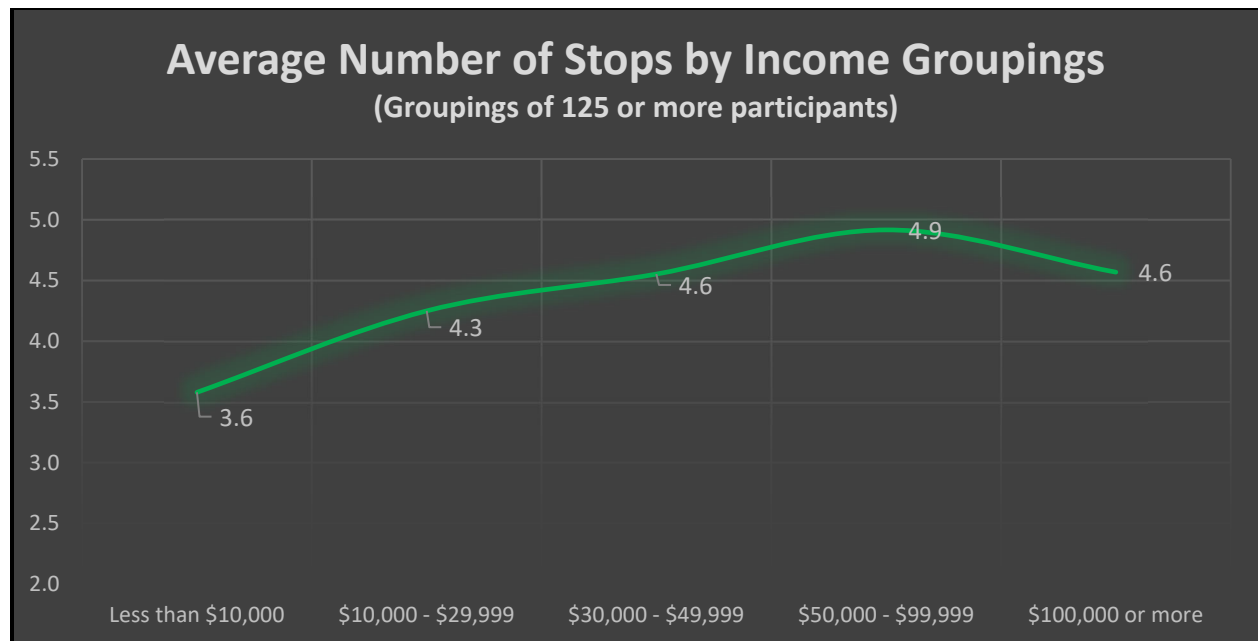*Figure 6: Average Number of Stops by Income Groupings (N > 125)*

Average Number of Stops by Income Groupings
(Groupings of 125 or more participants)

- Less than $10,000: 3.6
- $10,000 - $29,999: 4.3
- $30,000 - $49,999: 4.6
- $50,000 - $99,999: 4.9
- $100,000 or more: 4.6

Figure 7: Average Number of Stops by Income Grouping (N > 250)

Average Number of Stops by Income Groupings
(Groupings of 250 or more participants)

- Less than $20,000: 3.9
- $20,000 - $39,999: 4.3
- $40,000 or more: 4.7
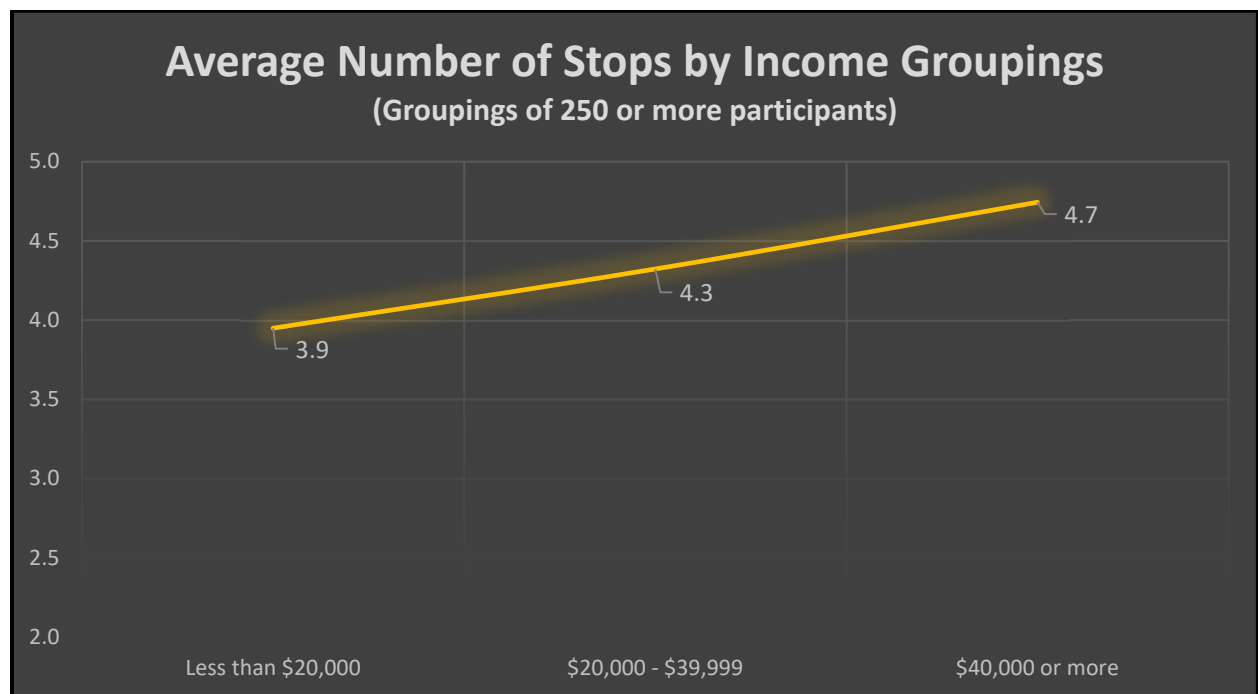
When reviewing the defined tours in the data set, sixty percent (59.6%) of the defined tours included at least one of the work activities (work/doing my job, other work-related activities at work, work-related, or working from home) while seven percent (6.9%) of defined tours included attending class/studying and 37.1% included a change in travel mode/transfer. Additionally, seventy-seven percent (77.1%) of all defined tours included the use of transit as a travel mode.

Previously it was noted that as income level increases so does the likelihood of the respondent being employed. If an individual is employed, they are likely to have a required work stop in addition to their other daily stops. Having a stop to a work location in addition to other daily stops may be the reason why higher income respondents had an increased number of stops.

