Evaluation of Effects of Real Time-Multi-Modal Transportation Information Displays

Final Report

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Executive Summary
This study used an experiment in Seattle, Washington, to test whether the installation of a public real-time transportation information display screen in an office building lobby caused changes in building occupants’ awareness, attitudes, satisfaction, and usage of alternative transportation modes including transit, car-sharing, transportation network companies (TNCs, e.g. Uber and Lyft), and bike-sharing services. Occupants of the test building, and two other nearby office buildings, were surveyed on their travel behavior and perceptions shortly before the installation in June, 2015, and again in December, 2015, after the test building had hosted the real-time information screen for six months.

Key Findings
We found little evidence that the real-time multi-modal display screen changed the travel choices, satisfaction, familiarity, or attitudes toward alternative travel modes of survey respondents at the test site over the six-month study period. In the building that received the real-time display screen, most respondents (70%) were aware of the screen’s presence, and attitudes toward it were generally positive. Nevertheless, two-thirds of this group never used the display despite being aware of it. Even in the absence of the display screen, respondents reported very high levels of familiarity with public transportation, and majorities were satisfied with public transportation and felt that sufficient information was available about public transport. The median respondent used mobile apps on a daily basis to obtain real-time transportation information. Open-ended comments suggested that respondents at this site have adequate alternative sources of information about public transportation available to them, particularly OneBusAway.

Motivation for Research
A real-time transportation information system is a travel demand management tool that presents current and potential users of alternative transportation services with dynamic, timely, and accurate information. Such a system typically includes arrival times, service availability updates, and/or service change notifications, information that facilitates more efficient travel decision making and allows travelers to adapt their plans based on current conditions. Prior research has shown that real-time information delivered at transit stops and through smartphone apps can increase traveler satisfaction and enhance sustainability by encouraging travelers to use alternatives to driving alone. Therefore, the purpose of this study was to test whether travelers’ attitudes, satisfaction, or choices were affected by a real-time information display in a public location other than a transit stop.

Research Location & Transportation Services Access
We conducted this experiment in three buildings located in the 11-acre area of downtown Seattle known as the Metropolitan Tract. Managed by a single property management company, all three buildings are within 400 to 600 feet of one another, with similar access to transportation infrastructure and resources. Within a quarter mile from the buildings studied in this experiment, there are 167 different transit routes. In the half-mile circular area around the three buildings, there is access to ferry, water taxi, and the South Lake Union streetcar. Due to the central location, excellent bike lanes, and convenient public transportation services, Walk Score has rated the area a walk score of 99, a transit score of 100, and a bike score of 64 to 74.

The plethora of viable alternatives to driving alone have led to high usage of alternative modes in downtown Seattle. According to the latest commuter survey (Commute Seattle 2015) among downtown Seattle’s estimated 228,000 employees, 31% of commuters drove alone to work, down from 35% in 2010
and 34% in 2012. Public transit was the most popular choice for downtown commuters (45%), followed by driving alone (31%), ridesharing (9%), walking (7%), teleworking (4%) and bicycling (3%).

**Data Collection**

We surveyed occupants of the three office buildings in May-June 2015. We recruited subjects via emails sent by property managers to tenant companies, who forwarded the emails on to individual occupants. As an incentive to complete the survey, subjects were entered in a drawing to receive one of two iPads valued at $499 each. Out of a total of 2,575 occupants in the three buildings, 808 clicked through to the survey, and 550 (21%) submitted usable responses. In the post-test survey, we again offered respondents the chance to win an iPad. 709 of 2,579 occupants viewed the post-test survey, and 455 (18%) submitted valid responses. These numbers exceeded our target sample size of 200-400. We also identified 137 respondents (5%) who completed both waves of the survey, and analyzed them separately.

The research team developed the survey instrument specifically for this project, to elicit data on four measures of interest: (1) familiarity with, (2) attitudes toward, (3) satisfaction with, and (4) usage of alternative travel modes. Survey items included a question about commute mode to and from work for the past five days, and asked respondents to complete a one-day, detailed travel diary. The average time to complete the survey was 20 minutes.

**Experimental Intervention**

A real-time multimodal transportation display screen provided by TransitScreen was installed in one of the three office buildings (Building A) on June 15, 2015. The screen displayed information on waiting times for nearby transit routes and the availability of nearby bike-share bikes, car2go shared cars, and wait times for Uber vehicles. Transit routes featured on the screen were prioritized for their ability to serve the commute needs of building occupants, based on respondents’ home locations. Occupants of Building A served as the treatment group, as they were exposed to the real-time information display as they entered and exited the building. Occupants of the other two buildings were a control group.

**Analysis**

We assessed the causal effects of the real-time information display on travel behavior, satisfaction, attitudes, and awareness of alternative modes by comparing the changes over time in the treatment group against the changes over time in the control group, using a difference-in-difference analysis. We used mixed-effect logistic regression to model the effect of the real-time display on commute mode choices, a gamma hurdle model for the effect on daily driving distance, and ordered logistic regression to model its effects on attitudinal questions pertaining to familiarity, satisfaction, convenience, etc. We conducted most of our statistical analyses on two sets of data: first, treating the full pre-test and post-test groups as independent cross-sections; and second, analyzing the 137 respondents who completed both survey waves as a panel data set.

**Conclusions and Recommendations**

We found no evidence that the installation of the real-time information display affected the familiarity, awareness, attitudes, or use of alternative transportation modes among respondents at our test site. Based on the quantitative data collected in the survey as well as open-ended comments from respondents, we offer the following recommendations for future installations of public real-time information displays:

- **Target gaps in awareness and use.** Future investments in public information displays may be more effective if they target locations with lower usage, satisfaction, and/or awareness of alternative transportation modes. Even in the absence of the real-time information display,
respondents in this study were very familiar with alternative modes, especially transit, and many reported using transit on a regular basis. A real-time information display might be more effective at shifting attitudes and behaviors if it were installed in a location with more room to increase awareness and use of alternative modes.

• **Target gaps in information.** Many respondents in this study felt that adequate information about transit was already available from other sources. In particular, many respondents mentioned their reliance on the OneBusAway smartphone app for obtaining real-time transit information. A real-time information display may have more to offer in locations where real-time information is not available via smartphone apps, where smartphone adoption is low, or in areas with poor mobile data service.

• **Consider usability in installation.** Several respondents noted the physical location of the real-time display in this study was inconvenient, located out of the way and close to a security guard’s desk. Future installations should strive to locate the screen where it is easy and comfortable for travelers to view.

• **Consider marketing / public information at launch.** Some respondents’ comments revealed a lack of understanding of the screen’s purpose and the information it contained, indicating that they believed the screen contained schedule information, not real-time information. Future installations might be more successful if the installation were accompanied by a modest marketing or public information campaign to ensure that potential users understand that the screen is displaying real-time information.
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1 Introduction

Enhancing the competitiveness of alternative transportation modes is imperative to combating automobile dependency and increasing transportation sustainability. Decades of industrialization and suburbanization in many countries have entrenched the private automobile as the primary mode of transportation, leading to high levels of traffic congestion, energy consumption, and local and global air pollution (Davis and Hale 2007). Alternative transportation services such as public transit, shared-use vehicle programs and transportation network companies (TNCs) provide mobility with higher sustainability and less environmental impact (Poudenx 2008). However, automobile use continues to predominate due to autos’ convenience, flexibility, and availability. In order to boost ridership of alternatives, a service provider may try to expand its service area, improve its service quality by upgrading the vehicle configuration, enlarge system capacity, and enhance on-time performance. As such efforts often involve substantial costs, alternative transportation providers have shown an increasing interest in more economical approaches to delivering attractive services. Thanks to recent progress in information and computing technology, a new strategy for alternative transportation modes to compete with the automobile emerged through the development of real-time transportation information systems (Lyons and Urry 2005).

A real-time transportation information system is a travel demand management tool that presents current and potential travelers with dynamic, timely, and accurate information on alternative transportation services, typically including vehicle arrival times, service availability updates, and service change notifications. Real-time transportation information facilitates more informed travel decision making, allowing travelers to adapt their trip plans based on current conditions, which offers considerable benefits (Schrank, Lomax, and Eisele 2011). Real-time information reduces the uncertainty of accessing transportation services, so that travelers reduce their time wasted on waiting and the productivity lost to missed, delayed or unavailable transportation service (Swanson, Ampt, and Jones 1997). For environmentalists, car-free residents, and disadvantaged populations who do not have access to private vehicles, real-time information improves the service quality of the modes on which they depend, increasing the accessibility of employment, education, and other opportunities. Governments anticipate that real-time information systems may enhance regional sustainability, by encouraging automobile travelers shift to alternative transportation modes. Increasingly, the provision of real-time information is seen as essential to attracting passengers, increasing revenues, and projecting the image of a state of the art transportation system (K. Dziekan 2004; Lyons and Harman 2002).

Based on the hypothesized economic, social, and environmental benefits to multiple stakeholders, many jurisdictions have invested in real-time transportation information systems (Cham et al. 2006). However, little knowledge has been confirmed regarding the effectiveness of deploying these systems. Unlike the relations between traveler information systems and driving behavior that have formed a large transportation research body (Lappin and Bottom 2001), travelers’ responses to real-time transportation information of alternative modes have received limited attention from researchers. A detailed review of the research literature on real-time transportation information systems is provided in Appendix A. Despite several studies examining ridership effects of real-time information among transit riders, few have confidently addressed the causal effect of real-time transportation information displays on the choices of general travelers.

In the present study, our University of Washington research team investigated how real-time transportation information affected travel behaviors and perceptions regarding multiple transportation modes, using an experiment in downtown Seattle. Real-time multimodal transportation information
display screens, provided by the company TransitScreen, were installed in a downtown office building. Occupants of this office building, and two other nearby office buildings, were surveyed on their travel behavior and perceptions immediately before the installation, and approximately six months afterwards.

2 Hypotheses
Although transportation mode choices are mostly determined by regional geography, economic and population attributes, and transportation system characteristics, real-time traveler information may help shift mode choices towards alternative transportation services (Taylor et al. 2009). This could happen when real-time information systems provide sufficient resources for travel decision making that travelers become aware of attractive trip options by alternative modes. Satisfaction, reliability, ease of use, and preference are among the most common measures in travel behavior intention studies. Occurring at the critical pre-process phase of service delivery, these perceptual indicators carry much weight for customers making future travel decisions (Dubé, Schmitt, and Leclerc 1991).

Based on findings in the current literature (see Appendix A), we are testing following hypotheses about the effects on travelers’ perceptual and behavioral responses from a real-time information display of alternative transportation modes.

1. Individuals exposed to the real-time information display are more likely to agree that sufficient resources exist for transportation information.
2. Individuals exposed to the real-time information display report higher levels of awareness of non-automobile transportation services.
3. Individuals exposed to the real-time information display report higher levels of satisfaction with transportation services targeted by the information systems.
4. Individuals exposed to the real-time information display report more favorable attitudes toward the modes served by the information display.
5. Individuals exposed to the real-time information display are more likely to choose alternative travel modes for their commutes in particular, and for travel in general.

3 Experimental design
We conducted a behavioral experiment to test the hypotheses that using real-time transportation information affect travel behavior and perceptions. The experiment was based on a pretest-posttest research design and was analyzed using a difference-in-difference analysis (Card and Krueger 1993). First, we divided the occupants of three office buildings into a treatment group (one building) and a control group (the other two buildings) (Haas and Kraft 1984). Both groups participated in a web-based survey which measured travel behaviors, perceptions, and selected background variables. This pretest survey was completed between late May and early June, 2015. A real-time information display screen was installed in the treatment group building on June 15, and a post-test survey was conducted in December, 2015.

3.1 Treatment and Control Sites
The experiment was conducted in downtown Seattle, Washington. Seattle’s public transportation system is among the best in the U.S., due to its frequent service and extensive network. The area is served by several providers including King County Metro, Sound Transit, and Washington State Ferries. Transit routes of bus, light rail, commuter rail, monorail, streetcar, water taxi and ferry, all connect downtown Seattle with other areas in the city and the region.
Pedestrian and bicycle facilities in downtown Seattle and adjacent areas have been greatly improved in recent years under the Pedestrian and Bicycle Master Plan. Despite the steep hills towards the waterfront, separated and protected bike lanes were added onto many streets in downtown Seattle. Neighborhood greenways and multi-use trails that prioritize non-motorized transportation connect the city core to other sections of the city.

Several new transportation services recently have been introduced to the Seattle area, including a bike-share program named Pronto, transportation network companies including Uber and Lyft, and car-sharing services (car2go). The downtown area is better served with these new transportation services than other neighborhoods in the city due to concentrated stations and shorter waiting times.

The wide availability and use of alternative transportation services in downtown Seattle and the Puget Sound region generally show that this is a viable market for these modes. In contrast, an underdeveloped multimodal transportation system could render alternative modes unattractive, even with improvements in information, and would not represent a good environment for testing the effects of a real-time transportation information display. According to the latest commuter survey (Commute Seattle 2015) among downtown Seattle’s estimated 228,000 employees, 31% of commuters drove alone to work, down from 35% in 2010 and 34% in 2012. Public transit was the most popular choice for downtown commuters (45%), followed by driving alone (31%), ridesharing (9%), walking (7%), teleworking (4%) and bicycling (3%). Clearly, the existing transportation system in downtown Seattle provides viable alternatives to driving alone.

Figure 1(a) shows the linkages between modes for multimodal commutes in the Puget Sound region, based on the 2014 Puget Sound Regional travel survey. The set of rectangles on the left-hand side represents the transportation modes commuters used when leaving their homes, with the height of the rectangle indicating the proportion of people using that mode. The connecting bands indicate how many people switched from that mode to each of the modes indicated in the second set of rectangles, or continued all the way to work (the rectangle on the far right). The diagram shows that a large portion, around 65%, drove or carpooled to work, and for most of these people the car is their only mode. However, a few drive before transferring to the bus or other modes. To make it easier to see the flows of the multi-modal commuters, Figure 1(b) omits the people who drive or carpool directly to work. The next most popular commute modes are bus and walk. Most people who use the bus as their first mode end up taking it all the way to work, but a significant number of people drive or walk for their first leg before continuing by bus. Most bicycle commuters go from home to work on a bike, and very few use a bike before or after another mode. Overall, 90% percent of the commuters used just one mode to travel to work while the other 10% use a combination of modes. Less than 5% of switched modes three times or more during their trip to work.

Downtown Seattle is home to numerous high-rise buildings, accommodating a mix of commuters who differ from each other in home location, income, and household characteristics. Thus using office buildings as sites for the experiment should mitigate the sampling bias resulting from recruiting only travelers with certain travel patterns. Initially, building managers were contacted through professional networks and informed of the experiment, leading to further engagement with two companies managing a total of five buildings. Ultimately, three buildings managed by a single property management company were confirmed to join the experiment, where managers were willing to facilitate disseminating survey instruments to building occupants and permitting installation of the real-time information screen. Located in the 11-acre area of downtown Seattle known as the Metropolitan Tract, all three buildings are within the 11-acre area of downtown Seattle known as the Metropolitan Tract, all three buildings are within
400 to 600 feet (120-180 m) of one another. Thus the transportation infrastructure and resources for occupants in these three buildings are quite similar to one another. The three participating buildings are no more than two blocks away from the University Street Station, a bus and light rail station in the underground Downtown Seattle Transit Tunnel. Within a quarter mile from the buildings, there are 167 different transit routes including those run on the surface level. In the half-mile circular areas centered on the three buildings, there are terminals for ferries, water taxis, and the South Lake Union streetcar. Due to the central location, excellent bike lanes, and convenient public transportation services, Walk Score rated the area a walk score of 99, a transit score of 100, and a bike score of 64 to 74, indicating a walker’s and rider’s paradise and a very bike-able environment (Walk Score 2015). All three buildings have electric-vehicle charging systems on site. They also provide secured bicycle storage and shower facilities to meet the needs of cyclists.

