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PSRC 2006 Household Activity Survey Analysis Report

final

report

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PSRC 2006 Household Activity Survey Analysis Report

prepared for

Puget Sound Regional Council
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prepared by

Cambridge Systematics, Inc.
3239 198th Place SE
Sammamish, Washington 98075

with

Mark Bradley Research and Consulting
ECO Northwest
MORPACE International

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Executive Summary

PURPOSE

The purpose of 2006 PSRC Household Activity Survey project is to provide data for the Puget Sound Region travel demand models, for the assessment of the current activity and travel patterns, and for the estimation of future activity and travel within the region under various policy scenarios. It is a goal of this project to improve planners' ability to evaluate impacts of future policies and actions on travel patterns and transportation facility use through the development of a database that not only captures the current status of activity and travel in the region but also includes attitudes, preferences, and choices with respect to activities and travel. Such data can support analyses that help understand why persons and households make certain travel choices, and can be used in activity choice models to predict the effects of changes in land uses, policies, demographic, or economic standing on travel behavior in the region.

The objectives of the 2006 PSRC Household Activity Survey project were to:

- Develop an assessment of current travel times and costs, both actual and perceived, facing users in the region, through the collection of Global Positioning System (GPS) and pertinent revealed-preference data, and choice experiments.

- Establish the foundation for building better "choice" models that predict what impacts residential location choice, policies, demographic or economic standing, etc. will have on travel behavior. This included incorporating both attitudinal and choice experiment exercises into the survey data collection and analysis process to identify motivators of travel mode choice.

- Distinguish between "captive/choice" or "routine/periodic" transit users and enumerate their unique characteristics. This included identifying the current and potential key drivers (predictors) for transit use among current and potential (perhaps neighborhood-based) transit users.

- Identify the demographic, neighborhood, and trip-making characteristics to define a "Transit Market." This included identifying the next steps in supporting the development of a regional "Transit Market Study."

OVERVIEW OF SURVEYS

There were three major component data collection activities in 2006 RSRC Household Activity Survey to support the analysis objectives cited above:

1. The first component was an activity and travel survey of a representative sample of households in the Puget Sound region. The survey methods are documented in Appendix A. This survey collected basic demographics, activities, and tour and travel characteristics from all members of respondent households on all out-of-home and certain in-home activities using a 48-hour diary. The final dataset contained information on 4,746 households. These data were expanded to describe the travel in the region, and can provide input for travel demand models. These data were also used to examine aspects of travel behavior such as trip chaining, and to identify the characteristics of transit users.

2. The second component was a GPS tracking of a representative subset of households participating in the diary portion of the study. The final GPS tracking data contained detailed information on the travel paths of 220 households with two vehicles in the same 48-hour period recorded in the diaries. Up to three vehicles per household were equipped with GPS units. Analysis of the GPS tracking data has contributed to the understanding of underreporting of trips, and provides insight into potential biases in the data. Comparison of the GPS data and reported diary data with GPS trips will provide input for the calibration of activity choice models.

3. The third component was a stated-preference (SP) survey of a subset of adult (age 16+) respondents participating in the diary portion of the survey, whose revealed trips fit criteria of interest for possible public transit and highway toll alternatives. 916 SP surveys were completed. The SP instrument included a short series of attitudinal statements, with stated-preference exercises consisting of mode and service choices, as well as toll choices, individually customized to the travel patterns of interest revealed by the

respondent as a part of the initial household activity survey. Data from the SP survey will provide input to activity choice models, and were used to better understand the market for transit services.

The survey forms used in the main survey are included in Appendix B. The survey forms used in the stated-preference survey are included in Appendix C. Finally, the code book used in the survey is included in Appendix D.

KEY FINDINGS

In preparation for future travel demand forecasting processes, the 2006 household activity survey was processed to identify person and household tours, in addition to trips. Tours are defined as a series of trips that begin and end at home. Tours that begin and end at work (i.e. tours that leave work in the middle of the day and return to work before heading home) are also separated for analysis purposes. This survey was also expanded to represent the full population in the Puget Sound region (described in Appendix E). The results of this data processing is that on average there are 3.6 trips per person from the 2006 survey, which matches the same statistic from the 1999 survey (3.6 trips per person). In addition, there was a GPS survey conducted to assess to potential under-reporting of trips in main survey. An analysis of this resulted in a potential 27 percent under-reporting of auto trips and 20 percent under-reporting of vehicle miles traveled.

The other summaries of the trips and tours by mode, destination, length, purpose, etc. are provided to demonstrate the results of the survey as well as to evaluate the reliability of the data for the purposes of estimating future travel demand forecasting models. To that end, the data does provide reliable and reasonable summaries as provided herein. That said, there are potential geocoding and data logic checks that can and should be completed to refine and improve the data prior to model estimation. Some of these checks are described in this report.

The household survey provided many insights into the nature of transit usage in the Puget Sound region. Chapter 2.0 compares the region's transit users to non-transit users. Eight percent of survey respondents used public transit during the 48-hour survey diary period, and 27 percent of respondents reported using

public transit at least once in the past 30 days. Transit trips made up about four percent of the region's trips during the travel diary periods.

Location characteristics are important in explaining transit usage. Transit usage is significantly higher for:

- City of Seattle residents, as opposed to other area residents,

- Urban area residents,

- Residents of areas with higher household densities, and

- Residents of areas with more multifamily dwelling units.

Respondents' household characteristics also affect transit usage rates. On a percentage basis, transit usage is significantly higher for respondents that:

- Live in multifamily dwelling units,

- Rent their homes,

- Live by themselves,

- Have limited auto availability,

- Have household incomes under $50,000 per year,

- Are 25 to 34 years old, and

- Are currently employed or are adult students.

Availability of transit options and workplace area employment density are also related to higher transit usage, though the direction of the association is unclear.

To further understand transit ridership, we asked a series of attitudinal questions as part of the stated preference survey. Respondents rated their level of agreement to the attitudinal statements on a one to ten scale. Based on the attitudinal statement ratings, we developed attitudinal market segments for travelers in transit corridors, as described in Chapter 3.0. These market segments may be helpful in transit service planning and in marketing and positioning efforts.

CONTENTS OF THIS REPORT

This report contains five sections. The first section describes the trip and tour characteristics of the surveys collected on the primary survey of households in the Puget Sound region. The second section presents the transit market characteristics of the same primary survey. The third section describes the

attitudinal data collected regarding modal characteristics in the smaller subset of the stated-preference survey. The fourth section describes the choice experiment portion of the stated-preference survey, as it relates to transit mode choices and toll/no-toll choices. The final section describes the GPS survey and the analysis of these data.

The report also contains six appendices. The first appendix (Appendix A) presents the survey methods report prepared by Morpace International. The second appendix contains the survey forms from the main survey and the third appendix contains the survey forms for the stated-preference survey. The fourth appendix contains the code book used to develop the survey databases. Appendices B, C, and D are the same as those contained in the main survey report, *PSRC 2006 Household Activity Survey: Appendix A Survey Methods*, by Morpace International. The fifth appendix (Appendix E) documents the expansion process, which allows us to summarize the survey for the full population in the Puget Sound region. The sixth appendix (Appendix F) contains the codes used to develop the travel activity files, which were used in the subsequent analysis contained in this report. The seventh and last appendix (Appendix G) documents the methods and results of the GPS survey.

1.0 Tour and Trip Analysis

While typical travel demand models in the past have focused on travel in units of trips per household-day, most new models for large U.S. MPO's predict travel in units of tours – trip chains that begin and end at home. The reason for this is that all trips within a tour are strongly interrelated in terms of mode choice, destination choice, and time of day choice, so it is important to analyze trips within a tour in an integrated manner. Another feature of recent demand models is to predict travel at the level of person-days rather than household-days. While household characteristics are important in such models, it also is clear that travel decisions made by a school child are very different than decisions made by a working parent or a retired grandparent who live in the same household.