Figure 8 shows the most common activity types by income groupings. The figure shows that the highest income group had a higher percentage of their stops include work and changing travel mode/transfer compared to the lowest income group. *Note: These figures include the activity at the base location and return trip homes.*

Figure 8: Most Common Activity Types by Income Groupings (including Base Location and Return Trips Home)
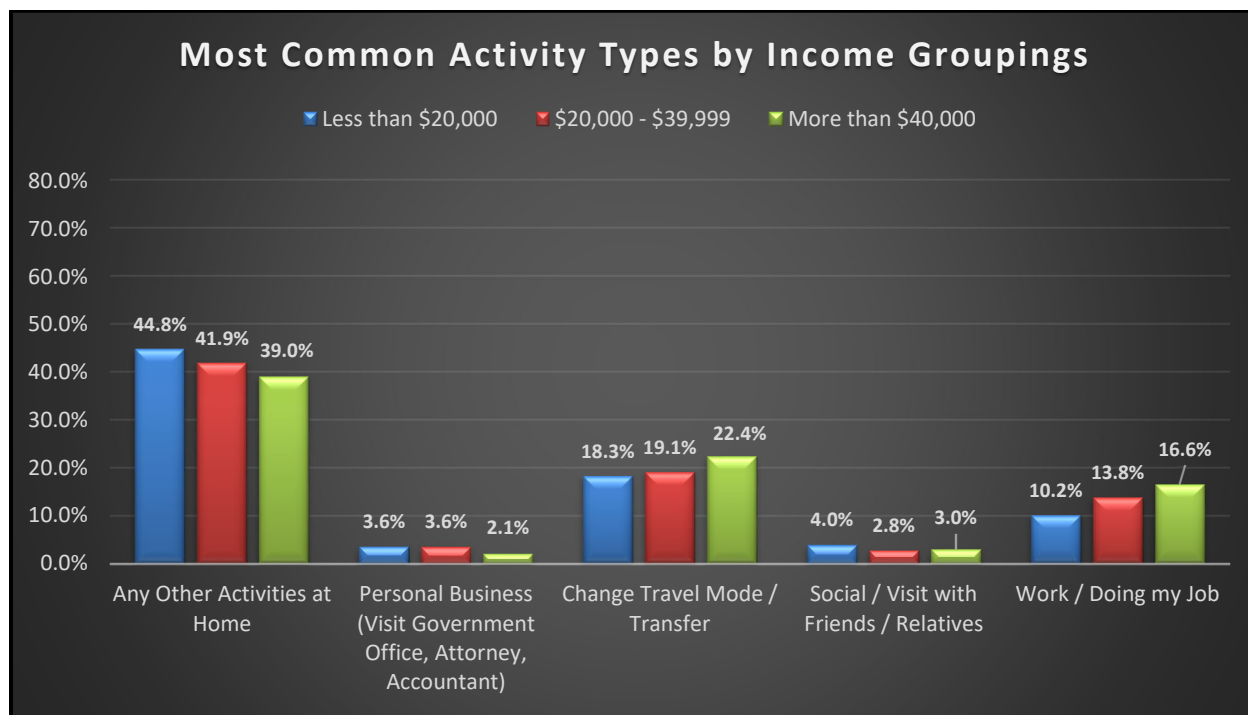
There is another reason why there might be a slight disparity between the average number of stops captured and income level. The method the stops were captured likely plays a significant role. For example, the average number of stops per method of stop collection was as follows:

- Mobile App (5.5 stops and 1.10 tours on average)
- CATI (3.8 stops and 1.06 tours on average)
- Online – Self-administered (3.3 stops and 0.81 tours on average)

Figure 9 on the following page shows that the mobile app collection method captures a higher number of stops than either the self-administered online version or the CATI method, regardless of income level.

Figure 10 on the following page shows that while respondents in the lower income ranges were almost equally as likely to participate in any of the three stop capture methods, higher income range

respondents were much more likely to enter the stop information themselves online or use one of the mobile apps to capture their stops.

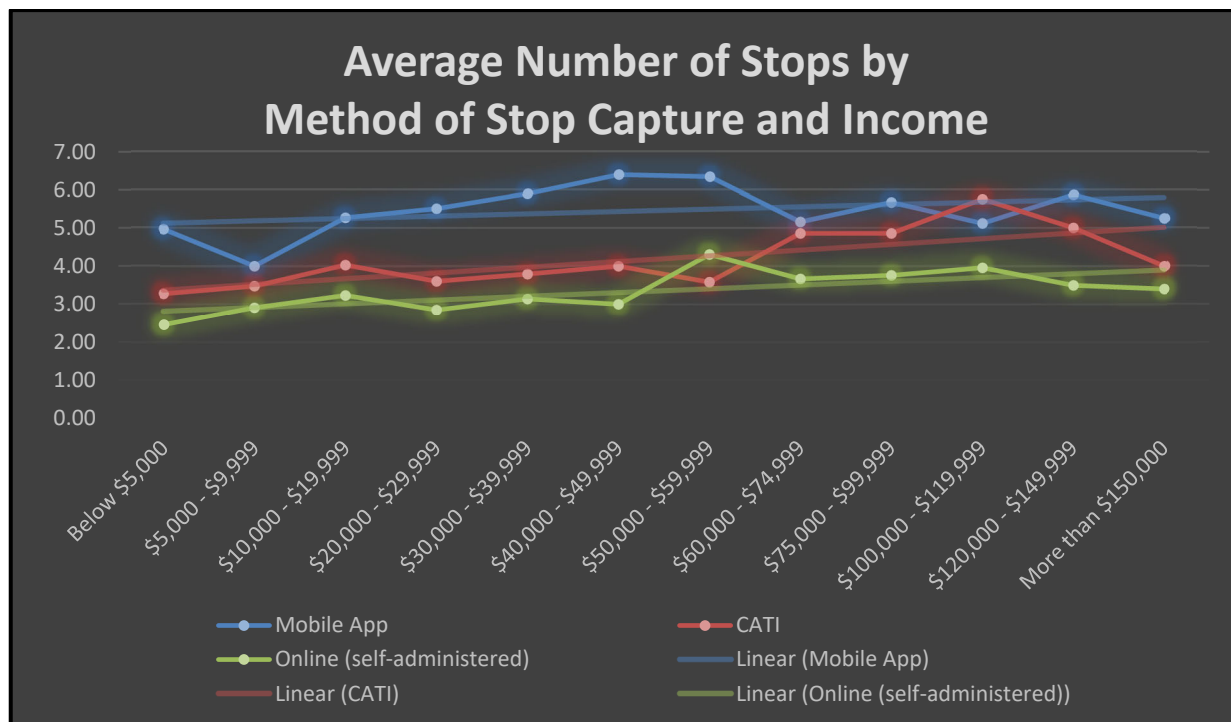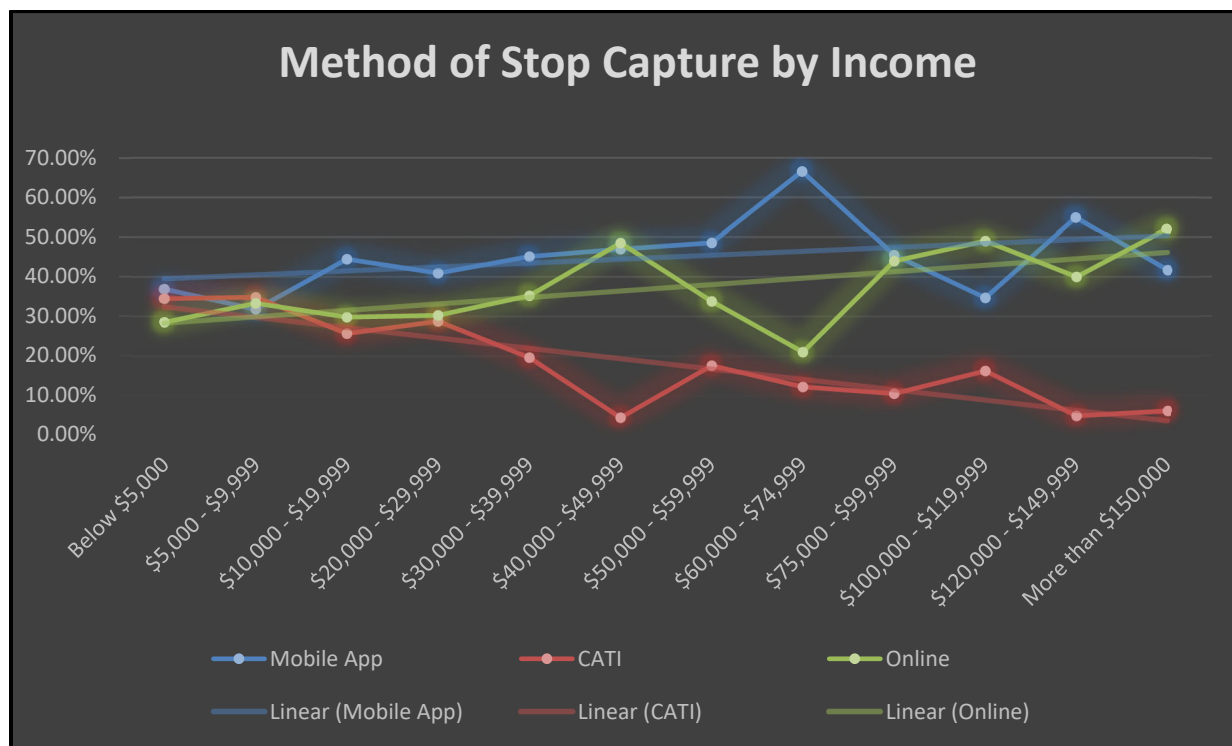*Figure 9:Average Number of Stops by Method of Stop Capture and Income*