![Figure 1: Linkages of multi-modal commutes in Puget Sound region.](image)
These three buildings were also similar in that they are all tall-rise buildings with 20 or more floors, hosting hundreds of employees. Details of the building configurations are listed in Table A1. Out of the three participating buildings, hereafter referred as Building A, Building B, and Building C, Building A was assigned to the treatment group and the other two to the control group based on the number of occupants in each building, so that both groups have comparable population sizes of individual travelers.

3.2 Difference-in-Difference Research Design

This study used a difference-in-difference quasi-experimental design to control for time-varying factors and obtain valid estimates of the causal effects of introducing a real-time information display. In an experiment involving habitual behaviors such as travel, treatment effects often take time to materialize. Thus, we waited approximately six months after the installation of the display before conducting the posttest survey. However, simply comparing the responses before and after the intervention does not provide a credible estimate of the causal effects. This is because over the six month waiting period, many other factors (weather, gasoline prices, service quality, etc.) could also change, meaning that individuals’ responses might have changed even if the screen had never been installed. In such cases, a research design involving a control group can help.

The basic intuition of the difference-in-difference design is simple (Card and Krueger 1993). We have two groups (treatment and control) and two time periods (before and after treatment), and we are interested in some outcome. We measure the difference in outcomes for the control group before and after the treatment, and the difference in the treatment group before and after treatment. We then assume that whatever difference we observed in the control group, is what we would have observed in the treatment group, if the latter had not received the treatment. When we make this assumption, then we can conclude that the causal effect of the treatment is the difference between the two differences calculated previously: the “difference in differences.”

<table>
<thead>
<tr>
<th></th>
<th>Control</th>
<th>Treatment</th>
<th>Difference</th>
<th>Treatment Effect</th>
</tr>
</thead>
<tbody>
<tr>
<td>Before</td>
<td>$C_0$</td>
<td>$T_0$</td>
<td>$D_1 = T_0 - C_0$</td>
<td>$D_2 - D_1 = (T_1 - C_1) - (T_0 - C_0)$</td>
</tr>
<tr>
<td>After</td>
<td>$C_1$</td>
<td>$T_1$</td>
<td>$D_2 = T_1 - C_1$</td>
<td></td>
</tr>
</tbody>
</table>

Figure 2 illustrates the relationships between these values graphically.
We develop the difference in difference estimator more formally here. To represent the group assignment and time period, two dummy variables are created:

\[
g_i = \begin{cases} 
0, & \text{if } i \text{ is in the control group} \\
1, & \text{if } i \text{ is in the experimental group}
\end{cases}
\]

\[
t_i = \begin{cases} 
0, & \text{if the observation is in the pretest survey} \\
1, & \text{if the observation is in the posttest survey}
\end{cases}
\]

For continuous outcome variables such as vehicle miles traveled, the following ordinary-least-squares regression model is considered:

\[
y_i = \alpha + \beta_1 g_i + \beta_2 t + \beta_3 g_i t + \epsilon_i
\]

In the above equation, \(\epsilon_i\) is a random disturbance term that is assumed to be independent of the explanatory variables. In the pre-test survey \((t = 0)\), no treatment takes effect. The expected value of the dependent variable among the control group \((g_i = 0)\) is

\[
E[y|g = 0, t = 0] = \alpha
\]

while the expected value in the treatment group \((g_i = 1)\) is

\[
E[y|g = 1, t = 0] = \alpha + \beta_1
\]

Thus \(\beta_1\) represents the baseline difference between the two groups. In the post-test survey \((t = 1)\), the treatment is applied only to the treatment group. The expected value of the outcome among the control group \((g_i = 0)\) is

---

*Figure 2. Difference-in-difference estimator. \(\beta_1\) is the estimate of the average treatment effect.*
while among the treatment group \((g_1 = 1)\) it is

\[
E[y|g = 1, t = 1] = \alpha + \beta_2 + \beta_3
\]

Thus \(\beta_2\) denotes the change over time in the control group, and which is assumed to represent that change that would have occurred in the treatment group, if it had not received the treatment. The coefficient \(\beta_3\) captures the additional change in the treatment group, beyond any initial differences with the control group and the change over time within the control group. Thus, \(\beta_3\) is our estimate of the causal effect of the treatment on the outcome.

Similarly, for categorical outcome variables such as commute mode choice, a logistic regression model is built with group and time period indicators. The net mode shift effects of real-time information service can be estimated from the first-order differences between the two groups over the two waves of survey.

\[
\ln \frac{P(y_i = m)}{P(y_i = n)} = \alpha + \beta_1 g_i + \beta_2 t + \beta_3 g_i t + \epsilon_i
\]

Again, \(\beta_3\) represents the treatment effect. \(\beta_3 > 0\) means the real-time information services are positively promoting mode \(m\) over mode \(n\). \(\beta_3 = 0\) indicates there is no mode shift effects observed in the sample. \(\beta_3 < 0\) suggests the real-time information services are discouraging mode \(m\) relative to mode \(n\).

### 3.3 Treatment

The treatment in this study was the installation of a real-time multimodal transportation information display in the lobby of the office building where subjects in the treatment group work. Specifically, the treatment was provided to travelers through a display system called TransitScreen, installed in the lobby of Building A on June 15, 2015.

TransitScreen has existed as a real-time information service of alternative transportation choices for the public since 2010. By establishing data feed sharing agreements with local governments, transit agencies, vehicle rental programs and transportation network companies, TransitScreen has been expanding its presence in major metropolitan areas throughout North America.

Unlike most other real-time transportation information systems that exclusively focus on transit services, TransitScreen incorporates real-time information for particular locations regarding time countdown of upcoming transit fleet, quantity and location of available shared-use vehicles, and estimated arrival time of TNC vehicles. TransitScreen provides such information typically via public display screens installed at indoor areas with high visibility and people flow. Although there are significant costs for device purchase and ongoing maintenance, an advantages of public display screens is that they are equally accessible to people of all ages and income levels, and do not require a smartphone to access data.

None of the three buildings was equipped with a real-time transportation information before the study. In order to control the exposure to such additional real-time transportation information, a TransitScreen public display was installed and kept in operation during the study period (June – December, 2015) in Building A, the work location of the travelers in the treatment group. The installation location was selected at the wall near the major entrance, information desk and elevators in the ground-floor lobby of Building A.
Building A, so that most people would easily see the display upon entering and exiting, and drivers who need to use the garage elevator would also be exposed to the information. No displays were installed at Building B or C. We assume that people who work at Building B and C will not go to Building A just to use the public display.

The public display shows a rolling list of arrival times of transit routes at certain stations and stops. During the interface design stage, public transportation resources in the adjacent area to Building A were studied to prioritize certain transit stations and routes on the screen. Stations and stops were selected based on their distances to Building A. A walking time of 10 minutes was used to truncate any stops and stations located farther than such distance from Building A. In the pretest survey, respondents reported their home ZIP codes, which were used to identify the most direct transit routes for commuting between home and work. Transit routes that more travelers were expected to ride were promoted on the screen. In addition, the public display indicates the number of bicycles available at three Pronto bike-share stations in the vicinity, the distance to the nearest car-share vehicle provided by car2go, and the estimated wait times for TNC vehicles operating on Uber’s platform. The content and design of the screen was updated in the initial few weeks after installation, based on feedback from the building’s property managers and Seattle Department of Transportation. A snapshot of the final version of the public display is illustrated in Figure 3.
3.4 Survey Design
The survey instrument was developed by the research team specifically for this project, and was designed to elicit data pertaining to four measures of interest:

- Familiarity with alternative travel modes
- Attitudes toward alternative travel modes
• Satisfaction with alternative travel modes
• Usage of alternative travel modes

A copy of the full survey instrument is included as Appendix B to this report.

Survey items related to alternative mode usage include a question about commute mode to and from work for the past five days, and a one-day travel diary. In addition to driving alone, carpooling, and transit, commute mode choices included many of the new transportation services (car-share, TNC, etc.), because these services are included on the real-time information display. Since the real-time information display was installed in the treatment group’s workplace, we hypothesize that any changes in mode choice are most likely to occur on commute trips. Nevertheless, it is also possible that by increasing awareness of alternative modes, the display screens could lead to increased use of alternative services for non-commute trips. The one-day travel diary asked respondents to report the origin, the destination, and the primary mode of transportation for all trips they made the day before they took the survey. These records allowed us to measure trip frequencies, trip lengths, and vehicle use intensities across all trips.

In perceptual questions, participants rated their awareness, satisfactions, and attitudes towards multiple travel modes and transportation services on a 0 to 10 scale. These questions acquired subjective measures of eight indicators:

• Familiarity with various modes
• Importance of those modes for the respondent’s daily travel
• Overall satisfaction with each mode
• Convenience of modes
• Reliability of modes
• Sufficiency of information available about modes
• Support for increasing availability of specific modes
• Preferences for using specific modes

In addition to the questions measuring travel behaviors and perceptions, the survey instrument also collected background data on commuter benefits offered by the respondent’s employer, and personal and household characteristics. Commuter benefits covered in the survey included:

• Adjustable work schedules
• Compressed work week
• Private shuttle services
• Subsidies for parking, transit use, TNC services1, car-share services, or bike-share services.

Socioeconomic characteristics that were assessed included:

• Age
• Gender
• Household size
• Income
• Vehicle ownership
• Possession of a driver’s license

---

1 In the survey instrument, we referred to TNCs as “Hired car service (e.g. Uber, Lyft…)” because we believe this terminology is more meaningful to most respondents. As this report targets an audience of transportation professionals, we use the jargon “TNC.”
Due to the existence of other real-time transportation information services prior to the experiment, participants in both the control group and the treatment group may have had additional ways to receive real-time transportation information during the experiment. In order to control for possible influences from other sources of real-time information, participants were asked about their frequency of accessing real-time transportation information via website, mobile device application, at-stop signage, phone calls, text messages, and social network feeds. These frequencies were rated on an eleven-point scale, from never to more than six times a day.

The survey instruments were tested by students at the University of Washington and reviewed by staff at Seattle Department of Transportation before the survey was administered to the subjects. The post-test survey instrument included the same questions as the pre-test survey. The treatment group, however, received a short series of additional questions in the post-test survey to assess their use and evaluation of the real-time multi-modal transportation information display.

3.5 Survey Administration
Both the treatment and control groups were surveyed twice using web-based surveys. The first survey was conducted between May 20 and June 3, 2015, shortly before the installation of the display screen at the treatment site. The second survey was conducted between December 7 and December 21, 2015, approximately six months after the real-time information display was installed at the treatment site on June 15. Prior studies have suggested that a study period of six months should be sufficient to detect some longer-term responses to the availability of real-time information (Katrin Dziekan and Vermeulen 2006; Brakewood, Barbeau, and Watkins 2014).

On the first day of the pre-test survey period, recruitment emails were forwarded to the organizations with office space in Building A, B and C by respective building managers. Printed notices of the survey were also posted in public areas in these buildings. Accordingly, employees at the three buildings received recruitment emails from their employers and participated in the survey through a hyperlink to the online survey tool embedded in the recruitment emails and posters.

To avoid biasing responses, participants were informed of the research purpose in only general terms, and the online survey tool was titled “Travel behavior and transportation information survey”. The survey began with a consent form and eligibility filters based on age and work location. Only those respondents who agreed on the consent form, stated they were 18 years of age or older, and who identified as working in one of the participating buildings could proceed with the survey. As an incentive to increase the response rate, respondents were entered in a drawing for one of two iPads (either an iPad Air 2 or iPad mini 3, each priced at $499 at the time of the survey). Upon completing all survey questions, participants were given the chance to provide their email addresses for entering the drawing and claiming the prize. The post-test survey recruitment followed similar procedures, except that one iPad was offered as an incentive and paper flyers were not posted in the buildings.

3.6 Sample size determination
The research team conducted a power analysis to determine the target sample sizes. The main driver of the sample size is the need to be able to identify a signal among the noise. Statistical analyses inevitably involve tradeoffs between the risk of a false positive (finding an effect when there isn’t really one) and a false negative (failing to detect a true effect). Common significance tests and p-values relate to the probability of a false positive. Power analysis is useful for assessing the risks of a false negative. The power of a statistical test is the probability of detecting an effect using that test, when there truly is an
effect. We would like power to be as large as possible, and power levels of at least 0.8-0.9 are generally considered desirable.

The research team began by assuming that we would be interested in an effect if it changed one of our outcomes by at least one-third to one-half of a standard deviation. Figure illustrates the relationship between effect size, sample sizes, and power when comparing two groups using a t test. To have a 90% probability of correctly detecting effect of 0.5 standard deviations (power = 0.9), the figure shows that we need approximately 85 individuals in each group. To have a 90% probability of detecting an effect equal to one-third of a standard deviation, we would need approximately 200 individuals per group. Based on this finding, and allowing that some data might be unusable, we conservatively determined that 100 would be the minimum group size, and 200 per group would be preferable.
Figure 4. Sample size determination for comparisons of two equally sized groups

Note: The vertical axis is the required sample size per group.

4 Results

The surveys exceeded the research team’s goals for sample size and response rate. The actual sample sizes for both survey waves are shown in Table A2. Among 2,575 occupants working in the three buildings, 808 (31%) visited the website of the online survey tool during the pre-test period. 567 of these individuals submitted their responses, corresponding to a 70% completion rate. Excluding 17 participants who either disagreed on the consent form, were aged under 18, or worked at none of the three buildings, the sample has 550 valid cases, resulting in a valid response rate of 21%. In the post-test survey, 709 (27%) of 2,579 occupants viewed the survey, and 466 (66%) of these completed the survey. Overall, 455 valid responses were received in the post-test survey, for a valid response rate of 18%. We were able to identify 137 respondents (5%) who completed both waves of the survey. We conducted most of our statistical analyses in two ways: first, treating the full pre-test and post-test groups as independent cross-sections; and second, analyzing the 137 repeat respondents as a panel data set.
4.1 Background Characteristics

Tables A3 and A4 summarize the demographic and socioeconomic characteristics of the treatment and control groups in both waves of the survey. Nearly two thirds of the respondents were female. Most respondents (60%) were aged under 45. Their annual household income were concentrated in the interval between $50,000 and $200,000. 28% of the respondents lived in single-person families, 32% in two-person families, 20% in three-person families, and 18% lived with three or more persons. Most respondents lived without children under age 13 (74%) or under age 18 (68%). An overwhelming majority (97%) of the sample held valid driver’s license, and more than 90% had access to at least one privately owned vehicle. On the contrary, only two-thirds of respondents had a bicycle in their household.

The treatment and control groups were similar on the reported demographic and socioeconomic variables. The control group had more females and was slightly older than the treatment group. Incomes in the treatment group were slightly higher than those in the control group. In general, the characteristics of each group were similar in the pre-test and post-test surveys, although average incomes in the post-test were about $7,000 and $13,000 lower in the control and treatment groups, respectively, than they had been in the pre-test. Average vehicle holdings increased slightly in the control group, and decreased from 2.0 to 1.7 vehicles per household in the treatment group.

In order to control for the potential interfering effects from other sources of real-time information, the survey instrument assessed the frequency of real-time transportation information use via six sources among 11 options: “never”, “every few months”, “monthly”, “every few weeks”, “weekly”, “every few days”, “daily”, “twice a day”, “three times a day”, “four to five times a day”, “six or more times a day”. Table A5 shows the median frequencies of reported use for each source of real-time information. Applications on mobile devices were the most frequently used source of real-time transportation information. The median frequency of application use for real time information among the control group was weekly in the pre-test and daily in the post-test. The median frequency for the treatment group was daily in both the pre-test and post-test.