In this report, Section 1.1 documents how travel tours were created from the 2006 Puget Sound Regional Travel Survey data, including rules for defining tours, defining the main activity purpose of a trip, tour, and person-day, and defining the main mode used for a trip or a tour.

In Section 1.2, we describe how persons are segmented into eight different types for further analysis. Section 1.3 presents initial analyses performed at the person-day level. Section 1.4 describes analyses performed at the tour level. Finally, Section 1.5 reports analyses performed at the trip level. All results presented in this chapter and elsewhere in the report are expanded and weighted to correct for sampling and non-response, as documented in Appendix E. In addition, the process to develop the person-day, tour, and trip files is provided in Appendix F.

1.1 DATA PROCESSING TO CREATE TOUR AND PERSON-DAY RECORDS

A home-based travel tour is defined as a chain of trips that both begins and ends at home. For example, leaving home at 7 am, going to work until returning home at 6 pm is one complete tour, and leaving home again at 8 pm to go to the gas station and coming back home 10 minutes later is a second tour. Home locations were identified in the survey as any trip end for which both the

geocoded X and Y coordinates match the geocoded X and Y coordinates for the home location.

We also define one particular type of subtour, or "tour within a tour." This is a work-based subtour, defined as a chain of trips that both begins and ends at the primary destination of a home-based work tour (i.e., the workplace), as identified by the geocoded X and Y coordinates of that work location.

For purposes of this analysis, activities are classified into nine separate categories – at home, or out-of-home work, school, escort, personal business, shopping, meal, social, or recreation. The translation of the survey categories into these nine locations is shown in Table 1.1. In addition, all activities that take place at home are classified as "home," regardless of activity code.

In the data, a respondent could state up to four different activities they performed at any given location. For this analysis, the "main activity" at a single location was specified in priority order from left to right in the table above. Thus, if a person performed both a work and a meal activity at the same location, the purpose is classified as work.

We also need to define rules to determine the primary destination and activity for a tour that visits two or more out-of-home locations. For example, if a person goes to work and then stops at a store on the way home from work, the tour is logically classified as a work tour rather than a shopping tour. Although there is no obvious behavioral rule to follow, the idea is to select the primary destination as the one that is likely to be most important in determining the overall location, mode, and time of day of the tour. In past studies, this has been done in various ways as a function of activity purpose, duration, and location, with the idea that longer and more distant activities are likely to be more important.

Table 1.1   Travel Activity Categories

	Home	Work	School	Escort	Personal Business	Shop-ping	Meal	Social	Rec-reation
Home – Paid Work	X								
Home – Other	X								
Work		X							
Attend Childcare			X						
Attend School			X						
Attend College			X						
Eat Out							X		
Personal Business					X				
Everyday Shopping						X			
Major Shopping						X			
Religious/Community					X				
Social								X	
Recreation – Participate									X
Recreation – Watch									X
Accompany Another Person				X					
Pick-Up/Drop-Off Passenger				X					
Turn Around									X

For this analysis, we follow a relatively simple hierarchy that also is being used for the Denver regional model for DRCOG, as presented in Table 1.2.   This hierarchy is representative of the current thinking for activity-based models and is followed in similar fashion by many other MPOs. The table below shows four basic decisions steps:

1. If a student visits one or more school locations or a non-student visits one or more work locations, then the longest duration activity of that type is the primary destination;

2. Otherwise, if student visits one or more work locations or a non-student visits one or more school locations, then the longest duration activity of that type is the primary destination;

3. Otherwise, if the person visits one or more escort activities, then the longest duration escort activity is the primary destination; and

4. Otherwise, all activities are of the five remaining types – personal business, shopping, meal, social and recreation – and the longest duration one is the primary destination.

Table 1.2   Activity Priority Rules for Both Tour Primary Destination and Primary Tour of the Day

Level	Rule	Choose
1	If not a student, and one or more Work activities	Work activity of longest duration, otherwise…
2	If not a student, and one or more School activities	School activity of longest duration, otherwise
1	If a student, and one or more School activities	School activity of longest duration, otherwise
2	If a student, and one or more Work activities	Work activity of longest duration, otherwise
3	If one or more Escort activities	Escort activity of longest duration, otherwise
4	No Work, School or Escort activities	Activity of longest duration, regardless of purpose

Note that escort activities, which are usually to pick up or drop off a passenger, are given a special place in the hierarchy because even though they are usually of very short duration, they are very important in determining the time and location and mode used for the tour. It is typical that someone has to be picked up or dropped off at a particular time and place, and that any other stops on the tour are subject to those constraints. Also, an escort tour is very likely to include at least one shared ride auto trip.

In cases where two or more out-of-home destinations are visited on the same tour, locations other than the primary destinations are referred to as "intermediate stops" or "extra stops." The same rules for specifying the primary destination versus intermediate stops also are applied to work-based subtours.

For persons who make more than one home-based tour during the same day, it is often useful in analysis to designate one tour as the "primary tour" of the day, and all other home-based tours as "secondary tours." The priority rules for determining the primary tour of the day are exactly the same as the rules above for determining the primary stop of a tour. Another way to look at it is that all out-of-home activities for the day are compared to determine the primary

activity of the day, and the tour which contains that primary activity is designated as the primary tour of the day.

A given trip or tour may use various different modes of travel. In the survey data, respondents stated up to five different "legs" for each trip. For example, a bus trip might contain a walk leg to the stop, then two bus legs before and after a transfer, plus another walk leg from the last stop to the destination. For purposes of this analysis, it was first useful to classify the survey modes into 7 categories: walk, bike, car, transit, ferry, school bus, and other. These are presented in Table 1.3. There were very few rail legs mentioned in the data, so those are classified together with bus as "transit." Dial-a-ride, taxi/shuttle, and paratransit are included as "other," however, since they are usually not included in regional models. There were also very few motorcycle legs in the data, and those are classified with the other private motor vehicles – car, truck and van.

Table 1.3   Travel Mode Categories

	School Bus	Ferry	Transit	Car	Bike	Walk	Others
Car, Van, Truck				X			
Motorcycle/Moped				X			
Bicycle					X		
Walk						X	
School Bus	X						
Taxi/Shuttle							X
Dial-A-Ride							X
Train			X				
Public Bus			X				
Ferry		X					
Private Bus							X
Boat/Kayak							X
Skateboard/Scooter							X
Airplane or Golf Cart							X
Ambulance							X
Rollerblades/Rollerskates							X
Baby Stroller/Stroller							X
Wheel Chair/Power Chair							X
Jogging/Running							X
Flexcar or Paratransit							X
Picked up/Got a ride (unspecified)							X
Other miscellaneous responses							X
Don't know or Refused/No response							X

For this analysis, a sequence of hierarchical decision rules is used to classify each trip into one of 11 different "trip modes" depending on which modes are used for any legs of the trip. The rules are shown in Table 1.4. First, a trip which uses any of the "other" modes is classified as "other," as these are typically not used in mode choice modeling. Next, a trip which uses school bus for any legs is classified as school bus, since these trips are usually modeled only in a simple manner for school trips. Next, drive access to ferry and then other transit are identified. After that, any other ferry and other transit trips are classified as walk access (A small number of these may be bicycle access, but not enough to treat as a separate mode). Next, car trips are classified as shared ride 3+, shared ride 2,

or drive alone; depending on the greatest number of occupants for any car leg on the trip. Next, any bike trips are identified. Finally, the rules leave only the trips with only walk legs, and these are walk trips. Note that any type of trip can contain walk legs, but a "walk trip" contains only walk legs and no other modes.