Figure 10: Method of Stop Capture by Income

The table below shows the percentage breakdown of activity types for all respondents. The most common activity type not related to "Home" was "Change Travel Mode / Transfer". *Note: These figures include the activity at the base location and return trip homes.*

Table 9: Activity at Stop (Including Base Location and Return Trip Home)

Activity Type at Stop

|	Count	Percentage
All Other Activities at School (Eat Lunch, Recreational, etc.)	11	0.25%
Any Other Activities at Home	1819	41.55%
Attend Major Sporting Event	1	0.02%
Attending Class / Studying	81	1.85%
Change Travel Mode / Transfer	887	20.26%
Civic or Religious Activities	12	0.27%
Drive Through (ATM, Bank, Fast Food, etc.)	27	0.62%
Dropped off Passenger(s) from my Car	19	0.43%
Eat Meal Out at Restaurant / Diner	99	2.26%
Grocery / Food Shopping	95	2.17%
Health Care (Doctor, Dentist, etc.)	62	1.42%
Household Errands (Bank, Dry Cleaning, etc.)	18	0.41%
Indoor Recreation (Yoga, GYM, etc.) or Outdoor Recreation (Jogging, Biking, Walking)	18	0.41%
Loop Trip (a trip that starts and ends in the same place, with no specific destination, such as walking the dog)	17	0.39%
Other (specify)	44	1.01%
Other Routine Shopping (Clothing, Convenience Store, Household Maintenance)	67	1.53%
Other Work-Related Activities at Work	53	1.21%
Personal Business (Visit Government Office, Attorney, Accountant)	140	3.20%
Picked up Passenger(s) in my Car	9	0.21%
Service Private Vehicle (Getting Gas, Oil, Lube, Repairs)	22	0.50%
Shopping (Online, Catalog or by Phone)	34	0.78%
Shopping for Major Purchases or Specialty Items	39	0.89%
Social / Visit with Friends / Relatives	139	3.17%
Volunteer Work / Activities	13	0.30%
Work / Doing my Job	613	14.00%
Working at Home (for Pay or as a Volunteer)	18	0.41%
Work-Related (Meeting, Sales Call, Delivery)	21	0.48%
Grand Total	**4378**	**100.00%**

Since the participants for the survey were recruited while using transit it is not a surprise that transit bus/rail was the most common mode of travel used by respondents to travel to and from their stops, followed by "I was a driver or a passenger in household vehicle and I parked" and walking.

Table 10: Travel Mode

Travel Mode

|	Count	Percentage
Cargo transport vehicle	2	0.07%
Carshare	16	0.52%
E-scooter	1	0.03%
I was a driver or a passenger in household vehicle and I parked	532	17.40%
I was a passenger in non-household vehicle and parked	90	2.94%
Personal Bicycle	8	0.26%
Shuttle	20	0.65%
Taxi	2	0.07%
Transit Bus/Rail	1840	60.17%
Uber-Lyft-etc	56	1.83%
Walk	376	12.30%
Was dropped off by someone going someplace else	112	3.66%
Wheelchair	3	0.10%
Grand Total	**3058**	**100.00%**

The figure on the following page shows how travel modes change as income level increases. The figure shows that as income level increases so does the likelihood that a respondent will use a household vehicle to travel to their stops. Lower income respondents are mostly dependent on transit and walking to travel to their stops.

Figure 11: Travel Mode by Income
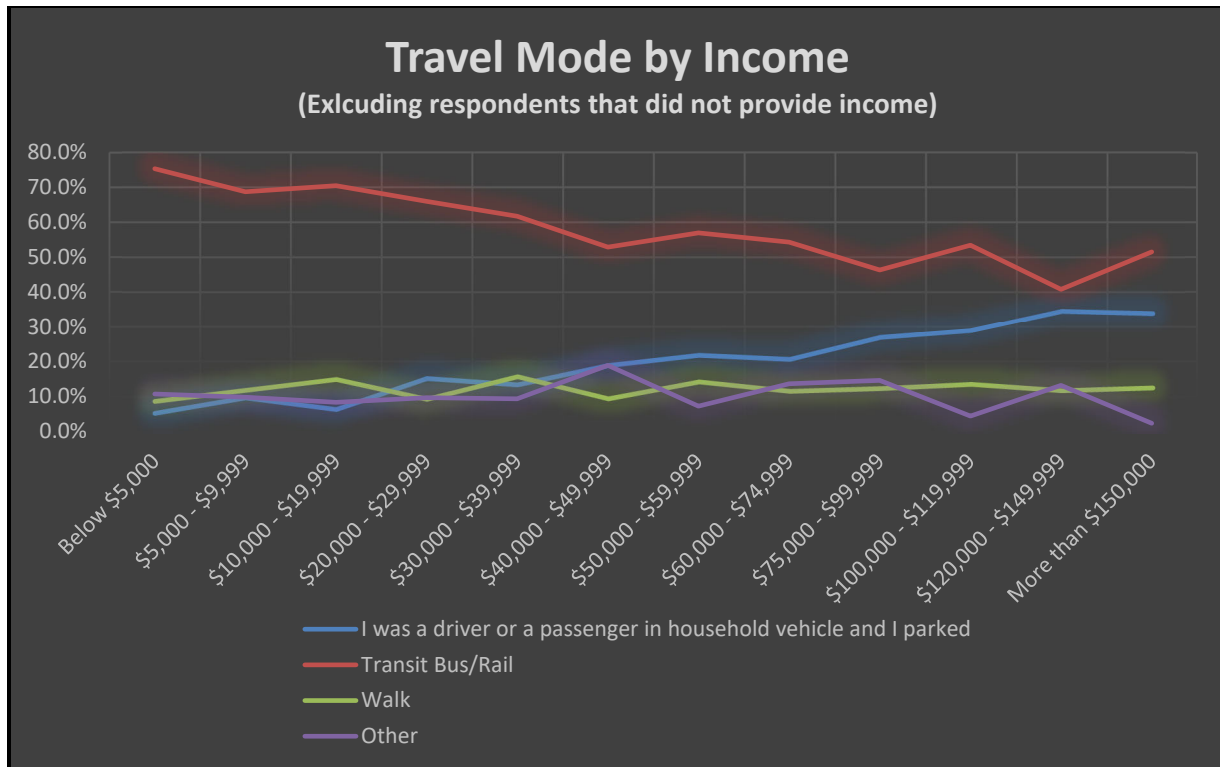
As shown in the previous chart, as income increase, the travel mode of "Transit Bus/Rail" decreases and the mode of using a household vehicle increases.