Table A6 summarizes commuter benefits such as flexibility in work schedule and subsidies for transportation services, which may affect commute patterns. In both survey waves, transit use subsidies and adjustable work schedules were the benefits most commonly used (approximately 65% and 40%) and available (approximately 85% and 50%).

We also collected the respondents’ home locations, by either street address, cross streets, or ZIP code. Based on the locational information, home addresses were geocoded using the Google Maps API, as shown in Figure. Accordingly, commute distances of those who provided home locations were estimated via Google Distance Matrix API. The estimation was conducted by averaging the driving distances from home to work in the morning and from work back home in the afternoon. Similarly, travel times and distances of those who made one or more trips the day prior to the survey were estimated by sending request to Google Distance Matrix API with the origin, destination, and mode of each trip. Since all respondents registered these trip details for a weekday, travel diaries reflected weekday trip characteristics.
Figure shows that respondents in the pre-test survey were living in 77 cities and 6 counties in Washington State, including Island County, King County, Kitsap County, Pierce County, Snohomish
County, and Thurston County. Most of the respondents were living in the Seattle (49%) and King County (81%). The one-way commute trip distances were calculated to be 12 miles on average.

4.2 Effect of Real-time Display on Travel Behavior

Table A7 shows that mode choices to and from work on a weekday had only slight differences, but commute patterns on each weekday was different from another. Roughly 8% did not commute on Monday, a lower percentage did not commute Tuesday through Thursday and 13% did not commute on Friday. Public transportation was the top choice for most commute trips (55% on Monday through Thursday, and 50% on Friday), followed by driving alone (about 21-23%). Although May was “Bike to Work” month, bicycling was the choice of only 2-3% of respondents in May, versus 1-2% in December. Walking was roughly twice as common as cycling, used for 5-7% commute trips. Very few respondents used TNC services, car-share services, bike-share services, taxicab, private shuttle or bus, or other modes for commuting. Between the pre-test survey and the post-test, the percentage of respondents who reported driving alone as their commute mode decreased on all days for the treatment group, and 4 out of 5 days for the control group. The commute mode shares for both groups, before and after the installation of the real-time display, are shown in Figure 6, below.

![Figure 6: Commute mode shares in control and treatment groups, before and after installation of real-time display](image)

We estimated a mixed-effect binary logistic regression model in order to test whether the installation of the screen had a significant effect on commute mode choices. In this model, the dependent variable is whether the traveler chose to drive alone or used some other mode for their commutes. A random intercept term was included to account for correlation in repeated choices made by the same individual, since each individual reported modes used for 10 commute trips. The model produced an estimated regression coefficient of -0.096 for the treatment effect, but this effect was not statistically significant ($p=0.92$).

We repeated the analysis for only the 137 respondents who participated in both waves of the survey, and the results yielded an estimated regression coefficient of 1.88 ($p=0.0005$), indicating that the installation of the real-time display was associated with a significantly higher probability of driving alone. This reflects the reported commute modes shown in the table below: repeat respondents in the control group
showed a 5 percentage point decrease in drive-alone commute trips, while those in the treatment group showed a 0.7 percentage point increase in drive-alone trips.

Table 1: Commute modes reported by 137 respondents who completed both survey waves.

<table>
<thead>
<tr>
<th>Group</th>
<th>Pre-test / Post-test</th>
<th>% Drive Alone</th>
</tr>
</thead>
<tbody>
<tr>
<td>Control</td>
<td>Pre</td>
<td>17.4%</td>
</tr>
<tr>
<td></td>
<td>Post</td>
<td>12.4%</td>
</tr>
<tr>
<td>Treatment</td>
<td>Pre</td>
<td>17.7%</td>
</tr>
<tr>
<td></td>
<td>Post</td>
<td>18.4%</td>
</tr>
</tbody>
</table>

Table A8 summarizes the trip characteristics from the one-day travel diaries and home location information, based on the travel times and distances by each mode as calculated using the Google Maps API. These results include all trips reported by the respondents, not just their commute trips. Average vehicle miles traveled for the respondents decreased slightly in the control group and more substantially in the treatment group, but given the high variability in these measures, more detailed analysis was needed to test if this drop was statistically significant.

The distribution of vehicle kilometers traveled (VKT) calculated from the one-day trip diaries was zero-inflated, meaning that 40% of observations included no vehicle travel on the reported travel day. On days when VKT was positive, it was strongly asymmetrically distributed (Figure 7). Therefore, we estimated a gamma hurdle model in which we first model the probability that vehicle travel is greater than zero on a given day, and conditional on travel being greater than zero, we model VKT as a continuous, gamma-distributed variable. Using this modeling system, we used 10,000 bootstrap simulations to construct 95% confidence intervals for the effect of the installation of the real-time information display. The 95% confidence intervals overlapped zero, meaning that the effect of the real-time display on daily VKT was not different than zero at the 0.05 significance level. This was the case when we used both the full data set and the panel data including only the 137 respondents who responded to both waves of the survey.
4.3 Effect of Real-time Display on Awareness, Attitudes, and Satisfaction

Table A9 summarizes the median ratings of perceptual indicators relating to various travel modes. A minimum score of 0 and a maximum score of 10 apply to all these indicators. Across both groups and both survey waves, respondents were very familiar with the local public transportation systems, moderately familiar with TNC services, and only slightly familiar with car-share and bike-share services. They considered public transportation the most important among all travel options, followed by driving and walking. TNC services, car-share services, and cycling were not considered important by most respondents. In terms of satisfaction, travel by walking received the highest evaluation, followed by public transportation, TNC service, and car-share service. Bicycling, driving, and bike-share service had relatively lower ratings on satisfaction. Regarding service quality factors such as convenience and reliability, TNC service had the highest ratings, even exceeding driving and public transportation. Bike-share service, on the contrary, fell behind in these two ratings. In the following sections, key results are presented for awareness, attitudes, and satisfaction with driving and alternative modes featured on the real-time information display used in this experiment. We also present results of our statistical analyses, which generally do not find evidence that the installation of the real-time information display caused a change in satisfaction, attitudes, or awareness of alternative modes.

4.3.1 Driving

Figures 8, 9, 10 and 11 display graphically the distributions of responses within each group (control and treatment) and time period (pre-test and post-test) for key attitudes toward driving. Figures 8 and 9 do not suggest any effect of the real-time display on stated importance or level of satisfaction with driving.
Figure 10 suggests that the installation may be associated with a slight increase in the desire to own an additional car, but a decrease in people preferring to drive whenever possible.

Figure 8: Stated importance of driving for treatment and control groups before and after screen installation
Figure 9: Stated satisfaction with driving for treatment and control groups before and after screen installation

Figure 10: Desired car ownership for treatment and control groups before and after screen installation
To assess whether the changes in attitudes and satisfaction with driving were significant, we estimated two sets of ordered logistic regression models. Each model used a response to one of the attitudinal questions as its dependent variable. The predictor variables were a treatment group indicator, a post-test indicator, and a post-test – treatment interaction variable. The latter captures the estimated causal effect of the real-time display on the dependent variable in question. We estimated one set of ordered logistic regression models for all respondents, and a set of mixed-effect ordered logistic regression models for the respondents who completed both waves of the survey. In the mixed-effect model, random effects were used to account for the correlation in responses from the same individual in the pre-test and post-test surveys. Estimates of the causal effects, and associated p-values, are summarized in Table 2, below. None of the estimates of treatment effect were statistically significant at conventional levels ($\alpha = 0.05$).

Table 2: Estimated treatment effects and associated p-values for attitudes and satisfaction with driving.

<table>
<thead>
<tr>
<th>Attitude or perception of driving</th>
<th>All respondents</th>
<th></th>
<th>Repeat respondents only</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Est’d. Treatment Effect</td>
<td>Pr(&gt;Chi)</td>
<td>Est’d. Treatment Effect</td>
</tr>
<tr>
<td>Importance</td>
<td>-0.104</td>
<td>0.654</td>
<td>0.100</td>
</tr>
<tr>
<td>Satisfaction</td>
<td>-0.342</td>
<td>0.143</td>
<td>-0.340</td>
</tr>
<tr>
<td>Convenience</td>
<td>-0.126</td>
<td>0.582</td>
<td>0.508</td>
</tr>
<tr>
<td>Reliability</td>
<td>-0.134</td>
<td>0.561</td>
<td>0.504</td>
</tr>
<tr>
<td>Information sufficiency</td>
<td>0.053</td>
<td>0.821</td>
<td>0.157</td>
</tr>
<tr>
<td>Desire for another car</td>
<td>0.334</td>
<td>0.208</td>
<td>0.405</td>
</tr>
<tr>
<td>Prefer to use</td>
<td>-0.298</td>
<td>0.195</td>
<td>-0.185</td>
</tr>
</tbody>
</table>
4.3.2 Public Transportation

Control group and treatment group respondents’ attitudes and satisfaction with public transportation before and after the screen was installed are summarized in Figures 12-16. The data indicate that respondents are very familiar with public transportation, and consider it to be important to their daily travel. A large majority in all groups was satisfied with public transportation in the Seattle area, and less than 20% disagreed with the idea that sufficient information is available about public transportation. A majority agreed that they prefer to ride public transportation whenever possible.

Figure 12: Stated familiarity with public transportation for treatment and control groups before and after screen installation
Figure 2: Stated importance of public transportation for treatment and control groups before and after screen installation

Figure 14: Stated satisfaction with public transportation for treatment and control groups before and after screen installation
Sufficient information is available about using public transportation

I prefer to ride public transportation whenever possible

Figure 15: Views on sufficiency of information about public transportation for treatment and control groups before and after screen installation

Figure 3: Stated preferences for public transportation for treatment and control groups before and after screen installation
We tested for any significant treatment effect of the real-time display screen on satisfaction with and attitudes toward public transportation. Our modeling approach was the same as for driving, outlined in Section 4.3.1. The estimated treatment effects and associated p-values from these analyses are summarized in Table 3. None of the estimated treatment effects were statistically significant at the $\alpha=0.05$ level.

Table 3: Estimated treatment effects and associated p-values for attitudes and satisfaction with public transportation.

<table>
<thead>
<tr>
<th>Attitude or perception of public transportation</th>
<th>All respondents</th>
<th>Repeat respondents only</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Est’d. Treatment Effect</td>
<td>Pr(&gt;Chi)</td>
</tr>
<tr>
<td>Familiarity</td>
<td>0.083</td>
<td>0.722</td>
</tr>
<tr>
<td>Importance</td>
<td>0.041</td>
<td>0.872</td>
</tr>
<tr>
<td>Satisfaction</td>
<td>0.089</td>
<td>0.701</td>
</tr>
<tr>
<td>Convenience</td>
<td>-0.078</td>
<td>0.731</td>
</tr>
<tr>
<td>Reliability</td>
<td>0.055</td>
<td>0.810</td>
</tr>
<tr>
<td>Information sufficiency</td>
<td>0.080</td>
<td>0.729</td>
</tr>
<tr>
<td>Expansion is beneficial</td>
<td>0.271</td>
<td>0.314</td>
</tr>
<tr>
<td>Prefer to use</td>
<td>0.357</td>
<td>0.117</td>
</tr>
</tbody>
</table>

4.3.3 Hired Car Services

One compelling hypothesis in this work was the idea that featuring alternative transportation modes on the real-time information display could increase the treatment group’s familiarity with these modes and shift respondents’ attitudes about the performance of these alternatives. Figures 17-20 summarize the distributions of attitudes toward hired car services (e.g. Uber and Lyft) in the control group and treatment group before and after the display was installed. Uber was one of the services featured on the real-time information display. As shown in Figure 17, about half of respondents were familiar with these services, and it does not appear that their familiarity was increased by the installation of the real-time display. Large majorities considered hired car services to be convenient and reliable (Figures 18 & 19), and these attitudes do not appear to have been affected by the installation of the display. Figure 20 suggests that the real-time display may have slightly increased perceptions that sufficient information was available about hired car services.

Table 4 summarizes the difference-in-difference estimates of the effect of the real-time display on familiarity, satisfaction, and attitudes toward hired car services, for all respondents and for only the subset who answered both waves of the survey. The results suggest that for the respondents who replied to both waves of the survey, the real-time display significantly increased their agreement that they “prefer to use hired car services whenever possible.” However, this result should be viewed in the broader context of the analysis: we are using two methods to analyze the effects of treatment on some 43 measures of satisfaction, familiarity, and attitudes. Using a typical significance level of $\alpha=0.05$, we would expect to find “statistically significant” results about 5% of the time, even if there is in fact no relationship between our dependent variable and our independent variable. Moreover, it seems unlikely that installing a real-time information display would increase respondents’ preference for using hired car services, without also affecting their familiarity or perceptions of convenience, reliability, or availability of sufficient information for the services.
Figure 17: Stated familiarity with hired car services for treatment and control groups before and after screen installation

Figure 18: Perceived convenience of hired car services for treatment and control groups before and after screen installation
Figure 19: Perceived reliability of hired car services for treatment and control groups before and after screen installation

Figure 20: Views on sufficiency of information about hired car services for treatment and control groups before and after screen installation
Table 4: Estimated treatment effects and associated p-values for attitudes and satisfaction with hired car services. Statistically significant ($\alpha = 0.05$) estimates are bolded.

<table>
<thead>
<tr>
<th>Attitude or perception of hired car services</th>
<th>All respondents</th>
<th>Repeat respondents only</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Est'd. Treatment Effect</td>
<td>Pr(&gt;Chi)</td>
</tr>
<tr>
<td>Familiarity</td>
<td>0.052</td>
<td>0.818</td>
</tr>
<tr>
<td>Importance</td>
<td>0.263</td>
<td>0.274</td>
</tr>
<tr>
<td>Satisfaction</td>
<td>0.145</td>
<td>0.635</td>
</tr>
<tr>
<td>Convenience</td>
<td>0.027</td>
<td>0.925</td>
</tr>
<tr>
<td>Reliability</td>
<td>0.001</td>
<td>0.996</td>
</tr>
<tr>
<td>Information sufficiency</td>
<td>0.104</td>
<td>0.703</td>
</tr>
<tr>
<td>Expansion is beneficial</td>
<td>0.342</td>
<td>0.220</td>
</tr>
<tr>
<td>Prefer to use</td>
<td>0.457</td>
<td>0.095</td>
</tr>
</tbody>
</table>

4.3.4 Carsharing

Figures 21-24 summarize respondents’ perceptions of carshare services such as Zipcar and car2go, both of which were featured on the real-time information display. About one quarter of respondents reported being familiar with carshare services, and about 40% felt that carsharing was convenient, reliable, and had sufficient information available. Figure 24 shows a sizeable increase in the proportion of respondents in the treatment group who considered information about carsharing to be sufficient. As shown in Table 5, however, this change was not statistically significant. Table 5 also shows estimated treatment effects and p-values for other attitudes toward carsharing. The results show a statistically significant increase in respondents’ agreement with the statement that expanding carsharing services is beneficial, although as with the apparent increase in respondents’ preferences for using hired car services (discussed in the preceding section) it is unclear why installing a real-time display would affect respondents’ views on the benefits of carsharing, but not affect their familiarity, satisfaction, or perceived convenience, reliability, or importance of carsharing. It is prudent to consider the possibility that this is a false positive.

Table 5: Estimated treatment effects and associated p-values for attitudes and satisfaction with carsharing. Statistically significant ($\alpha = 0.05$) estimates are bolded.