Table 1.4   Mode Priority Rules for Trip Mode

Level	Rule	Trip mode is…
0	If any Other mode legs…	Other, otherwise
1	If any School bus legs…	School bus, otherwise
2	If both Ferry and Car legs…	Drive to/from ferry, otherwise
3	If both Transit and Car legs…	Drive to/from transit, otherwise
4	If any Ferry legs…	Walk to/from ferry, otherwise
5	If any Transit legs…	Walk to/from transit, otherwise
6	If any Car legs with 2+ passengers	Shared ride 3+, otherwise
7	If any Car legs with 1 passenger	Shared ride 2, otherwise
8	If any Car legs	Drive alone, otherwise
9	If any Bike legs	Bike, otherwise
10	If only Walk legs	Walk

The same priority order as above also is used to determine the main mode of a tour. In fact, trips can be thought of as "legs" of a tour, just like there are legs within a trip. It is good to use consistent rules, because whether an activity is treated as a separate stop location or not is sometimes rather arbitrary and up to the respondent. For example, if someone walks to the bus stop and then stops in a store for a minute to buy a newspaper before boarding the bus, it is the intention of the survey that that be recorded as a shopping stop at that location, but many respondents may have simply recorded it as two legs of a walk to transit trip and not given the address of the store.

Applying these rules to tours means that any tour can contain a walk trip, but "walk tours" can contain only walk trips. The only instance where these rules are applied differently to tours than they are to trips is in the case of drive to ferry or drive to transit. A tour only needs to include one or more drive to ferry trip to be included as a drive to ferry tour, and does not need to include both car trips and ferry trips separately. Also note that for ferry and transit, drive access and drive egress are grouped together for this analysis. In tour-based modeling,

those can usually be assigned based on whether the half-tour is leaving home or arriving back at home.

1.2 A USEFUL SEGMENTATION FOR PERSON TYPE

In most recent activity-based model systems, it has proven very useful to maintain eight-category segmentation by person type. The rules for this segmentation are presented in Table 1.5.

Table 1.5 Rules for Person Type Segmentation

Rule	Person type is...
Person is age 0-4 (AGERNG=1)	Young child age 0-4, otherwise
Person is age 5-15 (AGERNG=2)	Grade school age 5-15, otherwise
Person is age 16-24, in grade K-12 (AGERNG=3,4, STYPE=1,2)	Grade school age 16+, otherwise
Person is a full-time worker (WRKR=1)	Full-time worker, otherwise
Person is a full-time post K-12 student (STYPE=4)	College student, otherwise
Person is a part-time worker (WRKR=2)	Part-time worker, otherwise
Person is an active student (SSTATUS=1)	College student, otherwise
Person is age 65+ (AGERNG>8)	Non-worker age 65+, otherwise
All other persons	Non-worker, age 18-64

The rules are simple and straightforward, except for classifying adults who both work and study. Here, the first check is for full-time workers, then for full-time students, then for part-time workers, then for any other active students. Note that volunteer workers and those looking for work are not classified as workers, and there is no standard treatment of these categories. Behaviorally, they may be most like part-time workers, as they tend to perform some activities that they label work, but not every day, and not for long durations. Retired is defined as non-workers age 65 and over. Behaviorally, it doesn't matter whether somebody used to work or not – the age is the important variable for this purpose.

A series of tables show the distributions of a number of person and household variables within each of the eight person types. A few results worth noting are:

- **Currently Employed/Type of Worker (Table 1.6 and Table 1.7).** About 44 percent of college students and 29 percent of grade school students age 16+ also are part-time workers. 24% of non-workers age 18-64 label themselves as "retired", as do 92% of non-workers age 65+.

- **Attending Any Level of School (Table 1.8).** Only about 3 percent of full-time workers and 8 percent of part-time workers also are students.

- **Type of School (Table 1.9).** About 86 percent of college students are full-time college students.

- **Age Range (Table 1.10).** About 2 percent of full-time workers, 9 percent of part-time workers, and 1 percent of college students are age 65 or older.

- **Gender (Table 1.11).** About 74 percent of part-time workers, 71 percent of non-workers age 18-64 and 61 percent of college students are female.

- **Relationship to First Person (Table 1.12).** About 38 percent of college students live with their parents (son/daughter of the main respondent). It is likely that the sample under-represents adult students who live in dorms or with other students, as they are very difficult to recruit. The expansion weights should correct for this to some extent, however.

- **Valid Driver License (Table 1.13).** About 98 percent of full time workers and 90 percent of other adults have a valid driver license. Only about 58 percent of grade school students age 16+ have a license.

- **Number of Persons in HH (Table 1.14).** 30 percent of non-workers age 65+ live alone, and very few live in households of size 3 or more.

- **Number Employed in HH (Table 1.15).** There appear to be some erroneous cases, as almost two percent of part-time workers report being in 0-worker households. About 84 percent of non-workers age 65+ and about five percent of children live in 0-workers households.

Total Household Income (Table 1.16). The non-workers and college students clearly have the highest percentages in the lower household income brackets

Table 1.6   Currently Employed by Person Type

Currently Employed * person type Crosstabulation

% within person type

					person type					
		full time worker	part time worker	non-worker age 65+	non-worker age 18-64	college student	grade school age 16+	grade school age 5-15	young child age 0-4	Total
Currently Employed	Yes	100.0%	100.0%			44.0%	28.7%			51.4%
	No			100.0%	100.0%	56.0%	71.3%	100.0%	100.0%	48.6%
Total		100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

Table 1.7   Type of Worker by Person Type

Type of Worker * person type Crosstabulation

% within person type

				person type						
		full time worker	part time worker	non-worker age 65+	non-worker age 18-64	college student	grade school age 16+	grade school age 5-15	young child age 0-4	Total
Type of Worker	NA (under 16)							100.0%	100.0%	21.4%
	PAID full-time worker	100.0%					.2%			40.4%
	PAID part-time worker		100.0%			44.0%	28.5%			11.0%
	UNPAID worker or volunteer			3.2%	8.5%	4.1%	1.9%			1.7%
	Retired			91.8%	24.1%	4.0%	2.1%			12.0%
	Not Working			5.0%	66.9%	47.2%	67.2%			13.5%
	Dont Know						.1%			.0%
	Refused					.5%	.5%			.1%
Total		100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

Table 1.8   Currently Attending School by Person Type

Currently Attending Any Level of School * person type Crosstabulation

% within person type

				person type						
		full time worker	part time worker	non-worker age 65+	non-worker age 18-64	college student	grade school age 16+	grade school age 5-15	young child age 0-4	Total
Currently Attending Any Level of School	Yes	3.4%	7.7%			100.0%	100.0%	95.4%	26.4%	24.1%
	No	96.5%	92.2%	99.9%	100.0%			4.6%	73.5%	75.8%
	Dont Know	.1%			.0%				.1%	.0%
	Refused		.0%	.1%						.0%
Total		100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

Table 1.9   Type of School by Person Type

Type of school * person type Crosstabulation

% within person type

				person type						
		full time worker	part time worker	non-worker age 65+	non-worker age 18-64	college student	grade school age 16+	grade school age 5-15	young child age 0-4	Total
Type of school	NA	96.6%	92.3%	100.0%	100.0%			4.6%	73.5%	75.9%
	Pre-school/Nursery school					.5%		4.2%	24.8%	2.3%
	K-12		.1%			2.4%	100.0%	91.0%	1.7%	17.1%
	Vocational/Technical	.3%	1.6%			2.6%		.0%		.3%
	FULL-time college student	1.2%				85.9%				2.8%
	PART-time college student	2.0%	6.0%			8.7%				1.6%
	Refused							.2%		.0%
Total		100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