Figure 12: Travel Mode by Income Grouping
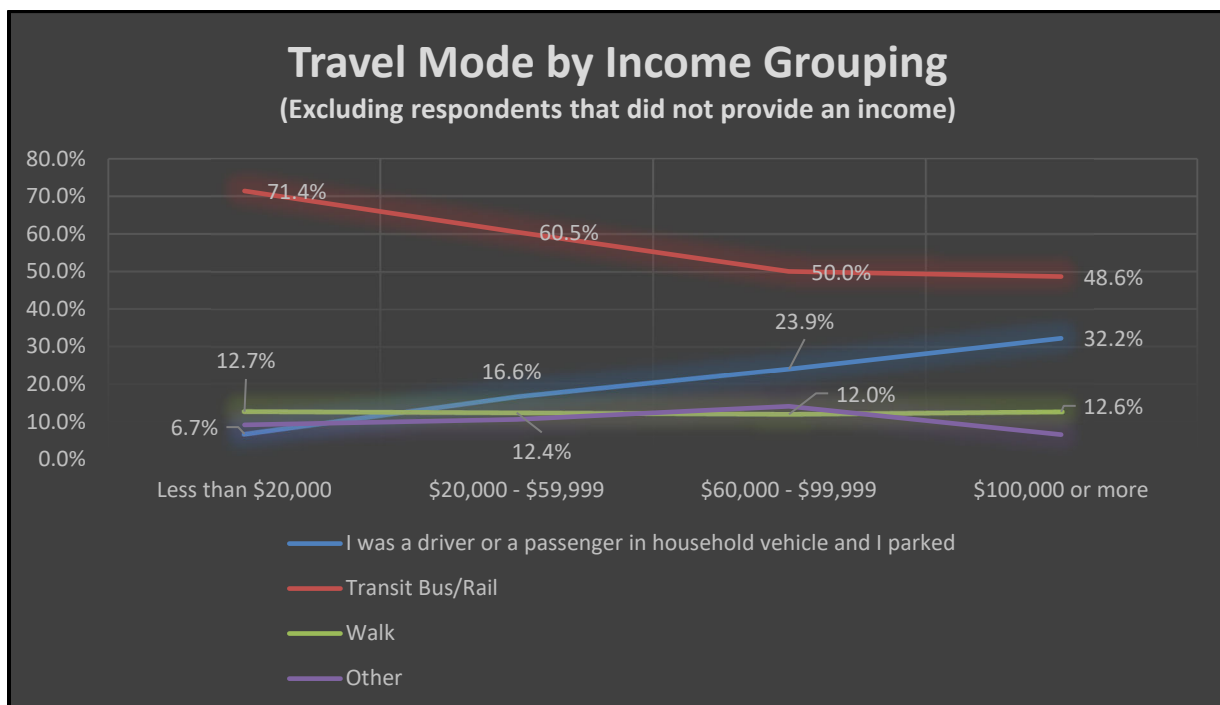
Additional Findings

The subsequent tables include some of the other findings from the survey.

Less than one percent (0.8%) of stops, that included parking a vehicle, were indicated to have a cost associated.

Table 11: Pay for Parking?

Pay for Parking?

	Count	Percentage
Yes	5	0.81%
No	616	99.19%
Grand Total	**621**	**100.00%**

Most households had two or fewer household members (50.6%). Fourteen percent (13.9%) had 5 or more people living in their household as shown below.

Table 12:Household Size

Household Size

	Count	Percentage
One (1)	232	23.20%
Two (2)	274	27.40%
Three (3)	190	19.00%
Four (4)	165	16.50%
Five (5)	75	7.50%
Six (6)	30	3.00%
Seven (7)	17	1.70%
Eight (8)	12	1.20%
Nine (9)	1	0.10%
Ten or More (10+)	4	0.40%
Grand Total	**1000**	**100.00%**

Less than ten percent of respondents (9.4%) indicated they had no one employed living in the household. Nearly seventy percent (68.9%) had "One (1)" or "Two (2)" people employed living in the household.

Table 13: Employed in Household

Employed in Household

	Count	Percentage
None (0)	94	9.40%
One (1)	354	35.40%
Two (2)	335	33.50%
Three (3)	151	15.10%
Four (4)	55	5.50%
Five (5)	5	0.50%
Six (6)	4	0.40%
Seven (7)	1	0.10%
Ten or More (10+)	1	0.10%
Grand Total	**1000**	**100.00%**

Just over one-third (34.1%) of respondents indicated that they did not have a household vehicle.

Table 14: Count of Vehicles in Household

Count of Vehicles in Household

	Count	Percentage
None (0)	341	34.10%
One (1)	315	31.50%
Two (2)	242	24.20%
Three (3)	76	7.60%
Four (4)	17	1.70%
Five or More (5+)	9	0.90%
Grand Total	**1000**	**100.00%**

Nearly three-quarters of the respondents (73.2%) indicated they have a valid driver's license.

Table 15: Have a Driver's License?

Driver's License

	Count	Percentage
No	268	26.80%
Yes	732	73.20%
Grand Total	**1000**	**100.00%**

Two-thirds of respondents (66.5%) indicated they use transit "5 or more days a week". Less than four percent (3.7%) of respondents indicated they use transit about once a month or less.

Table 16: Frequency of Transit Use

Frequency of Transit Use

	Count	Percentage
5 or more days a week	665	66.50%
2 to 4 days a week	238	23.80%
About once a week	29	2.90%
2 to 3 times a month	31	3.10%
About once a month	12	1.20%
Several times a year	16	1.60%
Once a year	9	0.90%
Grand Total	**1000**	**100.00%**

Nine percent (9.1%) of the respondents who completed a travel diary indicated they did not travel on their chosen travel day.

Table 17: Travel Today?

Travel Today?

	Count	Percentage
Yes	909	90.90%
No	91	9.09%
Grand Total	**1000**	**100.00%**

Just over eleven percent (11.4%) of respondents indicated their base location was some place other than home.