<table>
<thead>
<tr>
<th>Attitude or perception of carsharing</th>
<th>All respondents</th>
<th>Repeat respondents only</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Est’d. Treatment Effect</td>
<td>Pr(&gt;Chi)</td>
</tr>
<tr>
<td>Familiarity</td>
<td>0.049</td>
<td>0.828</td>
</tr>
<tr>
<td>Importance</td>
<td>0.428</td>
<td>0.103</td>
</tr>
<tr>
<td>Satisfaction</td>
<td>0.549</td>
<td>0.168</td>
</tr>
<tr>
<td>Convenience</td>
<td>0.362</td>
<td>0.331</td>
</tr>
<tr>
<td>Reliability</td>
<td>0.717</td>
<td>0.071</td>
</tr>
<tr>
<td>Information sufficiency</td>
<td>0.654</td>
<td>0.055</td>
</tr>
<tr>
<td>Expansion is beneficial</td>
<td>0.696</td>
<td>0.046</td>
</tr>
<tr>
<td>Prefer to use</td>
<td>0.429</td>
<td>0.215</td>
</tr>
</tbody>
</table>
Figure 4: Familiarity with carshare services for treatment and control groups before and after screen installation

Figure 22: Perceived convenience of carshare services for treatment and control groups before and after screen installation
Figure 23: Perceived reliability of carshare services for treatment and control groups before and after screen installation

Figure 24: Views on sufficiency of information about carshare services for treatment and control groups before and after screen installation
4.3.5 Bikesharing

Figures 25-28 summarize respondents’ perceptions of bikesharing. A minority of respondents are familiar with bikesharing, and only 20-30% regard it as convenient and reliable. Figure 28 suggests that the control group’s perception of information availability about bikesharing may have deteriorated slightly between the two survey waves, while the treatment group’s perceptions of the same improved slightly. However, as shown in Table 6, this effect was not statistically significant. The results in Table 6 do show statistically significant correlations between the installation of the real-time display and stronger agreement with the statements that bikesharing expansion is beneficial and that the respondent prefers to use bikesharing. Again, however, it is unclear why this would be the case when outcomes that are more directly related to the treatment – such as familiarity and information sufficiency – are unaffected by the presence of the real-time display.

Table 6: Estimated treatment effects and associated p-values for attitudes and satisfaction with bikesharing. Statistically significant (α = 0.05) estimates are bolded.

<table>
<thead>
<tr>
<th>Attitude or perception of carsharing</th>
<th>All respondents</th>
<th>Repeat respondents only</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Est’d. Treatment Effect</td>
<td>Pr(&gt;Chi)</td>
</tr>
<tr>
<td>Familiarity</td>
<td>0.205</td>
<td>0.384</td>
</tr>
<tr>
<td>Importance</td>
<td>0.173</td>
<td>0.597</td>
</tr>
<tr>
<td>Satisfaction</td>
<td>-0.571</td>
<td>0.250</td>
</tr>
<tr>
<td>Convenience</td>
<td>0.526</td>
<td>0.231</td>
</tr>
<tr>
<td>Reliability</td>
<td>0.153</td>
<td>0.748</td>
</tr>
<tr>
<td>Information sufficiency</td>
<td>0.397</td>
<td>0.300</td>
</tr>
<tr>
<td>Expansion is beneficial</td>
<td>0.752</td>
<td>0.047</td>
</tr>
<tr>
<td>Prefer to use</td>
<td>0.828</td>
<td>0.040</td>
</tr>
</tbody>
</table>
Figure 25: Familiarity with bikeshare services for treatment and control groups before and after screen installation

Figure 26: Perceived convenience of bikeshare services for treatment and control groups before and after screen installation
Figure 27: Perceived reliability of bikeshare services for treatment and control groups before and after screen installation

Figure 28: Views on sufficiency of information about bikeshare services for treatment and control groups before and after screen installation
5 Respondents’ use and evaluation of real-time information display

In the post-test survey of the treatment group, we received 175 valid respondents, of whom 124 (about 70%) knew about the real-time information screen that had been installed in the lobby of their building. Among the 124 who knew about the screen, 84 did not use the information on the screen for their travel decisions and only 9 respondents said they used the screen information daily. (Fig. 29)

![Figure 29: Screen usage frequency among treatment group respondents who knew about the screen](image)

Among the post-test respondents in the treatment group, there were 127 who had commuted using one of the modes featured on the screen at least once in the preceding week. Among these respondents, 88 (about 70%) knew about the screen, 56 did not use the information on it for their travel decision. (Fig. 30)

We asked treatment group respondents who were aware of the screen whether the screen was easy to read and understand, whether it displayed accurate and reliable travel information, whether they were satisfied with it, and whether it met their expectations. As shown in Figure 31, most people think that the screen is easy to understand, reliable, and meets their expectations.

To gain a deeper understanding of people’s perceptions of the screen, we reviewed responses to an open-ended question about the screen and how it might be improved. The full responses are provided in Appendix B, but we note the following themes among the responses:

- Numerous respondents noted that they prefer to use OneBusAway or similar smartphone apps to get the same information as is shown on the screen.
- Several comments implied that the respondent thought the display screen was showing schedule information, not real-time information.
- Several comments noted that the screen did not show route information for their transit routes.
- Several commented on the location of the screen: that it was hard to see, in a corner, or too close to the security guard.
Figure 30: Screen usage frequency among respondents who knew about the screen and commuted by one of the modes featured on the screen.

Figure 31: Perceptions of the real-time display screen among treatment group respondents who were aware of its presence.
6 Conclusions

We find little evidence that installation of a real-time multi-modal display screen in an office building lobby changed the building occupants’ travel choices, satisfaction, familiarity, or attitudes toward non-SOV travel modes over the course of a six-month study period. The installation of the real-time display had a statistically significant association with a few outcome indicators, but the number of these significant results was consistent with the rate of false positives that we would expect when testing at an $\alpha=0.05$ significance level.

In the building that received the real-time display screen, most respondents (70%) were aware of the screen’s presence, and attitudes toward it were generally positive. Nevertheless, two-thirds of this group never used the display despite being aware of it. Even in the absence of the display screen, respondents reported very high levels of familiarity with public transportation, and majorities were satisfied with public transportations and felt that sufficient information was available about public transport. The median respondent used apps on a daily basis to obtain real-time transportation information. Comments in response to an open-ended question about the display suggest that respondents have adequate alternative sources of information about public transportation available to them, particularly OneBusAway.
8 References


### Appendix A: Tables of Summary Statistics

#### Table A1 Building configuration

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<td>Building B</td>
<td>Building C</td>
</tr>
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<td>Puget Sound Plaza</td>
<td>IBM Building</td>
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#### Table A2: Respondent counts and rates

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Table A3: Personal characteristics of treatment and control
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<td>-------------------------</td>
<td>--------------------------</td>
<td>---------------------------</td>
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Table A6. Commuter benefits by groups

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<td>%</td>
<td>%</td>
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<td>Offered but not used</td>
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**Total** | **4.6** | **22.5** | **4.1** | **9.2** | **8.7** |
Table A8  Travel day characteristics by groups

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<tr>
<td>Miles traveled by transit</td>
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<tr>
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<td>Treatment Group Pre-Test</td>
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## Appendix B: Respondents’ detailed comments on real-time display

<table>
<thead>
<tr>
<th>Comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>I like it. Far better to look at this info in the safety of the lobby than in the street where everyone is aware that you don’t know where you’re going.</td>
</tr>
<tr>
<td>The real-time transportation information display is really helpful. I remember one time I forgot my phone at home and it helped me catch public transit and not miss my train/bus.</td>
</tr>
<tr>
<td>I think it’s a good idea to promote public transport but I use an app to get bus scheduling and current bus timing information almost exclusively. Probably due to convenience and habit, I was using OneBusAway long before the transportation information display was available.</td>
</tr>
<tr>
<td>Put it further out in the lobby so you don’t have to go right up to the front desk.</td>
</tr>
<tr>
<td>It’s located in a weird place. I feel like it’s too close to the security guard, like they expect me to talk to them when I want to just stand and read the sign. Also, why would I try to figure that sign out and find my bus stop and number, when I can use the One Bus Away app much faster? Aren’t they displaying the same info?</td>
</tr>
<tr>
<td>The display in our building is hard to see because it is slightly hidden behind the security podium. I would recommend moving it closer to the door in a more free standing location.</td>
</tr>
<tr>
<td>I have tried to look at that thing a few times. It is in a corner and is not always on. Also it would have been nice to get an announcement about its installation and features.</td>
</tr>
<tr>
<td>Seems unnecessary, maybe a strange place to put a display. Would make more sense for these displays to be provided by the city and out on the street near public transit stops, not in office buildings where only a few can benefit.</td>
</tr>
<tr>
<td>Expanded advertising so more people know about the display and its location.</td>
</tr>
<tr>
<td>They don’t have my bus stop at 2nd and Pike so I have no use for it, but it’d be nice to add my stop. I asked about it once, but he didn’t know the answer and didn’t follow up.</td>
</tr>
<tr>
<td>I would probably use it if I took a bus, but I always take light rail.</td>
</tr>
<tr>
<td>It doesn’t have my bus stop on it, so I don’t use it. Also, I can get real time information through an app on my smartphone.</td>
</tr>
<tr>
<td>Doesn’t cover my buses, but they’re not the most important ones.</td>
</tr>
<tr>
<td>If possible one day, have an interactive map showing where the bus stops are for your desired bus route. It could help both visitors and employees find their new routes, emergency routes, etc.</td>
</tr>
<tr>
<td>Handicap parking</td>
</tr>
<tr>
<td>Include traffic alerts</td>
</tr>
</tbody>
</table>
Improve the tracking on the back end. It's really annoying for the times to change from delayed to early all of a sudden and you miss your bus. It's also frustrating when for some reason the bus doesn't transmit real time info and all you get is the green number for when it's SCHEDULED. Most people probably know when it's scheduled already, but the point is to see if it's actually on time or not. That's the root of any issues you guys have really.

Who cares about the aesthetics if the data is unreliable.

I appreciate having it there, but the fact that buses rarely hew exactly to their scheduled arrival times means that I use my OneBusAway app instead of the display.

I only use the One Bus Away app, since I bus daily.

No. I just rarely look at it because I'm always in a hurry to catch the bus. Or I'm not taking the bus.

No, but honestly, I rarely use it...seems to mostly have bus info on it.

I'm not sure how much value it adds. My stop is a few blocks away so I instead rely on the "one bus away" app to determine when to leave the office to catch the bus.

I never use it - possibly because I only ride the bus and I only need to use the 'One Bus Away' app.

I actually forget it’s there. By the time I get to the lobby I’ve already checked my app for bus times.

I don't use this. I have the mobile One Bus Away app that works best for me.

Why would anyone use that board in the lobby when they have the same info in their pocket wherever they go? Seems like a waste of money.

I have never stopped to look at it, but will make a point to go and do so.

After completing this survey, I will be sure to look at the real-time display in the lobby of the Financial Center. I have never had a need to look at it (I walk most places in downtown). Now I am more curious about the display!

I just have never taken the time to look. Assume it is for public transportation users. I pick up my kids on the way home and public transportation and biking not convenient.

Look at it once in a while, but don't really use it.

I haven't looked at it yet

Not at this time...
Appendix C: Literature review

People are very adaptive to environmental conditions of travel (Loukopoulos 2005). Travelers’ response to travel information has received tremendous academic attention since three decades ago. Evidence has been documented that provision of real-time transportation information affects many travel indicators (Tseng, Knockaert, and Verhoef 2013). The research body to date, however, has mainly focused on driving behavior under auto-oriented travel information systems (Lappin and Bottom 2001). Not until recently did more researchers become interested in the association between travel indicators and real-time information regarding alternative modes, most commonly public transit. Previous studies of this relation are categorized into two groups: ones addressing behavioral effects, and other ones targeting perceptual effects.

Behavioral effects of real-time transportation information

Plausibly real-time transportation information availability changes travel behavior, by affecting the relative attractiveness of one travel option over another. Findings on whether such information improvement enhances the patronage to the targeting travel choices are mixed, according to respective project cases, study designs, and data types (Balcombe et al. 2004).

During the 1990s, few information systems were implemented to manage real-time transportation data of alternative modes. Due to the lack of real-world cases, researchers had to rely on traffic simulations to preliminarily assess such systems. With sophisticated modeling techniques, early studies were able to deliver useful insights into how travelers would respond to real-time information (R. G. Mishalani, McCord, and Wirtz 2006). Hickman and Wilson (1995) questioned the traffic efficiency benefits of acquiring information in real time regarding projected vehicle travel time information. They built an analytic framework where stochastic and time-dependent network travel times were to be minimized, and applied it to a corridor at the Massachusetts Bay Transportation Authority. The computer simulation of vehicle movements and boarding behaviors suggested that real-time information significantly changed path assignments, but decreased only very modestly origin-to-destination travel times and the travel time variability. Another simulation of passenger arrivals and bus movements incorporated the consistency of predicted and actual wait time (R. Mishalani, Lee, and McCord 2000). The modeling revealed a varying effect of real-time information on passenger utilities, dependent on the type of data available and other bus operations characteristics. A regret-based numeric simulation with Bayesian updating had conservative estimates regarding the perceived value and mode shift impacts of acquiring transit information (Chorus et al. 2006). In this simulated mode choice context, travelers with access to both options were to select traveling by car or by transit. It demonstrated that travelers would regret little traveling by car even after they acquired real-time information favorable to transit. Given these results for non-habitual car-drivers, this study suggested the effects of real-time transportation information on mode choice would be limited. While findings in the simulation studies implied a modest improvements in travel utilities, travelers in reality may not behave in the simulated pattern.

Later on, empirical evaluations were carried out of real-time transit information systems deployed by transit agencies. Using the stated-preference technique, other research efforts indicated a promising potential of increasing the propensity to use transit if the desired real-time transportation information is provided. M. Abdel-Aty, Kitamura, and Jovanis (1996) customized the procedure to present travel choice sets for commuters in Sacramento and San Jose, northern California. Their stated preference design included preferred information items under realistic travel times. Through computer-aided telephone interviews, they found that 38% of non-transit users would consider riding transit with appropriate information available. The frequency of service and walking time to the transit stop were among the significant information types that commuters desired (M. A. Abdel-Aty 2001). Reed and Levine (1997) reported a conjoint analysis using ratings of hypothetical situations to explore mode preference under different information levels. Real-time schedule information was found to affect day-to-day travel mode choices among 500 randomly-sampled employees on the University of Michigan Medical Campus. The aggregated travel patterns on a month-by-month basis, instead, were not significantly affected. The
disparity called for particular attention to disseminating transportation information with a highly accessible method.

When a number of real-time information systems became available to transit riders, revealed preference studies assessed the associated effects in a realistic context. In a before and after study, the effectiveness of deploying ShuttleTrac on University of Maryland College Park campus was empirically tested (Zhang, Shen, and Clifton 2008). The ShuttleTrac system disseminates real-time bus arrival information via telephone, website, terminals at selected stops, and a large display at an activity center. In order to determine riders’ behavioral and psychological responses to the transit information system, the authors built ordered probit models using the campus transportation survey results. The model estimates indicated insignificant impacts on individuals’ shuttle trip frequency, waiting anxiety and feeling of security at night. On the other hand, rider’s overall level of satisfaction and feelings of security after dark boosted with the ShuttleTrac use. Despite the advantage of panel survey data, this study may suffer from self-selection issues.