Table 1.10   Age Range by Person Type

Age Range * person type Crosstabulation

% within person type

		person type								Total
		full time worker	part time worker	non-worker age 65+	non-worker age 18-64	college student	grade school age 16+	grade school age 5-15	young child age 0-4	
Age Range	Under 5								100.0%	6.6%
	5 to 15							100.0%		14.8%
	16 to 17		.5%		.4%	3.3%	82.7%			3.0%
	18 to 24	4.4%	7.7%		7.1%	42.9%	17.3%			5.2%
	25 to 34	22.7%	17.3%		17.8%	30.5%				14.0%
	35 to 44	23.8%	21.9%		20.4%	11.4%				14.7%
	45 to 54	29.5%	22.0%		22.0%	6.5%				17.1%
	55 to 64	18.1%	22.0%		32.2%	4.3%				13.9%
	65 to 74	1.4%	7.0%	51.2%		.9%				5.9%
	75 to 84	.1%	1.5%	42.3%		.2%				4.1%
	85 and over	.0%		6.5%						.6%
	Refused	.1%	.0%							.0%
Total		100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

Table 1.11   Gender by Person Type

Gender * person type Crosstabulation

% within person type

				person type						
		full time worker	part time worker	non-worker age 65+	non-worker age 18-64	college student	grade school age 16+	grade school age 5-15	young child age 0-4	Total
Gender	Male	58.2%	26.0%	40.9%	28.6%	38.6%	58.8%	50.8%	53.7%	47.7%
	Female	41.7%	73.8%	59.0%	71.4%	61.4%	41.2%	49.1%	46.3%	52.2%
	Refused	.0%	.3%	.1%				.1%		.1%
Total		100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

Table 1.12   Relationship to First Person by Person Type

Relationship to first person * person type Crosstabulation

% within person type

		person type								
		full time worker	part time worker	non-worker age 65+	non-worker age 18-64	college student	grade school age 16+	grade school age 5-15	young child age 0-4	Total
Relationship to first person	Contact Person	52.6%	65.3%	62.9%	58.8%	39.3%	.2%		.2%	42.1%
	Husband/Wife/Partner	40.4%	23.5%	30.5%	29.0%	14.7%		.6%	.6%	25.8%
	Son/Daughter/in-law	4.0%	7.8%	.0%	5.6%	37.8%	94.4%	94.8%	95.0%	27.6%
	Brother/Sister/in-law	.6%	.7%	.0%	1.8%	1.2%	1.9%	.6%	.1%	.8%
	Mother/Father/in-law	.7%	.4%	5.6%	1.8%				.2%	1.1%
	Other Relative	.2%	.5%	.5%	.6%	.1%	3.4%	3.0%	3.2%	1.0%
	Roommate/Friend	1.4%	1.9%	.3%	1.7%	4.7%	.2%	.6%	.4%	1.2%
	Foster Home Resident	.0%			.7%	2.1%		.3%		.2%
	Grandchild/In-Law	.1%		.1%		.1%				.0%
	Other Specify	.0%								.0%
	Dont Know			.1%				.1%	.2%	.0%
Total		100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

Table 1.13   Valid Driver License by Person Type

Valid driver license * person type Crosstabulation

% within person type

		person type								Total
		full time worker	part time worker	non-worker age 65+	non-worker age 18-64	college student	grade school age 16+	grade school age 5-15	young child age 0-4	
Valid driver license	Yes	97.7%	92.8%	86.4%	87.8%	88.6%	57.7%			72.3%
	No	2.3%	7.2%	13.5%	12.1%	11.2%	42.3%			6.3%
	Not Applicable							100.0%	100.0%	21.4%
	Dont Know	.0%		.1%	.1%	.1%				.0%
Total		100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

Table 1.14   Number of Persons in Household by Person Type

Number of persons in Household * person type Crosstabulation

% within person type

		person type								Total
		full time worker	part time worker	non-worker age 65+	non-worker age 18-64	college student	grade school age 16+	grade school age 5-15	young child age 0-4	
Number of persons in Household	1	15.1%	12.5%	30.0%	14.9%	11.4%				12.3%
	2	35.0%	35.0%	58.5%	34.6%	26.2%	6.9%	3.2%	1.4%	29.0%
	3	19.7%	18.4%	6.1%	15.3%	23.2%	29.0%	17.9%	23.4%	18.1%
	4	21.7%	23.3%	3.3%	21.9%	26.2%	43.3%	47.5%	47.2%	26.5%
	5	6.4%	8.5%	1.7%	9.2%	11.0%	14.7%	19.0%	17.0%	9.5%
	6	1.7%	1.7%	.4%	3.5%	1.6%	5.8%	9.5%	7.1%	3.5%
	7	.2%	.3%		.3%	.5%	.2%	1.3%	1.9%	.5%
	8	.2%	.3%		.3%			1.6%	1.9%	.5%
Total		100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

Table 1.15 Number of Employed in Household by Person Type

Number Employed in Household * person type Crosstabulation

% within person type

		full time worker	part time worker	non-worker age 65+	non-worker age 18-64	college student	grade school age 16+	grade school age 5-15	young child age 0-4	Total
Number Employed in Household	0	.1%	1.4%	84.0%	36.9%	17.0%	4.3%	7.1%	4.7%	15.0%
	1	36.3%	29.2%	13.8%	54.4%	28.2%	20.6%	44.8%	51.4%	37.7%
	2	51.5%	53.4%	2.1%	5.7%	28.4%	43.6%	44.7%	42.4%	38.2%
	3	9.5%	11.3%	.1%	2.6%	23.2%	25.6%	3.0%	1.5%	7.3%
	4	2.3%	3.8%		.3%	2.2%	5.6%	.4%		1.6%
	5	.2%	.9%		.1%	1.0%	.3%			.2%
Total		100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

Table 1.16   Total Household Income by Person Type

Total Household Income * person type Crosstabulation

% within person type

| | | person type | |
		full time worker	part time worker	non-worker age 65+	non-worker age 18-64	college student	grade school age 16+	grade school age 5-15	young child age 0-4	Total
Total Household Income	Less than $10,000	1.0%	3.2%	3.9%	7.5%	5.7%	3.3%	3.2%	.7%	2.9%
	$10,000 to less than $20,000	2.7%	9.0%	11.0%	11.3%	7.3%	1.9%	3.6%	4.0%	5.5%
	$20,000 to less than $30,000	4.9%	9.6%	13.9%	7.7%	13.0%	5.3%	4.8%	5.3%	6.8%
	$30,000 to less than $40,000	7.0%	8.9%	14.7%	7.9%	4.5%	7.3%	6.5%	7.0%	7.9%
	$40,000 to less than $50,000	8.7%	9.0%	11.9%	8.1%	10.6%	5.5%	7.7%	11.7%	8.9%
	$50,000 to less than $60,000	8.0%	6.0%	7.6%	6.1%	12.4%	7.3%	7.1%	6.3%	7.4%
	$60,000 to less than $70,000	8.4%	7.3%	5.4%	6.7%	7.8%	6.7%	9.3%	8.8%	7.9%
	$70,000 to less than $80,000	7.8%	6.5%	3.2%	5.2%	6.3%	7.2%	8.9%	11.7%	7.3%
	$80,000 to less than $90,000	7.1%	4.8%	1.7%	5.0%	4.7%	7.8%	5.6%	8.7%	5.9%
	$90,000 to less than $100,000	6.2%	5.7%	1.9%	4.0%	4.2%	7.5%	6.3%	6.3%	5.5%
	$100,000 to less than $110,000	5.3%	3.0%	1.1%	4.2%	3.7%	6.7%	4.8%	3.1%	4.3%
	$110,000 to less than $120,000	4.3%	3.4%	1.8%	3.0%	3.1%	4.3%	6.7%	1.7%	4.0%
	$120,000 to less than $130,000	3.5%	3.2%	.9%	2.0%	2.7%	3.6%	4.1%	3.2%	3.1%
	$130,000 to less than $140,000	2.5%	1.7%	.5%	1.6%	2.0%	1.7%	2.0%	2.8%	2.0%
	$140,000 to less than $150,000	2.5%	1.9%	.9%	1.2%	1.0%	2.3%	1.8%	2.4%	2.0%
	$150,000 or more	8.8%	5.9%	1.8%	6.8%	4.1%	8.8%	8.2%	7.1%	7.3%
	Below $50,000 / Refused	1.5%	2.6%	5.3%	1.8%	1.7%	1.5%	1.0%	1.3%	1.9%
	$50,000 to $100,000 / Refused	1.4%	1.5%	3.4%	1.8%	.7%	2.3%	1.3%	1.4%	1.6%
	Above $100,000 / Refused	2.7%	1.9%	.8%	1.4%	.4%	3.0%	2.3%	1.8%	2.1%
	Dont Know	1.7%	1.4%	2.5%	2.7%	.4%	2.9%	1.6%	1.3%	1.8%
	Refused	4.0%	3.4%	5.9%	3.8%	3.6%	3.1%	3.3%	3.6%	3.9%
Total		100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