Table 18: Base Location was Home

Base Location was Home

	Count	Percentage
Yes	886	88.60%
No	114	11.40%
Grand Total	**1000**	**100.00%**

Maps of Trip Data

In this section there are some geographic information system (GIS) maps that display various location-based data from the survey. Some of the subsequent maps have additional layers that are simply meant to provide some extra information that may be of interest. *Note: some maps were "zoomed in" which occasionally caused a nominal number of points to not be displayed. This was done to improve the visualization experience of the viewer. Additionally, for some maps, the coordinates were reduced to 3 decimal spots in order to aggregate some locations that were very close to one another for illustration purposes.*

Location of Respondents Maps

Figure 13: Location of Respondents by System
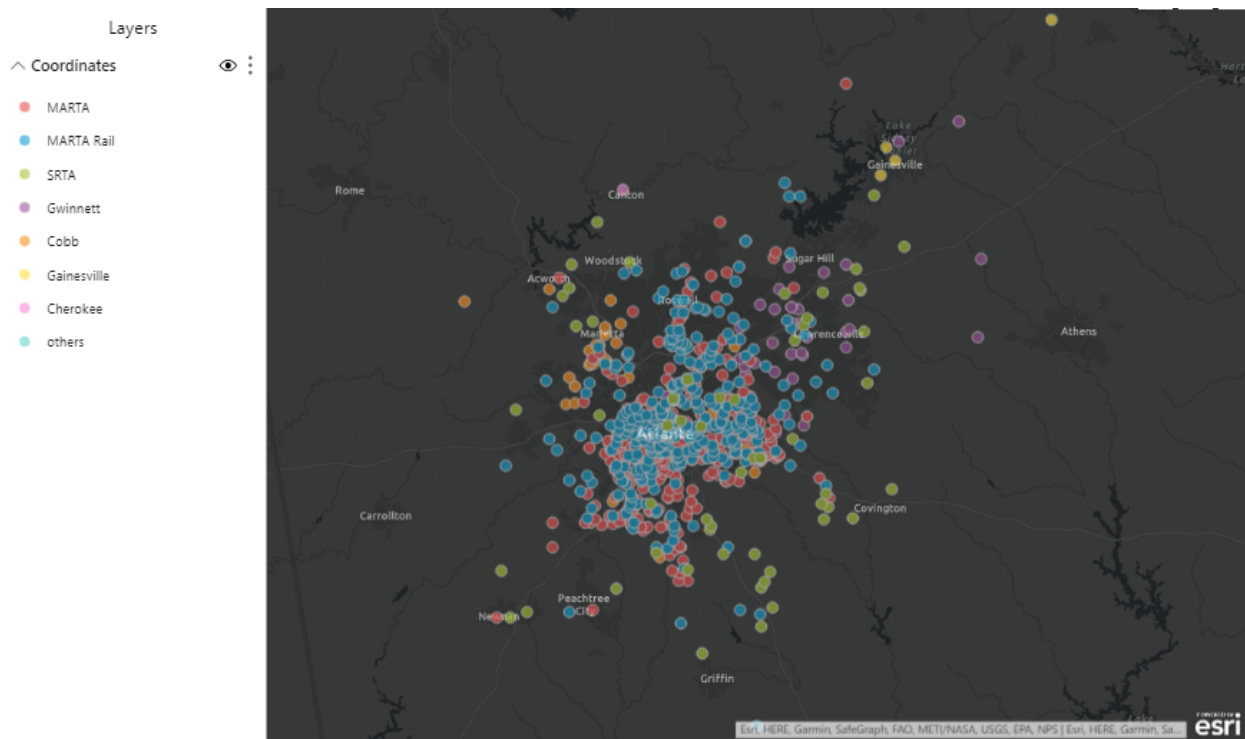
Figure 14: Location of Respondents Who Were Recruited on MARTA (BUS) with 2016 Median Household Income Layer
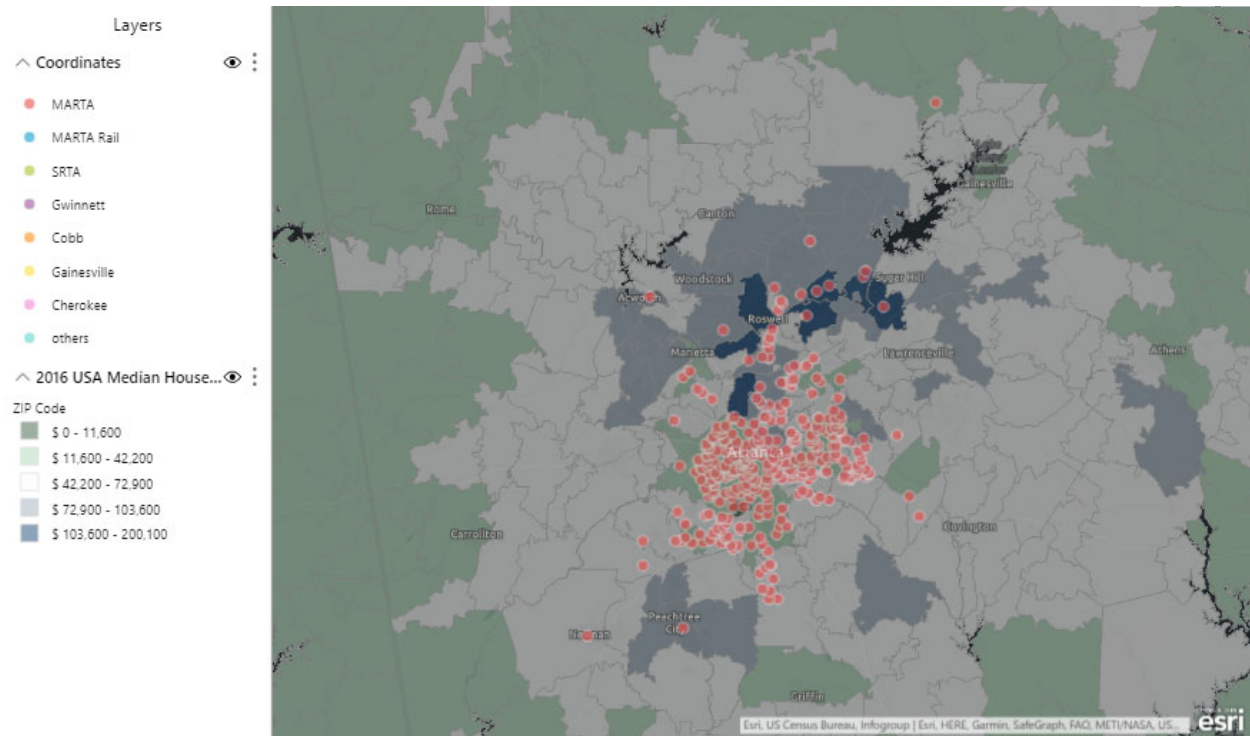
Figure 15: Home Location of Respondents Who Were Recruited on MARTA (RAIL) with 2016 Median Household Income Layer
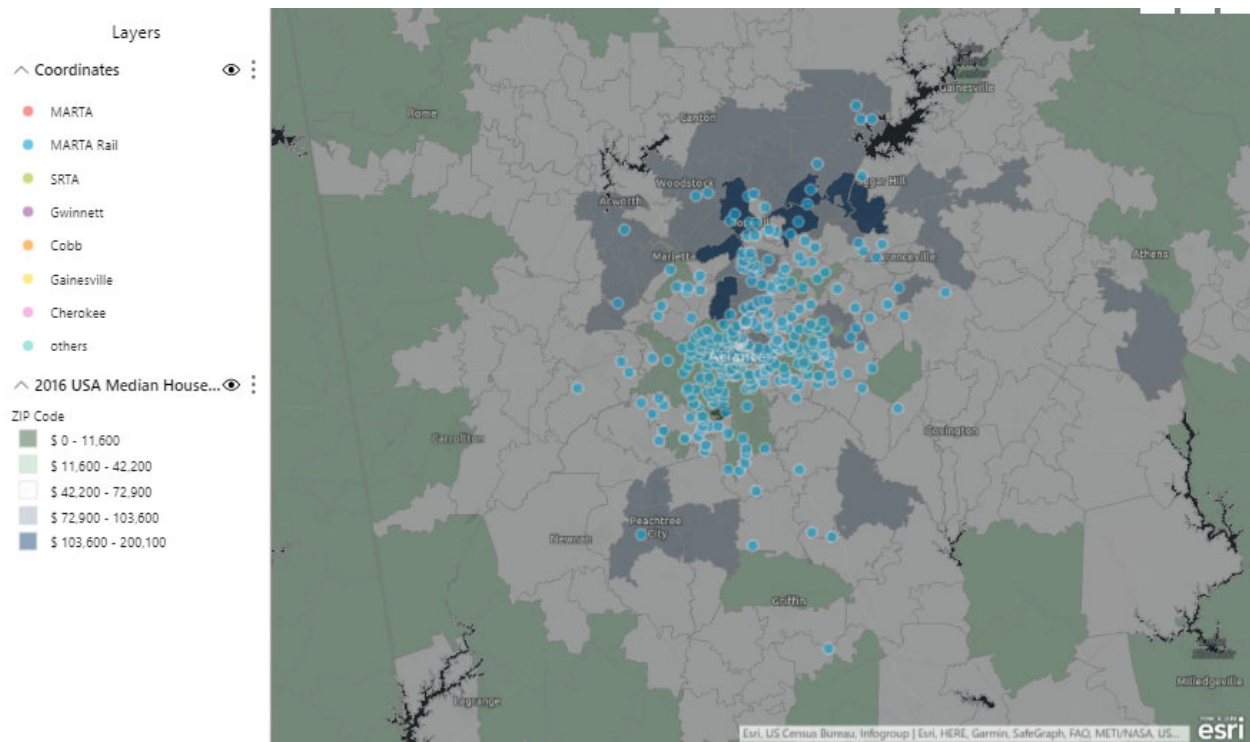
Figure 16: Home Location of Respondents Who Were Recruited on Cobb County Transit with 2016 Median Household Income Layer
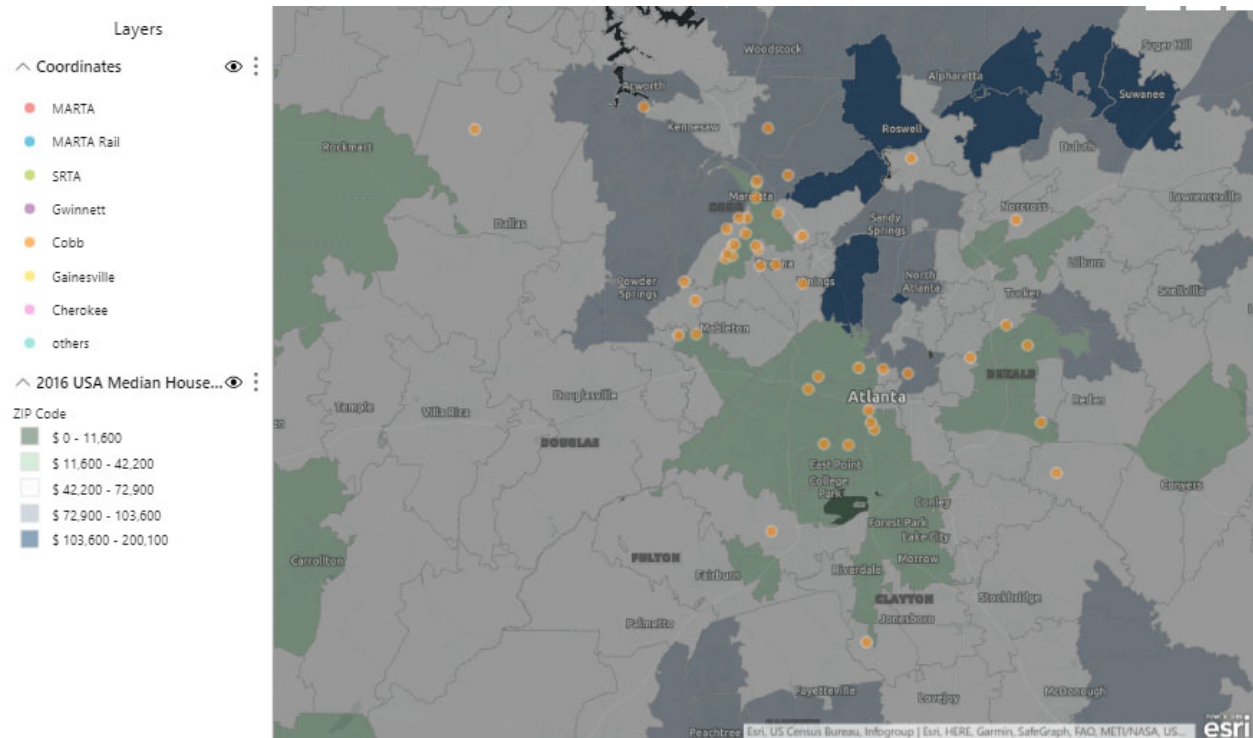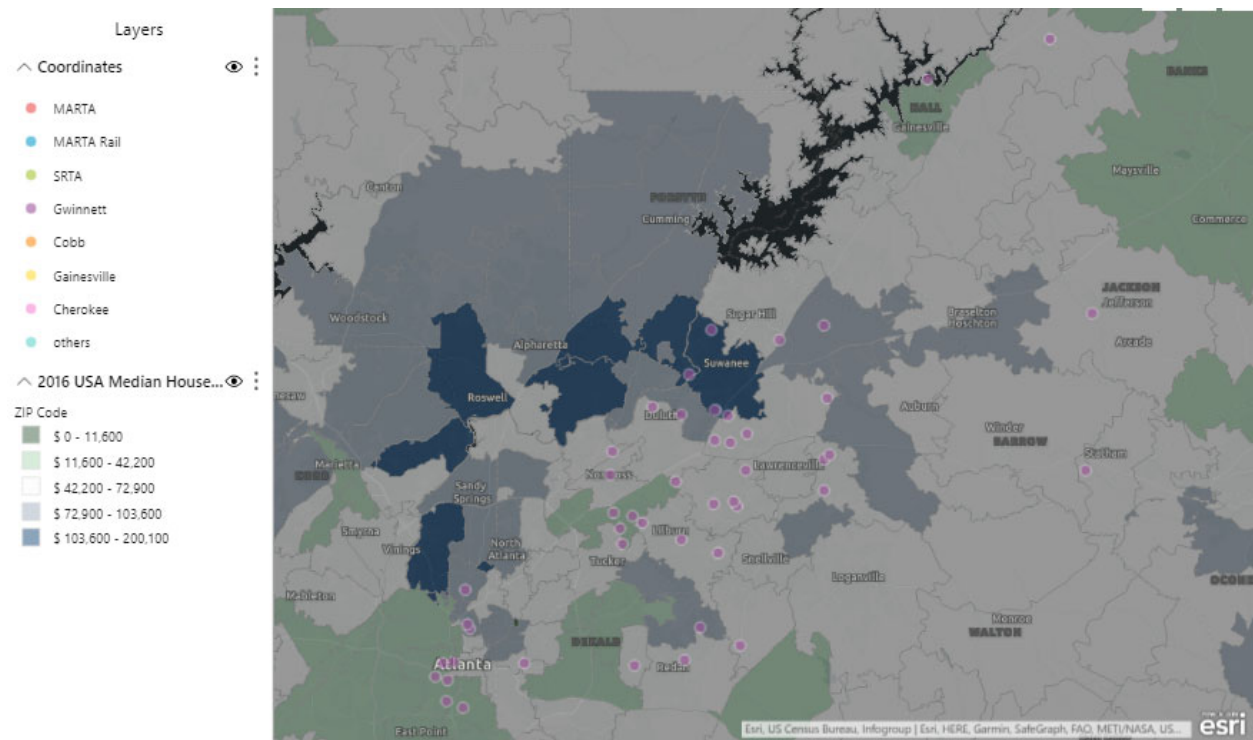