More rigorous research endeavor involves the design of experiment. In the 2010s, numerous real-time transportation information systems, especially mobile applications, have been developed to help public transit passengers find routes and vehicle arrival times. An example is the CTA Bus Tracker in the Chicago Transit Authority bus system. In order to investigate its impact on bus ridership, Tang and Thakuriah (2012) analyzed longitudinal data of route-level ridership. The incremental implementation of CTA Bus Tracker on different routes enabled their quasi-experimental design. They estimated linear mixed models which indicated a significant, modest, time-varying increase in monthly average weekday ridership after the provision of Bus Tracker service than before. A similar natural experiment was conducted in New York City where a real-time bus tracking system was gradually launched at each borough. Panel regression models recognized a 1.7% ridership increase on the route level attributable to real-time information provision (Brakewood, Macfarlane, and Watkins 2015). But a controlled behavioral experiment with a random group assignment of sampled bus riders in Tampa, Florida neither found a significant behavioral change (Brakewood, Barbeau, and Watkins 2014). In the study, OneBusAway, a mobile application of transit arrival information, is accessible only to the treatment group. Two waves of web-based surveys were conducted before and after the treatment, containing the same behavior, feeling, and satisfaction items. While providing strong evidence that the access to real-time information significantly improves the passenger experience of waiting for the bus, the analysis found no effects on trip and transfer frequencies.

**Perceptual effects of real-time transportation information**

In addition to behavioral outcomes of real-time transportation information impacts, empirical studies lend mixed findings to its perceptual benefits (Schweiger 2003). To combat reliability issues, transit agencies begun to gradually introduce real-time information signage at stops and stations. Cognitive studies find that such convenience will be translated into substantial improvements regarding perceptions of travel experiences. Although in most real cases real-time transportation information is provided free of charge to passengers, a willingness to pay has been detected (Wardman 2004). Dziekan and Kottenhoff (2007) summarized rider reactions to real-time arrival information via at-stop displays in form of a mind map. Possible perceptual effects have been sorted into seven categories: increase ease-of use perceived wait time, psychological effects, adjusted travel behavior, increase feelings of security, reduce uncertainty, willingness-to-pay, mode choice, customer satisfaction and image.

Real-time information sometimes contributed to customer satisfaction of transportation systems. Smith, Atkins, and Sheldon (1994) evaluated the application of advanced transport telematics, namely the Countdown project, to bus operations in London during the trial. The video monitoring and passenger interviews at bus stops revealed that passengers valued bus arrival information at stops. In addition, the stress related behavior and perceived wait time of transit riders reduced when dynamic real-time passenger information was displayed, although the actual on-time rate of transit arrival decreased. The London Countdown system led to an increased positive attitudes towards bus travel, the bus operator, and
the local public transportation authority. For a ferry system along the Thames in London, real-time information also added to the wider impression of the particular travel option (Cassidy and White 1995).

Awareness of the actual departure time or time remaining until departure of transit removes uncertainty in scheduling. Therefore, travelers would have more flexibility to avoid boarding crowded vehicles, to switch to secondary modes, to change departure time, and to adjust walking speed to reach respective transit stations (Schweiger 2003). A conjoint analysis found that real-time information was expected to reduce the burden of waiting as the degree of certainty increased (Reed 1995). Thus access to real-time information promotes feelings of reliability and convenience (Zito et al. 2011). When customer evaluations were conducted of bus status video monitor programs known as Transit Watch and Transit Tracker in two American cities, Seattle, Washington and Portland, Oregon, respectively, passengers felt less uncertainty and more in control after each implementation. However, no significant changes happened to the overall satisfaction of either local transit system (United States, Joint Program Office for Intelligent Transportation Systems, and Science Applications International Corporation 2003). Although passengers widely recognized the usefulness of receiving real-time information at bus stops, they did not translate the information improvement in this particular manner into better customer satisfaction. Instead, many of the representative samples of transit riders wanted the information via internet websites and at buildings close to transit (Mehndiratta et al. 2000).

The main determinants of desired travel information are time and effort savings at the pre-trip stage (Grotenhuis, Wiegmans, and Rietveld 2007). Several studies have reported that real-time information use affect wait times at transit stations in a positive way. The shortened wait time is associated with reduced disutility, less anxiety, and an increased feeling of personal security during the wait (Forsyth and Silcock 1985). An observational study on the Ohio State University campus in Columbus quantified the relationship between the perceived and actual waiting times experienced by passengers at a bus stop. It was found that passengers usually perceive wait time to be greater than the actual (R. G. Mishalani, McCord, and Wirtz 2006). Thus the ability to determine when the next vehicle is coming would bring travelers’ perception of wait time in line with the true time spent waiting (Katrin Dziekan and Kottenhoff 2007). Dziekan and Vermeulen (2006) used the case of the Tramline 15 in the Hague, the Netherlands. They distributed the same questionnaire to a sample of train riders three times, 1 month before, 3 months after, and 16 months after the introduction of the permanent real-time arrival signage at train stations. Only 32 individuals participated in all three waves of surveys. Despite the small sample size, sample mean tests showed a lasting decrease in perceived wait time by more than 20%, but no changes in security experience, willingness to recommend, or cognitive effort to make a trip. Another intercept survey of bus passengers in the vicinity of the University of Washington campus in Seattle further confirmed that mobile real-time transit information use reduced not only the perceived wait time, but also the actual wait time experienced by customers (Watkins et al. 2011).
Appendix D: Online Survey Instrument
This is a survey about your travel behavior, travel attitudes, evaluation of transportation services, and use of transportation information, being conducted by researchers at the University of Washington. The purpose of the survey is to better understand the travel patterns and travel needs of workers like you.

The survey should take about 15 minutes to complete. All of your responses will remain anonymous.

When you complete this survey, you can choose to enter a drawing for one of two iPads (iPad Air 2 or iPad Mini 3, at a $499 value each). Thank you again for your participation.

Consent Form
Scroll down in the text box below to read the full consent form for participating in the survey.

Project title: Travel Behavior and Transportation Information Survey

RESEARCHERS’ STATEMENT
Researchers:

(1) Don MacKenzie, Assistant Professor, Civil & Environmental Engineering, dwhm@uw.edu, 206-685-7198.
(2) Yanbo Ge, PhD Student, Civil & Environmental Engineering, yanboge@uw.edu, 206-519-9120.

We are asking you to be in a research study. The purpose of this consent form is to give you the information you will need to help you decide whether to be in the study or not. Please read the form carefully. This process is called “informed consent.” You should keep a copy of this form for your records.

You should only complete this form if you understand it in full. If you have any questions about this form, please contact the researchers listed above.

1. PURPOSE OF THE STUDY
This study is intended to identify the causal effect of real time multimodal information display screens on traveler’s mode choice.

2. STUDY PROCEDURES
If you volunteer to participate in this study, we would ask you to do the following things:

(1) Initial Travel Survey
We will ask you questions via an online questionnaire about your household characteristics, home address, your attitude towards different modes of transportation, your satisfaction with different transportation systems, and where and how you traveled in the past week.
(2) Follow-up Survey(s)

After about six months, we plan to follow up and will ask you at that time to complete a follow-up questionnaire similar to the one used for the initial travel survey.

(3) Cessation of Participation

Your participation in this study is voluntary and you can stop participating at any time if you do not wish to answer a question or for any other reason. You may also opt out of individual questions in the questionnaire. However, only when you complete the survey will you be able to enter the prize raffle.

3. BENEFITS OF THE STUDY

(1) Benefits to You

When you complete the survey, you will be entered in a drawing for one of several iPads.

(2) Benefits to Society

By looking into the effect of exposure to display screens on travelers’ awareness of and attitudes towards alternative modes and mode shifting among the travelers, this research will provide information about building occupants’ response to this information tool. In addition, this research will quantify the cost-effectiveness of display screen installations in buildings for shifting travel behaviors.

4. CONFIDENTIALITY OF RESEARCH INFORMATION

Any information that is obtained in connection with this study and that can be identified with you will remain confidential and will be disclosed only with your permission or as required by law. Your name and other information will remain confidential and will be stored on password-protected information systems at all times. No system for protecting confidentiality is completely secure and the information about you could be inadvertently accessed or seen by someone outside the research team.

Governments sometimes review studies such as this one to make sure they are being done safely and legally. If a review of this study takes place, your records may be examined. The reviewers will protect your privacy. The study records will not be used to put you at any legal risk of harm.

The data collected in this study may be made available for use by other researchers. If this happens, none of your identifying information will be shared.

5. RESEARCH-RELATED INJURY

If you think you have a medical problem or illness related to this research, contact Don MacKenzie at 206-794-0189 or dwbm@uw.edu right away. He will refer you for treatment.

SUBJECT’S STATEMENT

I volunteer to take part in this research. If I have questions later about the research, or if I have been harmed by participating in this study, I can contact one of the researchers listed on this consent form. If I have questions about my rights as a research subject, I can call the University of Washington Human Subjects Division at (206) 543-0098.

Please select your choice below.

Clicking on the "I agree" button below indicates that:
(1) you understand the information above
(2) you voluntarily agree to participate, and have not been pressured to do so
(3) you are at least 18 years of age

If you do not wish to participate in the research study, please decline participation by clicking on the "I disagree" button.

THIS IS THE END OF THE CONSENT FORM.

☐ I agree
☐ I disagree
No response

Logic destinations

Don't skip (default)
End of Survey
Don't skip (default)

Click "Next" below to proceed.

Please identify your age group.
Section A. Commute Choices

1. Which of the following commuter benefits does your employer offer and do you use?

Rows
- Flextime (adjustable work schedule)
- Compressed work week
- Free or subsidized parking
- Free or subsidized transit use
- Free or subsidized carpool/vanpool
- Free or subsidized private shuttle
- Discounted carshare membership (e.g. zipcar, car2go…)
- Discounted hired car service (e.g. Uber…)
- Discounted bike share membership (e.g. Pronto!…)

Survey status: 5% completed. Click "Next" below to proceed.
2. Last week, which weekdays did you commute and what mode of transportation did you use TO WORK and BACK HOME?

Select the mode used for the LONGEST DISTANCE if you used more than one mode in a commute trip.
Select "did not commute" for both blanks on the day when you did not work, teleworked, or had overnight business trips.
Select “carpool or vanpool” only if at least one other person age 16 or older was in the vehicle.

Rows

Monday .....(to work)  (back home)
Tuesday .....(to work)
Wednesday (to work)
Wednesday (back home)
Thursday ....(to work)
Thursday ...(back home)
Friday ........(to work)
Friday .......(back home)

- Did not commute--
- 1) Personal vehicle: drove alone
- 2) Personal vehicle: carpool or vanpool
- 3) Public transportation: (e.g. buses, light rail...)
- 4) Personal bicycle
- 5) Walk or wheelchair
- 6) Hired car service (e.g. Uber, Lyft...)
- 7) Carshare service (e.g. zipcar, car2go...)
- 8) Bike share service (e.g. Pronto...)
- 9) Taxicab
- 10) Private shuttle or bus
- 11) Other

Survey status: 15% completed. Click "Next" below to proceed.

Section A. Commute Choices

3. Where is your home located?

Please indicate either the street address or a pair of cross streets.
Include the street label (St, Ave, Pl, ...) and the directional sector if any (E, SW, W, ...).

(1) Street address
   number and street name (e.g. 1303 NE 45th St)

   Or the nearest cross streets:
   street #1 name (e.g. NE 45th St)

   and street #2 name (e.g. Brooklyn Ave NE)

(2) Name of city or town
(3) State or province

- Select one...
- --WA Washington--
- --BC British Columbia--
- --OR Oregon--
- --ID Idaho--
- AL Alabama
- AK Alaska
- AS American Samoa
- AZ Arizona
- AR Arkansas
- CA California
- CO Colorado
- CT Connecticut
- DE Delaware
- DC District of Columbia
- FM Fed. States of Micronesia
- FL Florida
- GA Georgia
- GU Guam
- HI Hawaii
- IL Illinois
- IN Indiana
- IA Iowa
- KS Kansas
- KY Kentucky
- LA Louisiana
- ME Maine
- MH Marshall Islands
- MD Maryland
- MA Massachusetts
- MI Michigan
- MN Minnesota
- MS Mississippi
- MO Missouri
- MT Montana
- NE Nebraska
- NV Nevada
- NH New Hampshire
- NJ New Jersey
- NM New Mexico
- NY New York
- NC North Carolina
- ND North Dakota
- MP Northern Mariana Is.
- OH Ohio
- OK Oklahoma
- PW Palau
- PA Pennsylvania
- PR Puerto Rico
- RI Rhode Island
- SC South Carolina
- SD South Dakota
- TN Tennessee
- TX Texas
- UT Utah
(4) ZIP Code

Survey status: 20% completed. Click "Next" below to proceed.

Section B. Travel Options

1. How familiar are you with the following travel options around the Seattle area?
Please rate on the following 0-10 scale: 0=not familiar at all, 10=extremely familiar.

Rows

- a) Public transportation (e.g. buses, light rail...)
- b) Hired car service (e.g. Uber, Lyft...)
- c) Carshare services (e.g. zipcar, car2go...)
- d) Bike share service (e.g. Pronto...)
  - Not familiar at all... 0
  - 1
  - 2
  - 3
  - 4
  - 5
  - 6
  - 7
  - 8
  - 9
  - Extremely familiar... 10

2. How important are the following travel options for your daily travel?
Please rate on the following 0-10 scale: 0=not important at all, 10=extremely important.

Rows

- a) Driving
b) Bicycling  
c) Walking  
d) Public transportation (e.g. buses, light rail...)  
e) Hired car service (e.g. Uber, Lyft...)  
f) Carshare services (e.g. zipcar, car2go...)  
g) Bike share service (e.g. Pronto...)  
   - Not important at all...... 0  
   - 1  
   - 2  
   - 3  
   - 4  
   - 5  
   - 6  
   - 7  
   - 8  
   - 9  
   - Extremely important 10  

3. Overall, how satisfied are you with the following travel options around the Seattle area?  
Please rate on the following 0-10 scale: 0=extremely dissatisfied, 10=extremely satisfied.  
In case that you have no experience with an option or service, select "N/A".

Rows
<p style="width:300px; height:4px;"> a) Driving </p>
b) Bicycling  
c) Walking  
d) Public transportation (e.g. buses, light rail...)  
e) Hired car service (e.g. Uber, Lyft...)  
f) Carshare services (e.g. zipcar, car2go...)  
g) Bike share service (e.g. Pronto...)  
   - Extremely dissatisfied 0  
   - 1  
   - 2  
   - 3  
   - 4  
   - 5  
   - 6  
   - 7  
   - 8  
   - 9  
   - Extremely satisfied 10  
   - N/A  

Survey status: 30% completed. Click "Next" below to proceed.

Section C. One-day Travel Diary

Did you make any trips yesterday?  
Consider all trips during the 24-hour period from 3AM yesterday to 3AM today, including short ones such as those to get gas, to pick up someone, to get lunch, and to return home.  

- Yes  
- Logic destinations
  - Don't skip (default)
Section C. One-day Travel Diary

a) Origin

1. Where did you start your first trip yesterday?

☐ Home
☐ Financial Center
☐ Puget Sound Plaza
☐ IBM Building
☐ Other, please specify below:

If you selected “Other”, indicate the origin by street address or cross streets. Include the street label (St, Ave, Pl, ...) and the directional sector if any (E, SW, W, ...)