1.3 PERSON-DAY LEVEL ANALYSIS

In this section, the eight person type classification is used once again. This time, we look at trip- and tour-making characteristics within each diary day. For each respondent, the two diary days are treated as two separate observations of travel days, the way they are typically treated in modeling. To be a valid tour, the trip must begin and end at home (for home-based tours) or at work (for work-based subtours).

- **Number of trips in person day (Table 1.17).** Overall, about 13 percent of respondents did not report any trips within a weekday. This is highest for children age 0-4 (24 percent), non-workers age 65+ (30 percent), and other non-workers (28 percent). Clearly, work and school are the main reasons people leave home. There are only about one percent of cases with just one trip, as this would indicate a day that either starts or ends away from home.

- **Number of home-based tours in person day (Table 1.18).** About 17 percent of people made no tours during the day. This includes the 14 percent who made fewer than two trips, plus some other people who made at least two trips, but did not leave and come back to home during those trips. About 30 percent made more than one home-based tour, with the numbers highest among college students and part-time workers.

- **Number of work-based subtours in person day (Table 1.19).** Only about 6 percent of full-time workers and 2 percent of part-time workers made subtours to and from the workplace. This incidence may seem low, but it also is typical of other recent surveys. It may be the case that very short walk trips near the workplace are under-reported.

- **Number of intermediate stops made on tours in person day (Table 1.20).** Overall, about 44 percent of the respondents made at least one extra stop on a tour during the day, with the highest number among part-time workers.

- **Person day begins at home? Person day ends at home? (Table 1.21).** About 3 percent of people did not begin the diary day at home, and 4 percent did not end the diary day at home. These are sometimes the same people, but

often not. The incidence is highest among children age 5-15, many of whom share time between divorced parents.

Table 1.17   Number of Trips in Person Day by Person Type

number of trips in person day * person type Crosstabulation

% within person type

					person type					
		full time worker	part time worker	non-worker age 65+	non-worker age 18-64	college student	grade school age 16+	grade school age 5-15	young child age 0-4	Total
number of trips in person day	0	7.1%	6.1%	29.6%	27.6%	6.3%	4.5%	6.3%	24.1%	12.8%
	1	1.7%	.8%	.8%	1.5%	.7%	.1%	1.3%	2.0%	1.4%
	2	28.9%	23.1%	20.4%	16.2%	25.7%	34.1%	38.4%	27.6%	27.2%
	3	14.1%	8.9%	12.5%	8.0%	13.1%	11.5%	12.4%	10.1%	12.0%
	4	17.5%	17.6%	13.0%	12.1%	19.9%	22.6%	20.6%	13.3%	16.8%
	5	10.1%	10.5%	9.2%	8.6%	9.4%	8.5%	8.5%	7.3%	9.4%
	6	8.5%	9.6%	6.1%	7.7%	5.4%	9.0%	6.4%	6.6%	7.7%
	7	4.5%	7.7%	3.0%	5.3%	5.7%	2.7%	2.4%	3.0%	4.3%
	8	3.3%	4.4%	2.4%	4.2%	5.0%	3.4%	1.6%	1.8%	3.1%
	9	1.9%	4.3%	1.2%	2.3%	2.9%	1.2%	1.0%	1.2%	1.9%
	10	1.0%	2.5%	.6%	2.5%	3.6%	1.6%	.4%	1.8%	1.4%
	11	.5%	1.9%	.6%	1.5%	1.9%		.4%	1.0%	.8%
	12	.4%	.7%	.3%	.8%	.2%	.4%	.0%		.4%
	13	.3%	.6%	.2%	.9%		.4%	.1%	.1%	.3%
	14	.1%	.7%	.0%	.4%	.3%		.0%		.1%
	15	.1%	.1%		.3%				.2%	.1%
	16	.0%	.2%	.0%	.0%					.0%
	17	.0%	.1%		.1%					.0%
	18		.1%		.1%					.0%
	19		.1%							.0%
	20	.0%								.0%
	21	.0%	.1%		.0%					.0%
Total		100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

Table 1.18   Number of Home-Based Tours in Person Day by Person Type

number of home-based tours in person day * person type Crosstabulation

% within person type

		person type								
		full time worker	part time worker	non-worker age 65+	non-worker age 18-64	college student	grade school age 16+	grade school age 5-15	young child age 0-4	Total
number of home-based tours in person day	0	11.4%	8.4%	31.9%	30.4%	9.3%	6.6%	11.0%	28.4%	16.5%
	1	61.2%	47.8%	45.3%	36.0%	47.9%	54.9%	57.9%	45.0%	52.9%
	2	22.1%	28.2%	17.9%	20.8%	31.5%	28.7%	27.5%	20.4%	23.2%
	3	4.2%	11.1%	3.9%	8.3%	8.8%	7.6%	3.2%	4.7%	5.5%
	4	1.0%	3.5%	.8%	3.8%	2.0%	2.2%	.4%	1.5%	1.6%
	5	.1%	.8%	.1%	.6%	.3%	.1%			.2%
	6	.0%	.2%		.1%	.3%				.1%
	7	.0%						.0%		.0%
Total		100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

Table 1.19   Number of Work-Based Subtours in Person Day by Person Type

number of work-based subtours in person day * person type Crosstabulation

% within person type

		person type								
		full time worker	part time worker	non-worker age 65+	non-worker age 18-64	college student	grade school age 16+	grade school age 5-15	young child age 0-4	Total
number of work-based subtours in person day	0	94.2%	98.1%	99.9%	99.6%	99.2%	99.8%	100.0%	100.0%	97.4%
	1	5.3%	1.9%	.1%	.3%	.8%	.2%			2.4%
	2	.5%	.0%		.0%					.2%
	3	.0%								.0%
Total		100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

Table 1.20   Number of Intermediate Stops Made on Tours by Person Type

number of intermediate stops made on tours * person type Crosstabulation

% within person type

					person type					
		full time worker	part time worker	non-worker age 65+	non-worker age 18-64	college student	grade school age 16+	grade school age 5-15	young child age 0-4	Total
number of intermediate stops made on tours	0	51.1%	44.7%	60.6%	57.6%	52.9%	64.5%	66.2%	65.9%	56.1%
	1	20.7%	20.7%	17.6%	15.7%	19.7%	16.7%	18.1%	15.7%	18.8%
	2	14.7%	15.3%	10.8%	9.8%	11.4%	10.7%	8.8%	9.0%	12.2%
	3	7.0%	8.2%	5.2%	6.6%	6.7%	3.8%	3.1%	4.0%	6.0%
	4	3.3%	4.2%	2.5%	4.6%	4.3%	2.6%	2.2%	2.5%	3.3%
	5	1.6%	3.5%	2.1%	2.6%	2.1%	.8%	1.0%	1.3%	1.8%
	6	.8%	1.6%	.5%	1.4%	2.5%	.2%	.3%	.8%	.9%
	7	.3%	.8%	.3%	1.1%	.2%	.2%	.1%	.6%	.4%
	8	.1%	.3%	.2%	.2%		.2%	.1%		.1%
	9	.2%	.1%	.2%	.3%	.2%	.3%	.1%	.2%	.2%
	10+	.1%	.6%	.0%	.3%					.1%
Total		100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