Figure 17: Home Location of Respondents Who Were Recruited on Gwinnett County Transit with 2016 Median Household Income Layer

Figure 18: Home Location of Respondents Who Were Recruited on SRTA with 2016 Median Household Income Layer
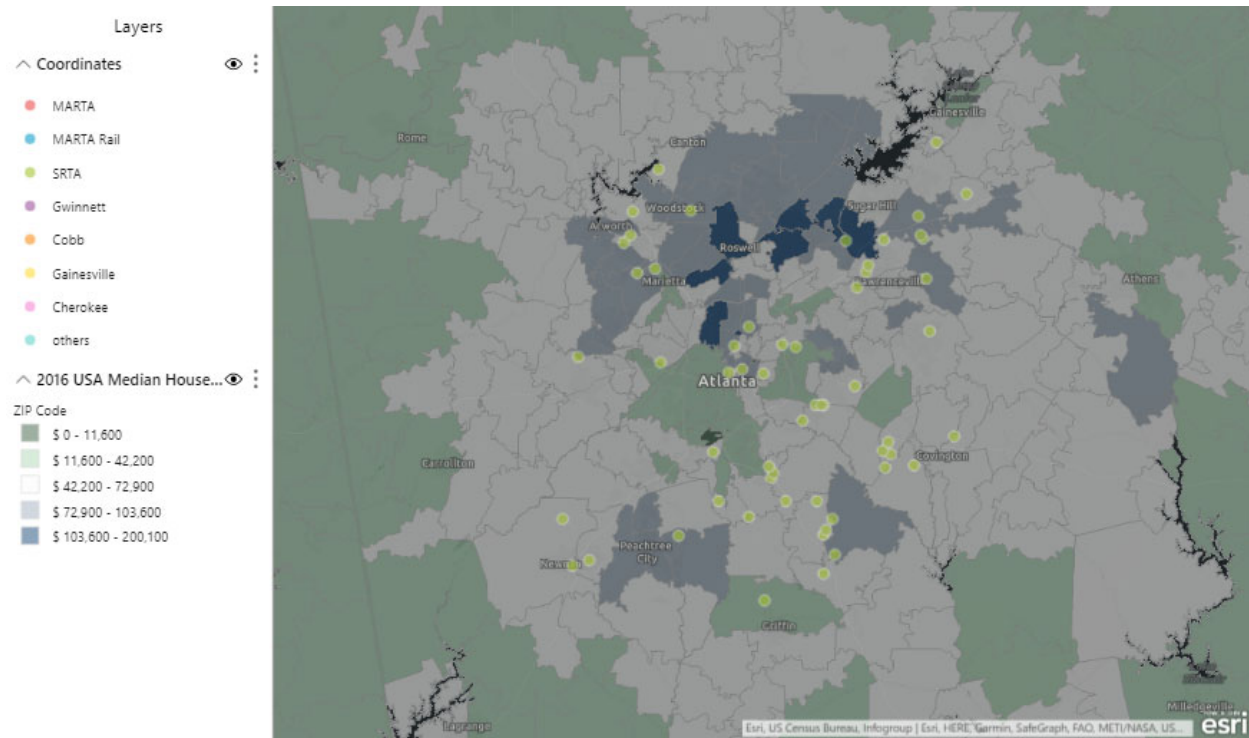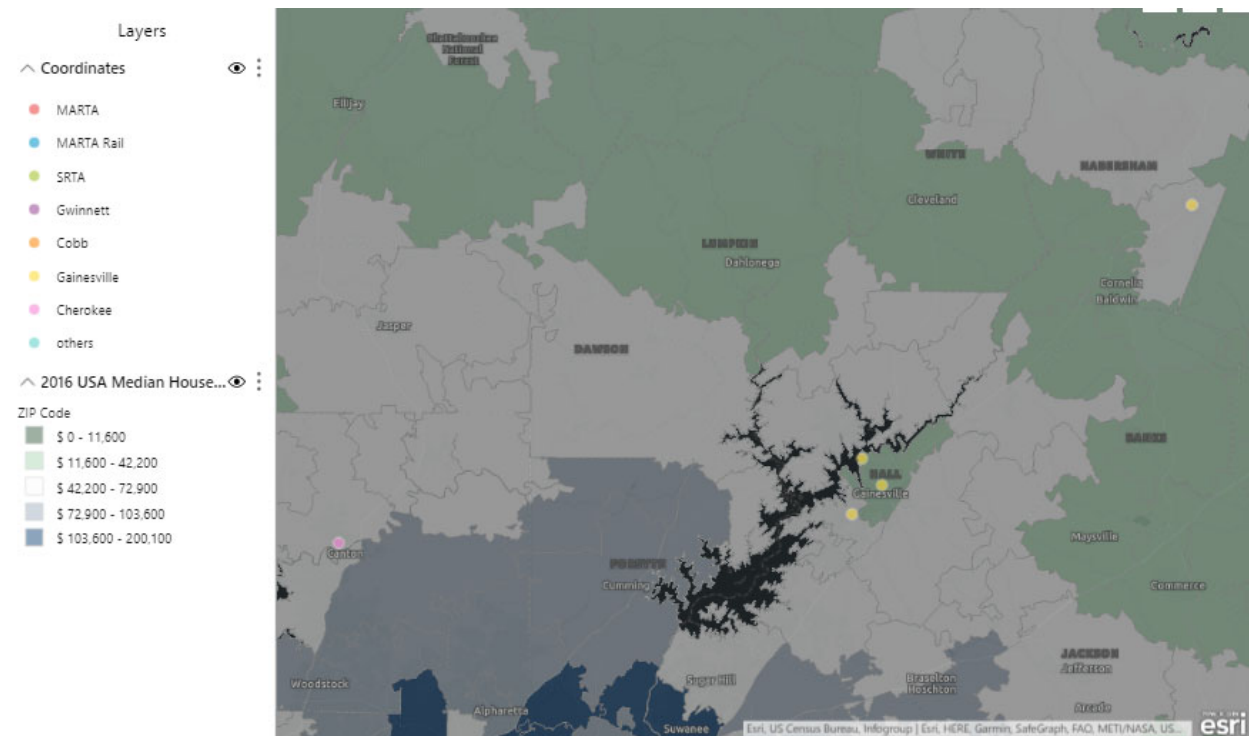

Figure 19: Home Location of Respondents Who Were Recruited on Cherokee and Gainesville Transit with 2016 Median Household Income Layer