(1) Street address,
number and street name (e.g. 1303 NE 45th St)

Or, the nearest cross streets
street #1 name (e.g. NE 45th St)

and street #2 name (e.g. Brooklyn Ave NE)

(2) Name of city or town

(3) State or province

☐ Select one...
☐ --WA Washington--
☐ --BC British Columbia--
☐ --OR Oregon--
☐ --ID Idaho--
☐ AL Alabama
☐ AK Alaska
☐ AS American Samoa
☐ AZ Arizona
☐ AR Arkansas
☐ CA California
☐ CO Colorado
☐ CT Connecticut
☐ DE Delaware
☐ DC District of Columbia
☐ FM Fed. States of Micronesia
☐ FL Florida
☐ GA Georgia
☐ GU Guam
☐ HI Hawaii
☐ IL Illinois
☐ IN Indiana
☐ IA Iowa
☐ KS Kansas
☐ KY Kentucky
☐ LA Louisiana
☐ ME Maine
☐ MH Marshall Islands
☐ MD Maryland
☐ MA Massachusetts
☐ MI Michigan
☐ MN Minnesota
☐ MS Mississippi
☐ MO Missouri
☐ MT Montana
☐ NE Nebraska
☐ NV Nevada
☐ NH New Hampshire
☐ NJ New Jersey
☐ NM New Mexico
☐ NY New York
☐ NC North Carolina
☐ ND North Dakota
☐ MP Northern Mariana Is.
☐ OH Ohio
☐ OK Oklahoma
☐ PW Palau
☐ PA Pennsylvania
☐ PR Puerto Rico
☐ RI Rhode Island
☐ SC South Carolina
☐ SD South Dakota
☐ TN Tennessee
☐ TX Texas
☐ UT Utah
☐ VT Vermont
☐ VA Virginia
☐ VI Virgin Islands
☐ WV West Virginia
☐ WI Wisconsin
☐ WY Wyoming
☐ AB Alberta
☐ MB Manitoba
☐ NB New Brunswick
☐ NF Newfoundland
☐ NT Northwest Territories
☐ NS Nova Scotia
☐ ON Ontario
☐ PE Prince Edward Island
☐ QC Quebec
☐ SK Saskatchewan
☐ YT Yukon

Survey status: 40% completed. Click "Next" below to proceed.
Section C. One-day Travel Diary

b) Trip #1 details

1. For Trip #1, what mode of transportation did you use?

- Select one mode...
  1) Private vehicle: drove alone
  2) Private vehicle: carpool or vanpool
  3) Public transportation: (e.g. buses, light rail...)
  4) Private bicycle
  5) Walk or wheelchair
  6) Hired car service (e.g. Uber, Lyft...)
  7) Carshare service (e.g. zipcar, car2go...)
  8) Bike share service (e.g. Pronto...)
  9) Taxi
  10) Private shuttle or bus
  11) Other

If you used motor vehicle -- selected any of 1) 2) 6) 7) 9), how many passengers (including the driver) were in the vehicle?

- Select # driver+passengers...
  1 (I drove alone)
  2
  3
  4
  5
  6
  7
  8
  9
  10
  11
  12 and more

If you selected “Other”, please specify below:

2. For Trip #1, where was your destination?

- Home
- Financial Center
- Puget Sound Plaza
- IBM Building
- Other, please specify below:

If you selected “Other”, indicate the destination by street address or cross streets.
Include the street label (St, Ave, Pl, ...) and the directional sector if any (E, SW, W, ...)  
(1) Street address,
  number and street name (e.g. 1303 NE 45th St)

Or, the nearest cross streets
  street #1 name (e.g. NE 45th St)
(2) Name of city or town

(3) State or province

Select one...
- WA Washington--
- BC British Columbia--
- OR Oregon--
- ID Idaho--
- AL Alabama
- AK Alaska
- AS American Samoa
- AZ Arizona
- AR Arkansas
- CA California
- CO Colorado
- CT Connecticut
- DE Delaware
- DC District of Columbia
- FM Fed. States of Micronesia
- FL Florida
- GA Georgia
- GU Guam
- HI Hawaii
- IL Illinois
- IN Indiana
- IA Iowa
- KS Kansas
- KY Kentucky
- LA Louisiana
- ME Maine
- MH Marshall Islands
- MD Maryland
- MA Massachusetts
- MI Michigan
- MN Minnesota
- MS Mississippi
- MO Missouri
- MT Montana
- NE Nebraska
- NV Nevada
- NH New Hampshire
- NJ New Jersey
- NM New Mexico
- NY New York
- NC North Carolina
- ND North Dakota
- MP Northern Mariana Is.
- OH Ohio
- OK Oklahoma
- PW Palau
- PA Pennsylvania
- PR Puerto Rico
3. Did you make any trips in addition to Trip #1 yesterday?
Consider all trips during the 24-hour period from 3AM yesterday to 3AM today, including short ones such as those to get gas, to pick up someone, to get lunch, and to return home.

- Yes
  - Don't skip (default)
- No
  - Question 172: Section D. Attitudes toward...
  - Don't skip (default)

Survey status: 48% completed. Click "Next" below to proceed.

Section C. One-day Travel Diary

c) Trip #2 details

1. For Trip #2, what mode of transportation did you use?

- Select one mode...
  - 1) Private vehicle: drove alone
  - 2) Private vehicle: carpool or vanpool
  - 3) Public transportation: (e.g. buses, light rail...)
  - 4) Private bicycle
  - 5) Walk or wheelchair
  - 6) Hired car service (e.g. Uber, Lyft...)
  - 7) Carshare service (e.g. zipcar, car2go...)
  - 8) Bike share service (e.g. Pronto...)
  - 9) Taxi cab
  - 10) Private shuttle or bus
  - 11) Other
If you used motor vehicle -- selected any of 1) 2) 6) 7) 9), how many passengers (including the driver) were in the vehicle?

- Select # driver+passengers...
  - 1 (I drove alone)
  - 2
  - 3
  - 4
  - 5
  - 6
  - 7
  - 8
  - 9
  - 10
  - 11
  - 12 and more

If you selected “Other”, please specify below:

2. For Trip #2, where was your destination?

- Home
- Financial Center
- Puget Sound Plaza
- IBM Building
- Other, please specify below:

If you selected “Other”, indicate the destination by street address or cross streets. Include the street label (St, Ave, Pl, ...) and the directional sector if any (E, SW, W, ...)

(1) Street address,
   number and street name (e.g. 1303 NE 45th St)

Or, the nearest cross streets
   street #1 name (e.g. NE 45th St)

   and street #2 name (e.g. Brooklyn Ave NE)

(2) Name of city or town

(3) State or province

- Select one...
  - --WA Washington--
  - --BC British Columbia--
  - --OR Oregon--
  - --ID Idaho--
  - AL Alabama
  - AK Alaska
  - AS American Samoa
  - AZ Arizona
  - AR Arkansas
  - CA California
  - CO Colorado
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<td>PE Prince Edward Island</td>
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<td>QC Quebec</td>
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3. Did you make any trips in addition to Trip #2 yesterday?
Consider all trips during the 24-hour period from 3AM yesterday to 3AM today, including short ones such as those to get gas, to pick up someone, to get lunch, and to return home.

[Radio buttons]
- Yes
- Question 172: Section D. Attitudes toward...
- No response
- Don't skip (default)
- Don't skip (default)

Survey status: 56% completed. Click "Next" below to proceed.

Section C. One-day Travel Diary

d) Trip #3 details

1. For Trip #3, what mode of transportation did you use?

[Radio buttons]
- Select one mode...
- 1) Private vehicle: drove alone
- 2) Private vehicle: carpool or vanpool
- 3) Public transportation: (e.g. buses, light rail...)
- 4) Private bicycle
- 5) Walk or wheelchair
- 6) Hired car service (e.g. Uber, Lyft...)
- 7) Carshare service (e.g. zipcar, car2go...)
- 8) Bike share service (e.g. Pronto...)
- 9) Taxicab
- 10) Private shuttle or bus
- 11) Other

If you used a motor vehicle -- selected any of 1) 2) 6) 7) 9), how many passengers (including the driver) were in the vehicle?

[Radio buttons]
- Select # driver+passengers...
- 1 (I drove alone)
- 2
- 3
- 4
- 5
- 6
- 7
- 8
- 9
- 10
- 11
- 12 and more

If you selected "Other", please specify below:

2. For Trip #3, where was your destination?
If you selected “Other”, indicate the destination by street address or cross streets. Include the street label (St, Ave, Pl, ...) and the directional sector if any (E, SW, W, ...)

1. Street address,
   number and street name (e.g. 1303 NE 45th St)

Or, the nearest cross streets
street #1 name (e.g. NE 45th St)

and street #2 name (e.g. Brooklyn Ave NE)

2. Name of city or town

3. State or province

Select one...

- WA Washington--
- BC British Columbia--
- OR Oregon--
- ID Idaho--
- AL Alabama
- AK Alaska
- AS American Samoa
- AZ Arizona
- AR Arkansas
- CA California
- CO Colorado
- CT Connecticut
- DE Delaware
- DC District of Columbia
- FM Fed. States of Micronesia
- FL Florida
- GA Georgia
- GU Guam
- HI Hawaii
- IL Illinois
- IN Indiana
- IA Iowa
- KS Kansas
- KY Kentucky
- LA Louisiana
- ME Maine
- MH Marshall Islands
- MD Maryland
- MA Massachusetts
- MI Michigan
- MN Minnesota
- MS Mississippi
3. Did you make any trips in addition to Trip #3 yesterday?
Consider all trips during the 24-hour period from 3AM yesterday to 3AM today, including short ones such as those to get gas, to pick up someone, to get lunch, and to return home.

- Yes
  - Don't skip (default)
- No
  - Question 172: Section D. Attitudes toward...
  - Don't skip (default)

Survey status: 61% completed. Click "Next" below to proceed.

---

Section C. One-day Travel Diary

e) Trip #4 details
1. For Trip #4, what mode of transportation did you use?

☐ Select one mode...
☐ 1) Private vehicle: drove alone
☐ 2) Private vehicle: carpool or vanpool
☐ 3) Public transportation: (e.g. buses, light rail...)
☐ 4) Private bicycle
☐ 5) Walk or wheelchair
☐ 6) Hired car service (e.g. Uber, Lyft...)
☐ 7) Carshare service (e.g. zipcar, car2go...)
☐ 8) Bike share service (e.g. Pronto...)
☐ 9) Taxi cab
☐ 10) Private shuttle or bus
☐ 11) Other

If you used motor vehicle -- selected any of 1) 2) 6) 7) 9), how many passengers (including the driver) were in the vehicle?

☐ Select # driver+passengers...
☐ 1 (I drove alone)
☐ 2
☐ 3
☐ 4
☐ 5
☐ 6
☐ 7
☐ 8
☐ 9
☐ 10
☐ 11
☐ 12 and more

If you selected “Other”, please specify below:

2. For Trip #4, where was your destination?

☐ Home
☐ Financial Center
☐ Puget Sound Plaza
☐ IBM Building
☐ Other, please specify below:

If you selected “Other”, indicate the destination by street address or cross streets. Include the street label (St, Ave, Pl, ...) and the directional sector if any (E, SW, W, ...)

(1) Street address,
number and street name (e.g. 1303 NE 45th St)

Or, the nearest cross streets
street #1 name (e.g. NE 45th St)

and street #2 name (e.g. Brooklyn Ave NE)
(2) Name of city or town

(3) State or province

- Select one...
- WA Washington--
- BC British Columbia--
- OR Oregon--
- ID Idaho--
- AL Alabama
- AK Alaska
- AS American Samoa
- AZ Arizona
- AR Arkansas
- CA California
- CO Colorado
- CT Connecticut
- DE Delaware
- DC District of Columbia
- FM Fed. States of Micronesia
- FL Florida
- GA Georgia
- GU Guam
- HI Hawaii
- IL Illinois
- IN Indiana
- IA Iowa
- KS Kansas
- KY Kentucky
- LA Louisiana
- ME Maine
- MH Marshall Islands
- MD Maryland
- MA Massachusetts
- MI Michigan
- MN Minnesota
- MS Mississippi
- MO Missouri
- MT Montana
- NE Nebraska
- NV Nevada
- NH New Hampshire
- NJ New Jersey
- NM New Mexico
- NY New York
- NC North Carolina
- ND North Dakota
- MP Northern Mariana Is.
- OH Ohio
- OK Oklahoma
- PW Palau
- PA Pennsylvania
- PR Puerto Rico
- RI Rhode Island
- SC South Carolina
- SD South Dakota
3. Did you make any trips in addition to Trip #4 yesterday?
Consider all trips during the 24-hour period from 3AM yesterday to 3AM today, including short ones such as those to get gas, to pick up someone, to get lunch, and to return home.

- Yes
  - Logic destinations
    - Don't skip (default)
- No
  - Question 172: Section D. Attitudes toward...
  - Don't skip (default)

**Survey status: 66% completed. Click "Next" below to proceed.**

---

**Section C. One-day Travel Diary**

*f) Trip #5 details*

1. For Trip #5, what mode of transportation did you use?

- Select one mode...
  - 1) Private vehicle: drove alone
  - 2) Private vehicle: carpool or vanpool
  - 3) Public transportation: (e.g. buses, light rail...)
  - 4) Private bicycle
  - 5) Walk or wheelchair
  - 6) Hired car service (e.g. Uber, Lyft...)
  - 7) Carshare service (e.g. zipcar, car2go...)
  - 8) Bike share service (e.g. Pronto...)
  - 9) Taxicab
  - 10) Private shuttle or bus
  - 11) Other

If you used motor vehicle -- selected any of 1) 2) 6) 7) 9), how many passengers (including the driver) were in the vehicle?
Select # driver+passengers...

- 1 (I drove alone)
- 2
- 3
- 4
- 5
- 6
- 7
- 8
- 9
- 10
- 11
- 12 and more

If you selected "Other", please specify below:

2. For Trip #5, where was your destination?

- Home
- Financial Center
- Puget Sound Plaza
- IBM Building
- Other, please specify below:

If you selected "Other", indicate the destination by street address or cross streets. Include the street label (St, Ave, Pl, ...) and the directional sector if any (E, SW, W, ...)

1) Street address,
   number and street name (e.g. 1303 NE 45th St)

   Or, the nearest cross streets
   street #1 name (e.g. NE 45th St)

   and street #2 name (e.g. Brooklyn Ave NE)

2) Name of city or town

3) State or province

Select one...

- WA Washington--
- BC British Columbia--
- OR Oregon--
- ID Idaho--
- AL Alabama
- AK Alaska
- AS American Samoa
- AZ Arizona
- AR Arkansas
- CA California
- CO Colorado
- CT Connecticut
- DE Delaware
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</table>
3. Did you make any trips in addition to Trip #5 yesterday?
Consider all trips during the 24-hour period from 3AM yesterday to 3AM today, including short ones such as those to get gas, to pick up someone, to get lunch, and to return home.

☐ Yes
☐ No
No response

Logic destinations

Don't skip (default)

Question 172: Section D. Attitudes toward...

Don't skip (default)

Survey status: 70% completed. Click "Next" below to proceed.

Section C. One-day Travel Diary

g) Trip #6 details

1. For Trip #6, what mode of transportation did you use?

☐ Select one mode...
☐ 1) Private vehicle: drove alone
☐ 2) Private vehicle: carpool or vanpool
☐ 3) Public transportation: (e.g. buses, light rail...)
☐ 4) Private bicycle
☐ 5) Walk or wheelchair
☐ 6) Hired car service (e.g. Uber, Lyft...)
☐ 7) Carshare service (e.g. zipcar, car2go...)
☐ 8) Bike share service (e.g. Pronto...)
☐ 9) Taxicab
☐ 10) Private shuttle or bus
☐ 11) Other

If you used motor vehicle -- selected any of 1) 2) 6) 7) 9), how many passengers (including the driver) were in the vehicle?

☐ Select # driver+passengers...
☐ 1 (I drove alone)
☐ 2
☐ 3
☐ 4
☐ 5
☐ 6
☐ 7
☐ 8
☐ 9
☐ 10
☐ 11
☐ 12 and more

If you selected "Other", please specify below:

2. For Trip #6, where was your destination?
If you selected “Other”, indicate the destination by street address or cross streets.
Include the street label (St, Ave, Pl, ...) and the directional sector if any (E, SW, W, ...)