Table 1.21   Person Day Begins or Ends at Home by Person Type

Person Day Begins at Home

person day begins at home? * person type Crosstabulation

% within person type

		full time worker	part time worker	non-worker age 65+	non-worker age 18-64	college student	grade school age 16+	grade school age 5-15	young child age 0-4	Total
person day begins at home?	no	3.7%	2.4%	1.1%	2.1%	4.6%	2.2%	3.7%	2.1%	3.0%
	yes	96.3%	97.6%	98.9%	97.9%	95.4%	97.8%	96.3%	97.9%	97.0%
Total		100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

Person Day End at Home

person day ends at home? * person type Crosstabulation

% within person type

		full time worker	part time worker	non-worker age 65+	non-worker age 18-64	college student	grade school age 16+	grade school age 5-15	young child age 0-4	Total
person day ends at home?	no	4.3%	3.2%	2.1%	2.5%	3.8%	3.0%	5.4%	4.1%	3.8%
	yes	95.7%	96.8%	97.9%	97.5%	96.2%	97.0%	94.6%	95.9%	96.2%
Total		100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

- **Average number of home-based tours by purpose (Table 1.22 and Figure 1.1).** Full-time workers make 0.81 work tours on average, and 1.23 tours in total. This is typical in household travel surveys because people may stay home from work on a certain day, or have to do something else instead of work, or else they only work 4 days per week (they could still have enough hours to be full-time), or else they work some on weekends instead of weekdays, or else they telecommute on some days (there are many possible reasons). Part-time workers make only 0.59 work tours, on average, but make 1.57 tours in total. Many of those additional tours are escort tours, picking up and dropping off children. Non-workers age 18-64 also make many escort tours, as do children age 0-4. In the latter case, the activity purpose is typically "accompany other person." Children age 5-15 make 0.81 school tours, and grade school 16+ make 0.90 school tours, while college students make only 0.59 school tours but also make 0.22 work tours. Non-workers age 65+ make the fewest tours in total (0.97), with the most common purposes being personal business and shopping. Note that both "non-worker" groups make about 0.05 work tours on average. As discussed above, this may include volunteer work or other types of non-paid work or looking for work.

Table 1.22   Average Number of Home-based Tours by Purpose and Person Type

	Full-Time Worker	Part-Time Worker	Non-Worker Age 65+	Non-Worker 18-64	College Student	Grade School Age 16+	Grade School 5-15	Child Age 0-4
Work	0.81	0.59	0.04	0.06	0.22	0.06	0.00	0.00
School	0.01	0.04	0.00	0.01	0.59	0.90	0.81	0.29
Escort	0.10	0.37	0.18	0.42	0.23	0.14	0.18	0.52
Pers.bus.	0.09	0.17	0.28	0.24	0.14	0.12	0.05	0.05
Shopping	0.07	0.16	0.19	0.19	0.14	0.04	0.02	0.03
Meal	0.04	0.06	0.09	0.06	0.05	0.02	0.02	0.03
Social	0.03	0.05	0.07	0.07	0.03	0.07	0.04	0.03
Recreation	0.08	0.13	0.13	0.15	0.09	0.10	0.13	0.09
Total	**1.23**	**1.57**	**0.97**	**1.21**	**1.48**	**1.44**	**1.24**	**1.06**

Figure 1.1   Average Tours Per Day by Purpose
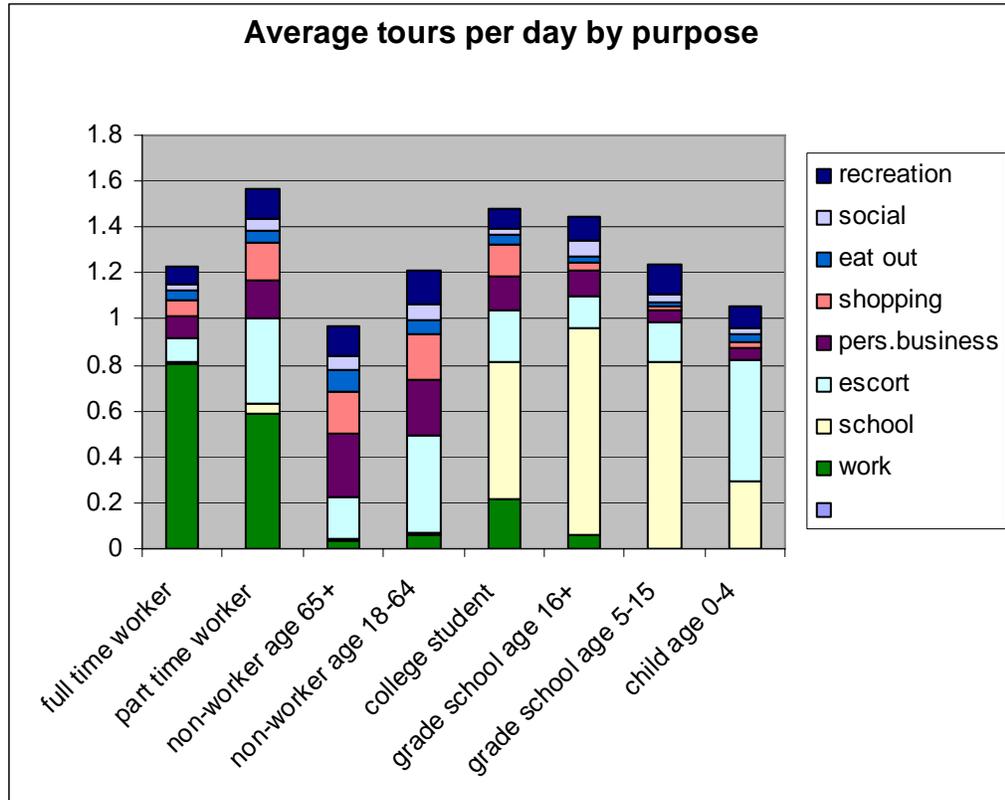
- **Average minutes spent in the day by purpose (Table 1.23 and Figure 1.2).** All groups spend most of the 1,440 minutes in a day at home, particularly non-workers and children age 0 to 4. Other than work and school, travel and personal business are the categories that the most time is devoted to. Workers and college students spend almost 90 minutes per day traveling, on average, while non-workers age 65+ and children under age 16 spend less than 60 minutes traveling. All adult groups spend less than 15 minutes on escort activities – even though they may participate in several pick up/drop off activities, those activities are of very short duration. The time expenditure also is shown graphically.