Maps of Activity Types

Figure 20: Location of Transit Change Travel Mode/Transfer (Coordinates fixed to three decimals – Sized Based on Count)
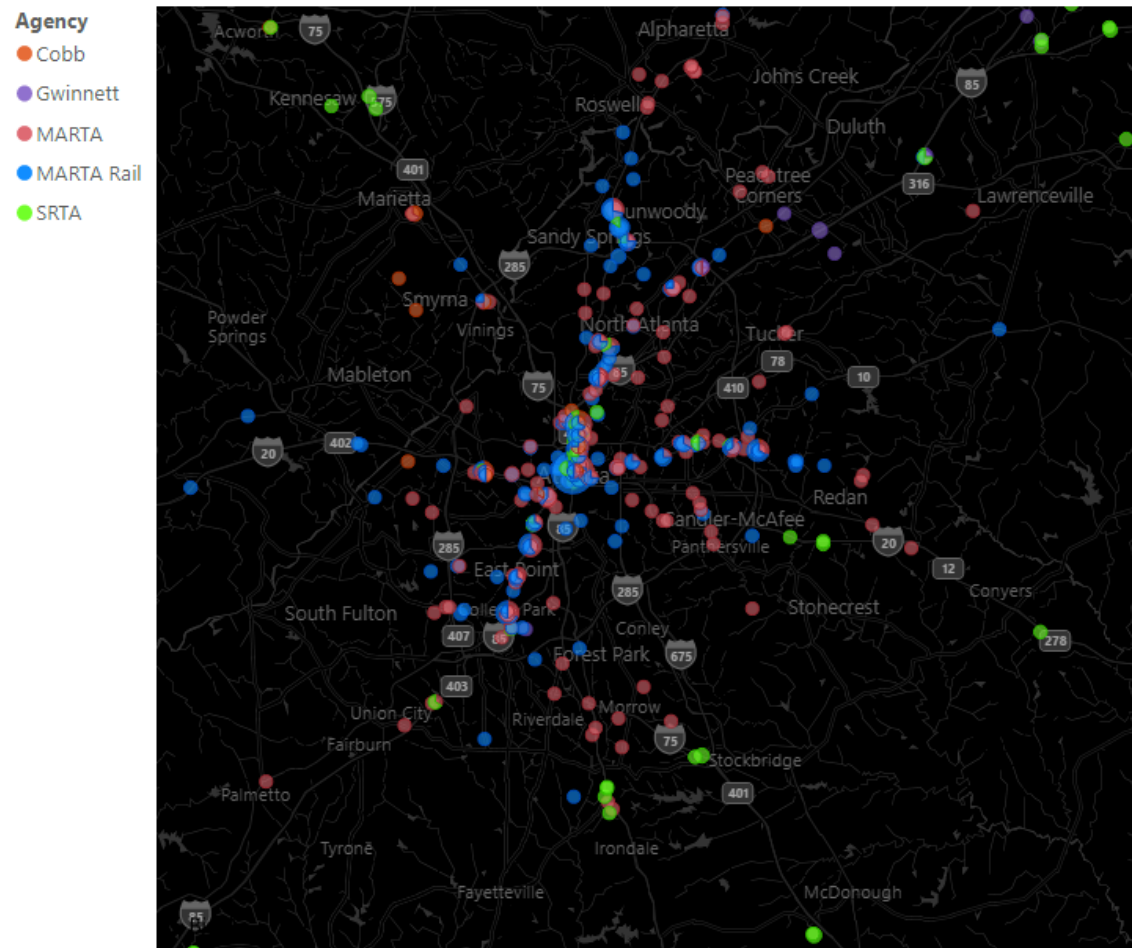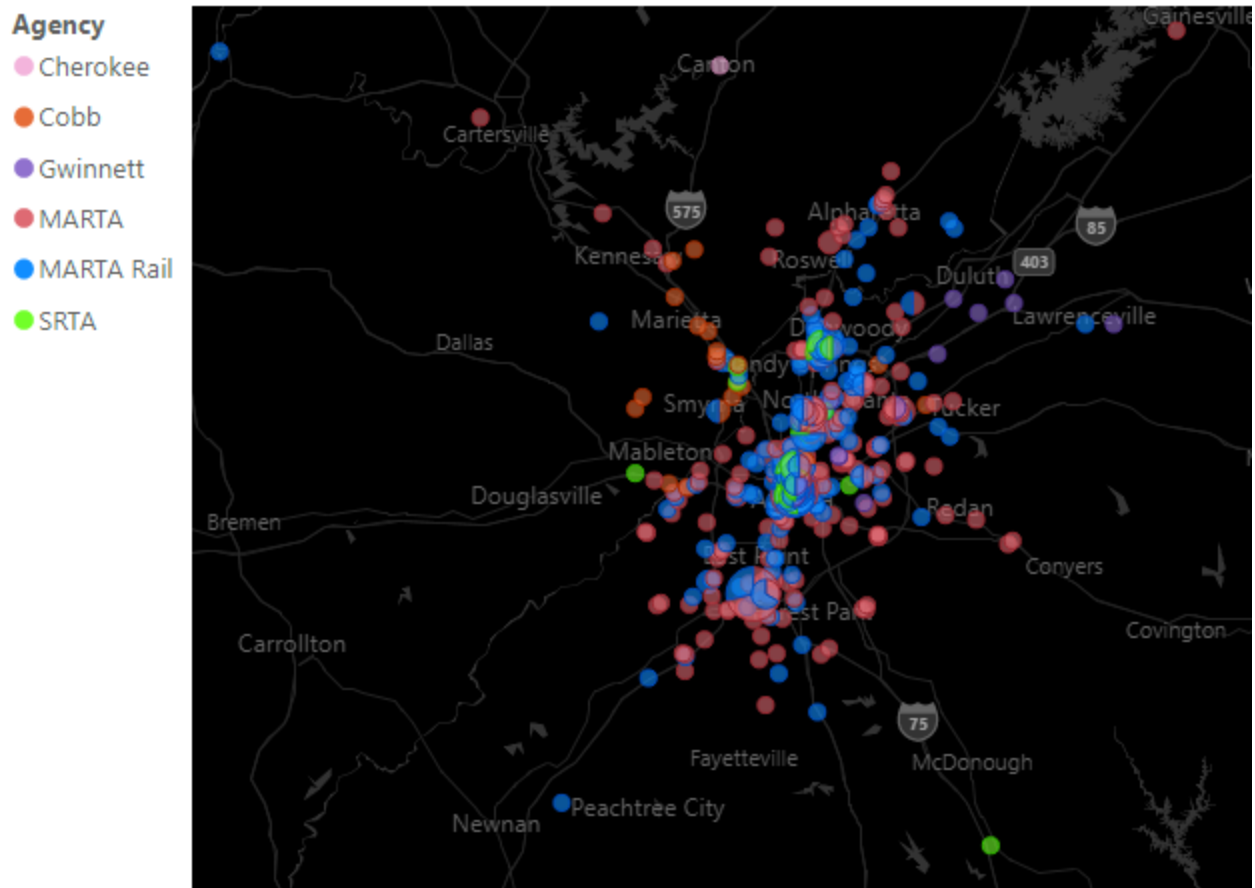
Figure 21: "Work/Doing my Job" Locations (Coordinates fixed to three decimals – Sized Based on Count)

The figure on the following page is based on the map from above. It has been zoomed in to areas of higher concentration of stops to better display stop locations.

Figure 22: "Work/Doing my Job" locations for Downtown Atlanta (Coordinates fixed to three decimals – Sized Based on Count)

Figure 23: Routine Shopping Stops (Coordinates fixed to three decimals – Sized Based on Count)