(1) **Street address**, 
number and street name (e.g. 1303 NE 45th St)

*Or, the nearest cross streets*
street #1 name (e.g. NE 45th St)

and street #2 name (e.g. Brooklyn Ave NE)

(2) **Name of city or town**

(3) **State or province**

- Select one...
- --WA Washington--
- --BC British Columbia--
- --OR Oregon--
- --ID Idaho--
- AL Alabama
- AK Alaska
- AS American Samoa
- AZ Arizona
- AR Arkansas
- CA California
- CO Colorado
- CT Connecticut
- DE Delaware
- DC District of Columbia
- FM Fed. States of Micronesia
- FL Florida
- GA Georgia
- GU Guam
- HI Hawaii
- IL Illinois
- IN Indiana
- IA Iowa
- KS Kansas
- KY Kentucky
- LA Louisiana
- ME Maine
- MH Marshall Islands
- MD Maryland
- MA Massachusetts
- MI Michigan
- MN Minnesota
- MS Mississippi
- MO Missouri
3. Did you make any trips in addition to Trip #6 yesterday?

Consider all trips during the 24-hour period from 3AM yesterday to 3AM today, including short ones such as those to get gas, to pick up someone, to get lunch, and to return home.

- [ ] Yes
- [ ] No

No response

Logic destinations
- Don't skip (default)
- Question 172: Section D. Attitudes toward... 
- Don't skip (default)

Survey status: 71% completed. Click "Next" below to proceed.

Section C. One-day Travel Diary

h) Trip #7 details
1. For Trip #7, what mode of transportation did you use?

- Select one mode...
  - 1) Private vehicle: drove alone
  - 2) Private vehicle: carpool or vanpool
  - 3) Public transportation: (e.g. buses, light rail...)
  - 4) Private bicycle
  - 5) Walk or wheelchair
  - 6) Hired car service (e.g. Uber, Lyft...)
  - 7) Carshare service (e.g. zipcar, car2go...)
  - 8) Bike share service (e.g. Pronto...)
  - 9) Taxicab
  - 10) Private shuttle or bus
  - 11) Other

If you used motor vehicle -- selected any of 1) 2) 6) 7) 9), how many passengers (including the driver) were in the vehicle?

- Select # driver+passengers...
  - 1 (I drove alone)
  - 2
  - 3
  - 4
  - 5
  - 6
  - 7
  - 8
  - 9
  - 10
  - 11
  - 12 and more

If you selected "Other", please specify below:

2. For Trip #7, where was your destination?

- Home
- Financial Center
- Puget Sound Plaza
- IBM Building
- Other, please specify below:

If you selected "Other", indicate the destination by street address or cross streets. Include the street label (St, Ave, Pl, ...) and the directional sector if any (E, SW, W, ...)

(1) Street address,
   number and street name (e.g. 1303 NE 45th St)

Or, the nearest cross streets
street #1 name (e.g. NE 45th St)

and street #2 name (e.g. Brooklyn Ave NE)

(2) Name of city or town
(3) State or province

- Select one...
  - WA Washington--
  - BC British Columbia--
  - OR Oregon--
  - ID Idaho--
  - AL Alabama
  - AK Alaska
  - AS American Samoa
  - AZ Arizona
  - AR Arkansas
  - CA California
  - CO Colorado
  - CT Connecticut
  - DE Delaware
  - DC District of Columbia
  - FM Fed. States of Micronesia
  - FL Florida
  - GA Georgia
  - GU Guam
  - HI Hawaii
  - IL Illinois
  - IN Indiana
  - IA Iowa
  - KS Kansas
  - KY Kentucky
  - LA Louisiana
  - ME Maine
  - MH Marshall Islands
  - MD Maryland
  - MA Massachusetts
  - MI Michigan
  - MN Minnesota
  - MS Mississippi
  - MO Missouri
  - MT Montana
  - NE Nebraska
  - NV Nevada
  - NH New Hampshire
  - NJ New Jersey
  - NM New Mexico
  - NY New York
  - NC North Carolina
  - ND North Dakota
  - MP Northern Marianas Is.
  - OH Ohio
  - OK Oklahoma
  - PW Palau
  - PA Pennsylvania
  - PR Puerto Rico
  - RI Rhode Island
  - SC South Carolina
  - SD South Dakota
  - TN Tennessee
3. Did you make any trips in addition to Trip #7 yesterday?

Consider all trips during the 24-hour period from 3AM yesterday to 3AM today, including short ones such as those to get gas, to pick up someone, to get lunch, and to return home.

- Yes
- No

No response

Logic destinations

- Don't skip (default)
- Question 172: Section D. Attitudes toward...

Survey status: 72% completed. Click "Next" below to proceed.

Section C. One-day Travel Diary

i) Trip #8 details

1. For Trip #8, what mode of transportation did you use?

- Select one mode...
- 1) Private vehicle: drove alone
- 2) Private vehicle: carpool or vanpool
- 3) Public transportation: (e.g. buses, light rail...)
- 4) Private bicycle
- 5) Walk or wheelchair
- 6) Hired car service (e.g. Uber, Lyft...)
- 7) Carshare service (e.g. zipcar, car2go...)
- 8) Bike share service (e.g. Pronto...)
- 9) Taxicab
- 10) Private shuttle or bus
- 11) Other

If you used motor vehicle -- selected any of 1) 2) 6) 7) 9), how many passengers (including the driver) were in the vehicle?

- Select # driver+passengers...
1 (I drove alone)
2
3
4
5
6
7
8
9
10
11
12 and more

If you selected “Other”, please specify below:

**2. For Trip #8, where was your destination?**

- Home
- Financial Center
- Puget Sound Plaza
- IBM Building
- Other, please specify below:

If you selected “Other”, indicate the destination by street address or cross streets. Include the street label (St, Ave, Pl, ...) and the directional sector if any (E, SW, W, ...)

**1) Street address,**
   number and street name (e.g. 1303 NE 45th St)

**Or, the nearest cross streets**
street #1 name (e.g. NE 45th St)

and street #2 name (e.g. Brooklyn Ave NE)

**2) Name of city or town**

**3) State or province**

- Select one...
  - WA Washington--
  - BC British Columbia--
  - OR Oregon--
  - ID Idaho--
  - AL Alabama
  - AK Alaska
  - AS American Samoa
  - AZ Arizona
  - AR Arkansas
  - CA California
  - CO Colorado
  - CT Connecticut
  - DE Delaware
  - DC District of Columbia
FM Fed. States of Micronesia
FL Florida
GA Georgia
GU Guam
HI Hawaii
IL Illinois
IN Indiana
IA Iowa
KS Kansas
KY Kentucky
LA Louisiana
ME Maine
MH Marshall Islands
MD Maryland
MA Massachusetts
MI Michigan
MN Minnesota
MS Mississippi
MO Missouri
MT Montana
NE Nebraska
NV Nevada
NH New Hampshire
NJ New Jersey
NM New Mexico
NY New York
NC North Carolina
ND North Dakota
MP Northern Mariana Is.
OH Ohio
OK Oklahoma
PW Palau
PA Pennsylvania
PR Puerto Rico
RI Rhode Island
SC South Carolina
SD South Dakota
TN Tennessee
TX Texas
UT Utah
VT Vermont
VA Virginia
VI Virgin Islands
WV West Virginia
WI Wisconsin
WY Wyoming
AB Alberta
MB Manitoba
NB New Brunswick
NF Newfoundland
NT Northwest Territories
NS Nova Scotia
ON Ontario
PE Prince Edward Island
QC Quebec
SK Saskatchewan
YT Yukon
3. Did you make any trips in addition to Trip #8 yesterday?

Consider all trips during the 24-hour period from 3AM yesterday to 3AM today, including short ones such as those to get gas, to pick up someone, to get lunch, and to return home.

☐ Yes
☐ No
No response

Logic destinations

Don't skip (default)
Question 172: Section D. Attitudes toward...
Don't skip (default)

Survey status: 73% completed. Click "Next" below to proceed.

---

Section C. One-day Travel Diary

j) Trip #9 details

1. For Trip #9, what mode of transportation did you use?

☐ Select one mode...
  ☐ 1) Private vehicle: drove alone
  ☐ 2) Private vehicle: carpool or vanpool
  ☐ 3) Public transportation: (e.g. buses, light rail...)
  ☐ 4) Private bicycle
  ☐ 5) Walk or wheelchair
  ☐ 6) Hired car service (e.g. Uber, Lyft...)
  ☐ 7) Carshare service (e.g. zipcar, car2go...)
  ☐ 8) Bike share service (e.g. Pronto...)
  ☐ 9) Taxicab
  ☐ 10) Private shuttle or bus
  ☐ 11) Other

If you used motor vehicle -- selected any of 1) 2) 6) 7) 9), how many passengers (including the driver) were in the vehicle?

☐ Select # driver+passengers...
  ☐ 1 (I drove alone)
  ☐ 2
  ☐ 3
  ☐ 4
  ☐ 5
  ☐ 6
  ☐ 7
  ☐ 8
  ☐ 9
  ☐ 10
  ☐ 11
  ☐ 12 and more

If you selected "Other", please specify below:

2. For Trip #9, where was your destination?

☐ Home
☐ Financial Center
Puget Sound Plaza
IBM Building
Other, please specify below:

If you selected “Other”, indicate the destination by street address or cross streets. Include the street label (St, Ave, Pl, ...) and the directional sector if any (E, SW, W, ...)

1) Street address,
   number and street name (e.g. 1303 NE 45th St)

   Or, the nearest cross streets
   street #1 name (e.g. NE 45th St)

   and street #2 name (e.g. Brooklyn Ave NE)

2) Name of city or town

3) State or province

Select one...
--WA Washington--
--BC British Columbia--
--OR Oregon--
--ID Idaho--
AL Alabama
AK Alaska
AS American Samoa
AZ Arizona
AR Arkansas
CA California
CO Colorado
CT Connecticut
DE Delaware
DC District of Columbia
FM Fed. States of Micronesia
FL Florida
GA Georgia
GU Guam
HI Hawaii
IL Illinois
IN Indiana
IA Iowa
KS Kansas
KY Kentucky
LA Louisiana
ME Maine
MH Marshall Islands
MD Maryland
MA Massachusetts
MI Michigan
MN Minnesota
MS Mississippi
MO Missouri
MT Montana
3. Did you make any trips in addition to Trip #9 yesterday?

Consider all trips during the 24-hour period from 3AM yesterday to 3AM today, including short ones such as those to get gas, to pick up someone, to get lunch, and to return home.

- Yes
- No

**Logic destinations**

- Don't skip (default)
- Question 172: Section D. Attitudes toward...
- Don't skip (default)

**Survey status: 74% completed. Click "Next" below to proceed.**
Select one mode...
- 1) Private vehicle: drove alone
- 2) Private vehicle: carpool or vanpool
- 3) Public transportation: (e.g. buses, light rail...)
- 4) Private bicycle
- 5) Walk or wheelchair
- 6) Hired car service (e.g. Uber, Lyft...)
- 7) Carshare service (e.g. zipcar, car2go...)
- 8) Bike share service (e.g. Pronto...)
- 9) Taxi
- 10) Private shuttle or bus
- 11) Other

If you used motor vehicle -- selected any of 1) 2) 6) 7) 9), how many passengers (including the driver) were in the vehicle?

Select # driver+passengers...
- 1 (I drove alone)
- 2
- 3
- 4
- 5
- 6
- 7
- 8
- 9
- 10
- 11
- 12 and more

If you selected “Other”, please specify below:

2. For Trip #10, where was your destination?

- Home
- Financial Center
- Puget Sound Plaza
- IBM Building
- Other, please specify below:

If you selected “Other”, indicate the destination by street address or cross streets. Include the street label (St, Ave, Pl, ...) and the directional sector if any (E, SW, W, ...)

(1) Street address,
    number and street name (e.g. 1303 NE 45th St)

    Or, the nearest cross streets
    street #1 name (e.g. NE 45th St)

    and street #2 name (e.g. Brooklyn Ave NE)

(2) Name of city or town
(3) State or province

- Select one...
- --WA Washington--
- --BC British Columbia--
- --OR Oregon--
- --ID Idaho--
- AL Alabama
- AK Alaska
- AS American Samoa
- AZ Arizona
- AR Arkansas
- CA California
- CO Colorado
- CT Connecticut
- DE Delaware
- DC District of Columbia
- FM Fed. States of Micronesia
- FL Florida
- GA Georgia
- GU Guam
- HI Hawaii
- IL Illinois
- IN Indiana
- IA Iowa
- KS Kansas
- KY Kentucky
- LA Louisiana
- ME Maine
- MH Marshall Islands
- MD Maryland
- MA Massachusetts
- MI Michigan
- MN Minnesota
- MS Mississippi
- MO Missouri
- MT Montana
- NE Nebraska
- NV Nevada
- NH New Hampshire
- NJ New Jersey
- NM New Mexico
- NY New York
- NC North Carolina
- ND North Dakota
- MP Northern Mariana Is.
- OH Ohio
- OK Oklahoma
- PW Palau
- PA Pennsylvania
- PR Puerto Rico
- RI Rhode Island
- SC South Carolina
- SD South Dakota
- TN Tennessee
- TX Texas
- UT Utah
3. Did you make any trips in addition to Trip #10 yesterday?

Consider all trips during the 24-hour period from 3AM yesterday to 3AM today, including short ones such as those to get gas, to pick up someone, to get lunch, and to return home.

☐ Yes  
☐ No  
☐ No response

Logic destinations

- Don't skip (default)
- Question 172: Section D. Attitudes toward...
- Don't skip (default)

Survey status: 75% completed. Click "Next" below to proceed.

Section C. One-day Travel Diary

1) Trip #11 details

1. For Trip #11, what mode of transportation did you use?

☐ Select one mode...  
☐ 1) Private vehicle: drove alone  
☐ 2) Private vehicle: carpool or vanpool  
☐ 3) Public transportation: (e.g. buses, light rail...)  
☐ 4) Private bicycle  
☐ 5) Walk or wheelchair  
☐ 6) Hired car service (e.g. Uber, Lyft...)  
☐ 7) Carshare service (e.g. zipcar, car2go...)  
☐ 8) Bike share service (e.g. Pronto...)  
☐ 9) Taxicab  
☐ 10) Private shuttle or bus  
☐ 11) Other

If you used motor vehicle -- selected any of 1) 2) 6) 7) 9), how many passengers (including the driver) were in the vehicle?

☐ Select # driver+passengers...  
☐ 1 (I drove alone)  
☐ 2
If you selected “Other”, please specify below:

2. For Trip #11, where was your destination?

- Home
- Financial Center
- Puget Sound Plaza
- IBM Building
- Other, please specify below:

If you selected “Other”, indicate the destination by street address or cross streets. Include the street label (St, Ave, Pl, ...) and the directional sector if any (E, SW, W, ...)

(1) Street address,

number and street name (e.g. 1303 NE 45th St)

Or, the nearest cross streets

street #1 name (e.g. NE 45th St)

and street #2 name (e.g. Brooklyn Ave NE)

(2) Name of city or town

(3) State or province

- Select one...
  - --WA Washington--
  - --BC British Columbia--
  - --OR Oregon--
  - --ID Idaho--
  - AL Alabama
  - AK Alaska
  - AS American Samoa
  - AZ Arizona
  - AR Arkansas
  - CA California
  - CO Colorado
  - CT Connecticut
  - DE Delaware
  - DC District of Columbia
  - FM Fed. States of Micronesia
  - FL Florida
3. Did you make any trips in addition to Trip #11 yesterday?
Consider all trips during the 24-hour period from 3AM yesterday to 3AM today, including short ones such as those to get gas, to pick up someone, to get lunch, and to return home.

- Yes
- No
- No response

Survey status: 76% completed. Click "Next" below to proceed.

Section C. One-day Travel Diary

m) Trip #12 details.