Table 1.23 Average Minutes Spent in Day by Purpose and Person Type

	Full-Time Worker	Part-Time Worker	Non-Worker Age 65+	Non-Worker 18-64	College Student	Grade School Age 16+	Grade School 5-15	Child Age 0-4
Travel	89.5	82.4	57.4	65.9	92.2	68.6	54.4	44.8
Work	418.7	215.2	10.1	16.2	83.6	20.7	0.8	1.8
School	2.2	6.5	0.7	3.0	170.0	349.6	323.8	130.6
Escort	6.9	13.5	11.1	14.5	10.4	12.0	23.0	58.1
Pers.bus.	50.2	109.8	81.1	119.7	99.6	79.5	47.3	47.5
Shopping	7.5	16.6	17.2	19.1	9.6	4.0	2.4	3.5
Meal	9.3	10.6	15.0	13.0	11.2	5.6	4.3	6.2
Social	6.3	11.9	14.2	15.2	14.6	19.9	11.1	11.1
Recreation	12.7	17.4	19.3	20.3	14.9	23.8	23.9	15.0
At home	836.7	956.1	1213.9	1152.9	933.9	856.3	949.0	1121.4

Figure 1.2   Average Tours Per Day by Purpose
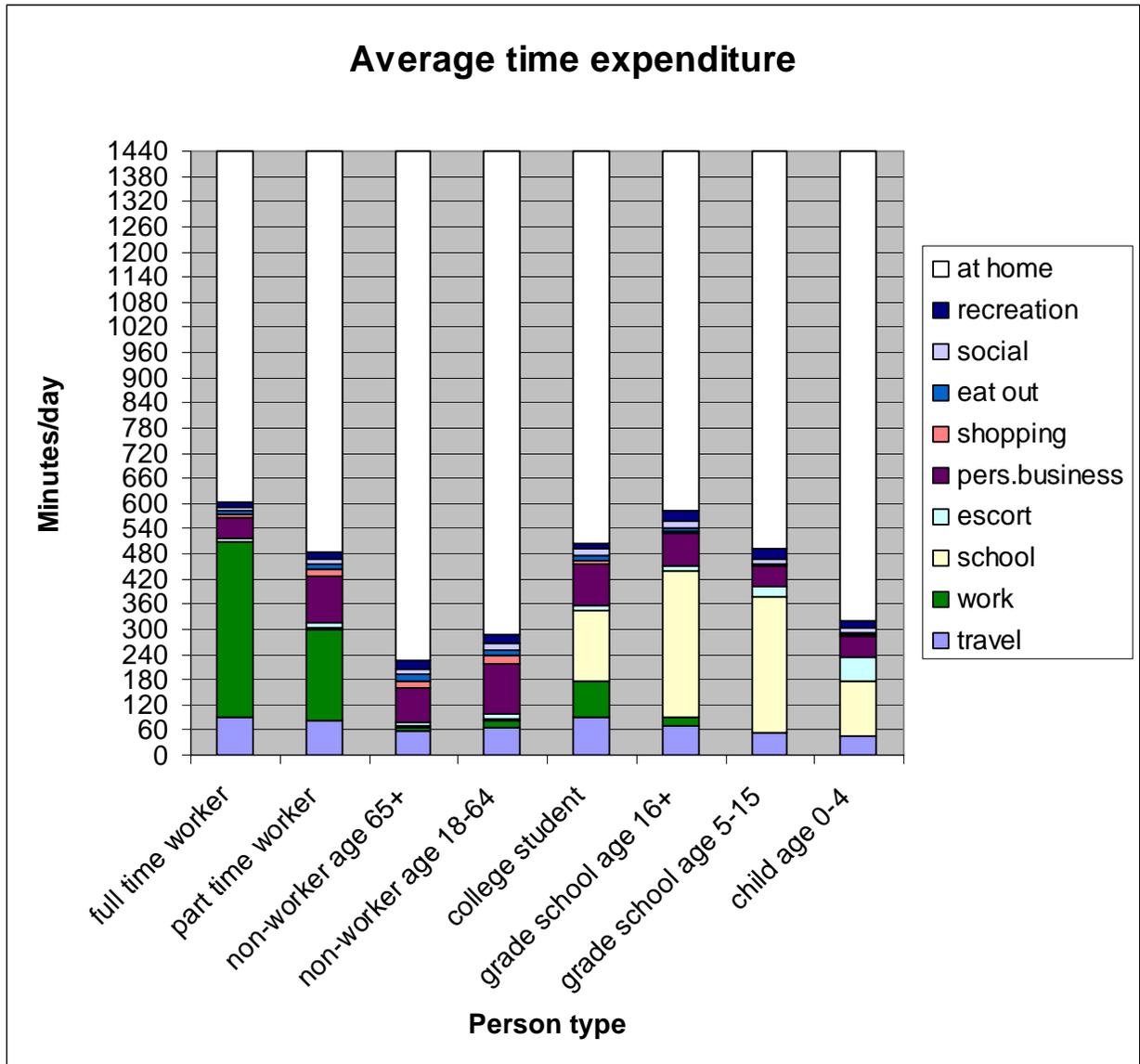
1.4 TOUR-LEVEL ANALYSIS

This section reports results analyses done using the tour-level file.

- **Tour main mode by purpose type (Table 1.24).** This table is shown three times, first in terms of absolute number of tour records in the file, second in terms of the expanded number of tours, and then finally in terms of mode share within purpose. Overall, only 201 tours use all "other" modes. There are 1,118 school bus tours, almost all for the school purpose. There are 206 drive to ferry and 66 walk to ferry tours, mostly work tours. There are 245 drive to transit tours, again mostly work tours. There are 1,134 walk to transit tours, with almost 400 for purposes other than work. There are 308 bike tours, about half for work. There 1925 walk tours, split fairly evenly across the purposes. Overall, this would seem adequate to model transit and ferry and non-motorized mode choice at the tour level, particularly for work tours. Note the school tours are mostly school bus and shared ride, while escort tours are about 90 percent shared ride. In total, transit and ferry make up 14 percent of work tours. Because we deliberately over-sampled ferry users, park and ride users, and transit areas, this is likely higher than the actual share in the region. Expanded, the records represent 8.27 million tours in the region over 2 days, or 4.14 million daily tours.

- **Tour main mode by person type (Table 1.25).** The advantage of segmenting by person type is clear when looking at mode choice. Children under 16 do not choose drive alone (except for some anomalies in the data) and rarely choose drive to transit (these could include "kiss and ride"). Full-time workers are more likely to use ferry and transit than part-time workers. College students and children 5-15 are most likely to use bike.

- **Tour purpose type by priority type (Table 1.26).** When looking at the primary home-based tour of the day, about 45 percent of such tours are work tours, and almost 23 percent are school tours. Among secondary tours of the day, however, very few are work and school tours. Most are escort, personal business, and recreation tours. Most work-based subtours are for meals (40 percent) or work-related activities (22 percent).

- **Purpose type at primary destination by purpose type of primary tour of day, among secondary tours only (Table 1.27).** Looking only within

secondary tours, there does not seem to be a very strong relationship between tour purpose and the purpose of the primary tour. Almost 11 percent of secondary tours for those who make work tours are additional work tours, but most are for escort, personal business, or recreation. Those whose primary tour of the day is for escort are likely to make additional escort tours (Often, escort tours come in pairs – one to drop off a child somewhere and another to retrieve that same child).

- **Number of trips in first half tour (Table 1.28).** Overall, about 80 percent of tours include only 1 trip (no intermediate stops) on the way to the primary destination. The purposes most likely to include stops are work, escort and shopping, while recreation tours are the least likely to include stops.