1. For Trip #12, what mode of transportation did you use?

- Select one mode...
  - 1) Private vehicle: drove alone
  - 2) Private vehicle: carpool or vanpool
  - 3) Public transportation: (e.g. buses, light rail...)
  - 4) Private bicycle
  - 5) Walk or wheelchair
  - 6) Hired car service (e.g. Uber, Lyft...)
  - 7) Carshare service (e.g. zipcar, car2go...)
  - 8) Bike share service (e.g. Pronto...)
  - 9) Taxicab
  - 10) Private shuttle or bus
  - 11) Other

If you used motor vehicle -- selected any of 1) 2) 6) 7) 9), how many passengers (including the driver) were in the vehicle?

- Select # driver+passengers...
  - 1 (I drove alone)
  - 2
  - 3
  - 4
  - 5
  - 6
  - 7
  - 8
  - 9
  - 10
  - 11
  - 12 and more

If you selected "Other", please specify below:

2. For Trip #12, where was your destination?

- Home
- Financial Center
- Puget Sound Plaza
- IBM Building
Other, please specify below:

If you selected "Other", indicate the destination by street address or cross streets. Include the street label (St, Ave, Pl, ...) and the directional sector if any (E, SW, W, ...)

1. **Street address**, number and street name (e.g. 1303 NE 45th St)

Or, the nearest cross streets
street #1 name (e.g. NE 45th St)

and street #2 name (e.g. Brooklyn Ave NE)

2. **Name of city or town**

3. **State or province**

- Select one...
  - WA Washington--
  - BC British Columbia--
  - OR Oregon--
  - ID Idaho--
  - AL Alabama
  - AK Alaska
  - AS American Samoa
  - AZ Arizona
  - AR Arkansas
  - CA California
  - CO Colorado
  - CT Connecticut
  - DE Delaware
  - DC District of Columbia
  - FM Fed. States of Micronesia
  - FL Florida
  - GA Georgia
  - GU Guam
  - HI Hawaii
  - IL Illinois
  - IN Indiana
  - IA Iowa
  - KS Kansas
  - KY Kentucky
  - LA Louisiana
  - ME Maine
  - MH Marshall Islands
  - MD Maryland
  - MA Massachusetts
  - MI Michigan
  - MN Minnesota
  - MS Mississippi
  - MO Missouri
  - MT Montana
  - NE Nebraska
  - NV Nevada
3. Did you make any trips in addition to Trip #12 yesterday?
Consider all trips during the 24-hour period from 3AM yesterday to 3AM today, including short ones such as those to get gas, to pick up someone, to get lunch, and to return home.

- Yes
- No

---

Survey status: 77% completed. Click "Next" below to proceed.

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Section C. One-day Travel Diary

n) Trip #13 details

1. For Trip #13, what mode of transportation did you use?
Select one mode...
1) Private vehicle: drove alone
2) Private vehicle: carpool or vanpool
3) Public transportation: (e.g. buses, light rail...)
4) Private bicycle
5) Walk or wheelchair
6) Hired car service (e.g. Uber, Lyft...)
7) Carshare service (e.g. zipcar, car2go...)
8) Bike share service (e.g. Pronto...)
9) Taxicab
10) Private shuttle or bus
11) Other

If you used motor vehicle -- selected any of 1) 2) 6) 7) 9), how many passengers (including the driver) were in the vehicle?

Select # driver+passengers...
1 (I drove alone)
2
3
4
5
6
7
8
9
10
11
12 and more

If you selected "Other", please specify below:

2. For Trip #13, where was your destination?

Home
Financial Center
Puget Sound Plaza
IBM Building
Other, please specify below:

If you selected "Other", indicate the destination by street address or cross streets. Include the street label (St, Ave, Pl, ...) and the directional sector if any (E, SW, W, ...)

(1) Street address,
   number and street name (e.g. 1303 NE 45th St)

Or, the nearest cross streets
   street #1 name (e.g. NE 45th St)

   and street #2 name (e.g. Brooklyn Ave NE)

(2) Name of city or town

(3) State or province
Select one...
- WA Washington--
- BC British Columbia--
- OR Oregon--
- ID Idaho--
- AL Alabama
- AK Alaska
- AS American Samoa
- AZ Arizona
- AR Arkansas
- CA California
- CO Colorado
- CT Connecticut
- DE Delaware
- DC District of Columbia
- FM Fed. States of Micronesia
- FL Florida
- GA Georgia
- GU Guam
- HI Hawaii
- IL Illinois
- IN Indiana
- IA Iowa
- KS Kansas
- KY Kentucky
- LA Louisiana
- ME Maine
- MH Marshall Islands
- MD Maryland
- MA Massachusetts
- MI Michigan
- MN Minnesota
- MS Mississippi
- MO Missouri
- MT Montana
- NE Nebraska
- NV Nevada
- NH New Hampshire
- NJ New Jersey
- NM New Mexico
- NY New York
- NC North Carolina
- ND North Dakota
- MP Northern Mariana Is.
- OH Ohio
- OK Oklahoma
- PW Palau
- PA Pennsylvania
- PR Puerto Rico
- RI Rhode Island
- SC South Carolina
- SD South Dakota
- TN Tennessee
- TX Texas
- UT Utah
- VT Vermont
- VA Virginia
3. Did you make any trips in addition to Trip #13 yesterday?
Consider all trips during the 24-hour period from 3AM yesterday to 3AM today, including short ones such as those to get gas, to pick up someone, to get lunch, and to return home.

- Yes
- No

Logic destinations

- Don't skip (default)
- Question 172: Section D. Attitudes toward...

No response

Don't skip (default)

Survey status: 78% completed. Click "Next" below to proceed.

Section C. One-day Travel Diary

o) Trip #14 details

1. For Trip #14, what mode of transportation did you use?

- Select one mode...
  - 1) Private vehicle: drove alone
  - 2) Private vehicle: carpool or vanpool
  - 3) Public transportation: (e.g. buses, light rail...)
  - 4) Private bicycle
  - 5) Walk or wheelchair
  - 6) Hired car service (e.g. Uber, Lyft...)
  - 7) Carshare service (e.g. zipcar, car2go...)
  - 8) Bike share service (e.g. Pronto...)
  - 9) Taxicab
  - 10) Private shuttle or bus
  - 11) Other

If you used motor vehicle -- selected any of 1) 2) 6) 7) 9), how many passengers (including the driver) were in the vehicle?

- Select # driver+passengers...
  - 1 (1 drove alone)
  - 2
  - 3
  - 4
If you selected “Other”, please specify below:

2. For Trip #14, where was your destination?

- Home
- Financial Center
- Puget Sound Plaza
- IBM Building
- Other, please specify below:

If you selected “Other”, indicate the destination by street address or cross streets. Include the street label (St, Ave, Pl, ...) and the directional sector if any (E, SW, W, ...)

(1) Street address,
number and street name (e.g. 1303 NE 45th St)

Or, the nearest cross streets
street #1 name (e.g. NE 45th St)

and street #2 name (e.g. Brooklyn Ave NE)

(2) Name of city or town

(3) State or province

- Select one...
- WA Washington--
- BC British Columbia--
- OR Oregon--
- ID Idaho--
- AL Alabama
- AK Alaska
- AS American Samoa
- AZ Arizona
- AR Arkansas
- CA California
- CO Colorado
- CT Connecticut
- DE Delaware
- DC District of Columbia
- FM Fed. States of Micronesia
- FL Florida
- GA Georgia
- GU Guam
3. Did you make any trips in addition to Trip #14 yesterday?

Consider all trips during the 24-hour period from 3AM yesterday to 3AM today, including short ones such as those to get gas, to pick up someone, to get lunch, and to return home.
Section C. One-day Travel Diary

p) Trip #15 details

1. For Trip #15, what mode of transportation did you use?

Select one mode...
- 1) Private vehicle: drove alone
- 2) Private vehicle: carpool or vanpool
- 3) Public transportation: (e.g. buses, light rail...)
- 4) Private bicycle
- 5) Walk or wheelchair
- 6) Hired car service (e.g. Uber, Lyft...)
- 7) Carshare service (e.g. zipcar, car2go...)
- 8) Bike share service (e.g. Pronto...)
- 9) Taxicab
- 10) Private shuttle or bus
- 11) Other

If you used motor vehicle -- selected any of 1) 2) 6) 7) 9), how many passengers (including the driver) were in the vehicle?

Select # driver+passengers...
- 1 (I drove alone)
- 2
- 3
- 4
- 5
- 6
- 7
- 8
- 9
- 10
- 11
- 12 and more

If you selected “Other”, please specify below:

2. For Trip #15, where was your destination?

- Home
- Financial Center
- Puget Sound Plaza
- IBM Building
- Other, please specify below:
If you selected “Other”, indicate the destination by street address or cross streets. Include the street label (St, Ave, Pl, ...) and the directional sector if any (E, SW, W, ...)

(1) Street address,
    number and street name (e.g. 1303 NE 45th St)

    Or, the nearest cross streets
    street #1 name (e.g. NE 45th St)

    and street #2 name (e.g. Brooklyn Ave NE)

(2) Name of city or town

(3) State or province

Select one...

- WA Washington--
- BC British Columbia--
- OR Oregon--
- ID Idaho--
- AL Alabama
- AK Alaska
- AS American Samoa
- AZ Arizona
- AR Arkansas
- CA California
- CO Colorado
- CT Connecticut
- DE Delaware
- DC District of Columbia
- FM Fed. States of Micronesia
- FL Florida
- GA Georgia
- GU Guam
- HI Hawaii
- IL Illinois
- IN Indiana
- IA Iowa
- KS Kansas
- KY Kentucky
- LA Louisiana
- ME Maine
- MH Marshall Islands
- MD Maryland
- MA Massachusetts
- MI Michigan
- MN Minnesota
- MS Mississippi
- MO Missouri
- MT Montana
- NE Nebraska
- NV Nevada
- NH New Hampshire
- NJ New Jersey
- NM New Mexico
3. Did you make any trips in addition to Trip #15 yesterday?
Consider all trips during the 24-hour period from 3AM yesterday to 3AM today, including short ones such as those to get gas, to pick up someone, to get lunch, and to return home.

- Yes
- No

Survey status: 80% completed. Click "Next" below to proceed.

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Section D. Attitudes towards Travel Options

1. Do you agree with the following statements about traveling around the Seattle area by driving and public transportation?
Please rate on the following 0-10 scale: 0=strongly disagree, 10=strongly agree.

Rows
- Driving is convenient
- Driving is reliable
- Sufficient information is available about driving
- I would like to own at least one more car
- I prefer to drive whenever possible
a) Riding public transportation is convenient  
b) Riding public transportation is reliable  
c) Sufficient information is available about using public transportation.  
d) Expanding public transportation services is beneficial  
e) I prefer to ride public transportation whenever possible  

- Strongly disagree 0  
- 1  
- 2  
- 3  
- 4  
- 5  
- 6  
- 7  
- 8  
- 9  
- Strongly agree... 10  
- N/A

**Survey status: 80% completed. Click "Next" below to proceed.**

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**Section D. Attitudes towards Travel Modes**

**2. Do you agree with the following statements about new transportation services around the Seattle area, including:**

*Hired car services (e.g. Uber, Lyft...)*  
*Carshare vehicle services (e.g. zipcar, car2go...)*  
*Bike share program (e.g. Pronto...)?*  

Please rate on the following 0-10 scale: 0=strongly disagree, 10=strongly agree.

**Rows**

- a) Using hired car services is convenient  
- b) Using hired car services is reliable  
- c) Sufficient information is available about hired car services  
- d) Expanding hired car services is beneficial  
- e) I prefer to use hired car services whenever possible  

- a) Using carshare vehicle services is convenient  
- b) Using carshare vehicle services is reliable  
- c) Sufficient information is available about carshare vehicle services  
- d) Expanding carshare vehicle services is beneficial  
- e) I prefer to use carshare vehicle services whenever possible  

- a) Using bike share services is convenient  
- b) Using bike share services is reliable  
- c) Sufficient information is available about bike share services  
- d) Expanding bike share services is beneficial  
- e) I prefer to use bike share services whenever possible  

- Strongly disagree 0  
- 1  
- 2  
- 3  
- 4  
- 5  
- 6  
- 7  
- 8  
- 9
Section E. Travel Information

How often do you use the following information sources to get dynamic, real-time travel information around the Seattle area?
Please rate on the following 0-10 scale: 0=never, 10=many times per day.

Rows
- Website (e.g. WSDOT)
- Phone/mobile-device app
- At-stop dynamic display
- Phone calls (e.g. 511)
- Text messages
- Social media (e.g. Twitter, Facebook)

- Never 0
- 1
- Monthly 2
- 3
- Weekly 4
- 5
- Daily 6
- 7
- 3+ times a day 8
- 9
- 6+ times a day 10

Survey status: 90% completed. You are almost there. Click "Next" below to proceed.

Section F. Household Characteristics

1. What is your age?

2. What is your gender?

- Male
- Female
- Other, please specify below:

3. Including yourself, how many people in each age group currently live in your household?
4. What was your total household income before taxes during the past 12 months?

- Select an income interval...
  - Less than $10,000
  - $10,000 to $24,999
  - $25,000 to $34,999
  - $35,000 to $49,999
  - $50,000 to $74,999
  - $75,000 to $99,999
  - $100,000 to $149,999
  - $150,000 to $199,999
  - $200,000 to $249,000
  - $250,000 or more
  - Prefer not to answer

5. Do you have a valid driver’s license?

- Yes
- No

6. How many motor vehicles (in working order) are there in your household?

- Select # vehicles...
  - 0 (none)
  - 1
  - 2
  - 3
  - 4
  - 5
  - 6
  - 7
  - 8
  - 9
  - 10 or more

7. How many working bicycles are there in your household?
Select # bicycles...
- 0 (none)
- 1
- 2
- 3
- 4
- 5
- 6
- 7
- 8
- 9
- 10 or more

Survey status: 95% completed. Click "Next" below to proceed.

Logic destination
Question 189: Congratulations! You compl...

Section G. Real-time Display

1. Have you moved since May 1, 2015?
   - Yes
   - No

2. Have you changed your work location (by building) since May 1, 2015?
   - Yes
   - No

3. Did you know that there is a real-time transportation information display in the lobby at your workplace?
   - Yes
   - No
   - No response

An illustrative picture of the said real-time transportation information display is shown below:
### Survey status: 97% completed. Click "Next" below to proceed.

4. How often do you check the real-time display to get travel information?

- [ ] Never
- [ ] Every few months
- [ ] Monthly
- [ ] Every few weeks
- [ ] Weekly
- [ ] Every few days
- [ ] Daily
- [ ] Twice a day
- [ ] 3 times a day
- [ ] 4-5 times a day
- [ ] 6+ times a day

5. Do you agree with the following statements about the real-time transportation information display?

Please rate on the following 0-10 scale: 0=strongly disagree, 10=strongly agree.

**Rows**

- a) It is easy to read and understand
- b) It displays accurate and reliable travel information
- c) It helps me arrive at my destination on time
- d) Overall, I am satisfied with the display
- e) It meets my expectations
- f) I have complained about it

- [ ] Strongly disagree 0
- [ ] 1
- [ ] 2
- [ ] 3
- [ ] 4
- [ ] 5
- [ ] 6
- [ ] 7
- [ ] 8
- [ ] 9

https://catalyst.uw.edu/webq/build?iarut=271673
6. Do you have additional comments for improving the real-time transportation information display?

Survey status: 99% completed. Click "Next" below to proceed.

Congratulations!
You completed the survey and deserve the chance to win an iPad Air 2 or iPad 3 mini (a $499 value). We sincerely appreciate your participation. In order to enter the drawing, please enter your email address below.

Email address:

Logic destination
End of Survey

Survey status: 100% completed. Click "Submit responses" to finish up!

Please click "Submit responses" below to proceed.