Table 1.24 Tour Main Mode by Purpose Type at Primary Destination

Count

| | | \multicolumn{8}{c}{purpose type at primary destination} | Total |
		work	school	escort	pers.bus.	shopping	meal	social	recreation	
tour main mode	others	88	10	20	37	6	7	12	21	201
	school bus	4	1099	7	4		1		3	1118
	drive to ferry	138	9	23	18	2	5	5	6	206
	drive to transit	204	25	8	3		2	1	2	245
	walk to ferry	54	2	2	4	1	2	1		66
	walk to transit	759	162	28	90	42	8	17	28	1134
	shared ride 3+	622	1080	2192	377	239	289	194	588	5581
	shared ride 2	1121	479	1761	618	495	395	214	470	5553
	drive alone	5374	338	86	1692	1275	431	416	812	10424
	bike	158	48	8	17	14	11	11	41	308
	walk	190	242	325	214	212	232	93	417	1925
Total		8712	3494	4460	3074	2286	1383	964	2388	26761

Expanded Count

tour main mode * purpose type at primary destination Crosstabulation

Count

| | | \multicolumn{8}{c}{purpose type at primary destination} | Total |
		work	school	escort	pers.bus.	shopping	meal	social	recreation	
tour main mode	others	26746	3784	9844	14702	2010	707	2757	6476	67026
	school bus	1359	429250	3031	1544		392		895	436471
	drive to ferry	25177	1390	4440	2204	304	422	611	1157	35705
	drive to transit	54744	11930	2660	643		512	141	704	71334
	walk to ferry	9804	433	186	613	84	533	220		11873
	walk to transit	212113	53477	11481	36033	15283	2332	4389	9464	344572
	shared ride 3+	203335	378797	752034	131604	86727	95164	68062	203289	1919012
	shared ride 2	371657	159915	545808	183822	157204	99735	62969	139382	1720492
	drive alone	1654403	119720	22798	445939	345589	113021	110453	213224	3025147
	bike	39425	18311	2405	3900	2828	1991	3079	14909	86848
	walk	50820	99675	105350	56021	48348	59372	20651	113087	553324
Total		2649583	1276682	1460037	877025	658377	374181	273332	702587	8271804

Table 1.24 Tour Main Mode by Purpose Type at Primary Destination (continued)

tour main mode * purpose type at primary destination Crosstabulation

% within purpose type at primary destination

		purpose type at primary destination								Total
		work	school	escort	pers.bus.	shopping	meal	social	recreation	
tour main mode	others	1.0%	.3%	.7%	1.7%	.3%	.2%	1.0%	.9%	.8%
	school bus	.1%	33.6%	.2%	.2%		.1%		.1%	5.3%
	drive to ferry	1.0%	.1%	.3%	.3%	.0%	.1%	.2%	.2%	.4%
	drive to transit	2.1%	.9%	.2%	.1%		.1%	.1%	.1%	.9%
	walk to ferry	.4%	.0%	.0%	.1%	.0%	.1%	.1%		.1%
	walk to transit	8.0%	4.2%	.8%	4.1%	2.3%	.6%	1.6%	1.3%	4.2%
	shared ride 3+	7.7%	29.7%	51.5%	15.0%	13.2%	25.4%	24.9%	28.9%	23.2%
	shared ride 2	14.0%	12.5%	37.4%	21.0%	23.9%	26.7%	23.0%	19.8%	20.8%
	drive alone	62.4%	9.4%	1.6%	50.8%	52.5%	30.2%	40.4%	30.3%	36.6%
	bike	1.5%	1.4%	.2%	.4%	.4%	.5%	1.1%	2.1%	1.0%
	walk	1.9%	7.8%	7.2%	6.4%	7.3%	15.9%	7.6%	16.1%	6.7%
Total		100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

Table 1.25 Tour Main Mode by Person Type

tour main mode * person type Crosstabulation

% within person type

		person type								Total
		full time worker	part time worker	non-worker age 65+	non-worker age 18-64	college student	grade school age 16+	grade school age 5-15	young child age 0-4	
tour main mode	others	.8%	.7%	2.1%	.9%	1.4%	.2%	.2%	.7%	.8%
	school bus	.0%	.1%	.0%	.1%	.4%	14.5%	31.9%	.8%	5.3%
	drive to ferry	.7%	.4%	.4%	.3%	.4%	.1%	.0%	.2%	.4%
	drive to transit	1.5%	.5%	.5%	.2%	2.5%	.9%	.1%	.1%	.9%
	walk to ferry	.3%	.0%	.0%	.1%	.2%				.1%
	walk to transit	5.3%	4.9%	2.7%	3.8%	12.8%	1.5%	1.2%	1.6%	4.2%
	shared ride 3+	11.9%	17.7%	9.5%	29.3%	17.0%	23.7%	43.5%	71.5%	23.2%
	shared ride 2	18.3%	27.0%	32.5%	25.8%	21.0%	26.0%	12.3%	18.4%	20.8%
	drive alone	54.2%	41.8%	45.8%	31.2%	33.9%	26.8%	.1%	.0%	36.6%
	bike	1.2%	.6%	.3%	.5%	2.8%	1.3%	1.8%	.2%	1.0%
	walk	5.8%	6.3%	6.2%	7.9%	7.6%	5.1%	8.9%	6.4%	6.7%
Total		100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

Table 1.26   Purpose Type at Primary Destination by Tour Priority Type

purpose type at primary destination * tour priority type Crosstabulation

% within tour priority type

		tour priority type			
		primary home-based tour	secondary home-based tour	work-based subtour	Total
purpose type at primary destination	work	45.4%	4.9%	22.1%	32.0%
	school	22.6%	1.6%		15.4%
	escort	12.8%	28.5%	6.9%	17.7%
	pers.bus.	6.7%	18.6%	13.1%	10.6%
	shopping	4.6%	14.8%	10.9%	8.0%
	meal	2.0%	7.2%	39.8%	4.5%
	social	2.2%	5.8%	1.0%	3.3%
	recreation	3.8%	18.5%	6.1%	8.5%
Total		100.0%	100.0%	100.0%	100.0%

Table 1.27   Purpose Type at Primary Destination by Purpose Type of Primary Tour of Day for Secondary Tours

purpose type at primary destination * purpose type of primary tour of day * tour priority type Crosstabulation

% within purpose type of primary tour of day

tour priority type: secondary home- based tour

		purpose type of primary tour of day								Total
		work	school	escort	pers.bus.	shopping	meal	social	recreation	
purpose type at primary destination	work	10.7%	4.5%							4.9%
	school	1.2%	5.8%							1.6%
	escort	25.5%	30.3%	47.7%						28.5%
	pers.bus.	16.8%	13.8%	16.5%	39.0%	35.6%	28.1%	32.4%	26.1%	18.6%
	shopping	13.7%	6.5%	12.7%	28.1%	35.0%	33.4%	30.1%	35.7%	14.8%
	meal	9.0%	4.8%	4.5%	10.6%	8.9%	14.8%	10.3%	10.8%	7.2%
	social	6.2%	7.4%	4.9%	3.2%	1.8%	5.4%	11.2%	3.4%	5.8%
	recreation	16.9%	26.9%	13.7%	19.1%	18.7%	18.3%	15.9%	23.9%	18.5%
Total		100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

Table 1.28   Number of Trips in First Half Tour by Purpose Type at Primary Destination

# of trips in first half tour * purpose type at primary destination Crosstabulation

% within purpose type at primary destination

		purpose type at primary destination								
		work	school	escort	pers.bus.	shopping	meal	social	recreation	Total
# of trips in first half tour	1	75.1%	85.3%	76.2%	85.2%	75.0%	86.2%	80.9%	90.7%	80.0%
	2	18.8%	11.6%	13.0%	9.5%	17.0%	10.3%	13.2%	6.6%	13.9%
	3	4.3%	2.3%	6.0%	3.0%	4.8%	2.1%	3.4%	1.6%	3.8%
	4	1.1%	.6%	2.2%	1.4%	2.1%	.7%	1.9%	.8%	1.3%
	5	.4%	.1%	1.4%	.5%	.5%	.4%	.5%	.4%	.6%
	6	.2%	.1%	.5%	.2%	.2%	.1%	.1%	.0%	.2%
	7	.0%	.0%	.3%	.3%	.2%	.1%			.1%
	8	.0%		.1%	.0%					.0%
	9	.0%	.0%	.1%			.0%			.0%
	10	.0%								.0%
	11			.0%						.0%
	12			.0%						.0%
	18			.0%						.0%
Total		100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

- **Number of trips in second half tour (Table 1.29).** Overall, about 71 percent of tours include only 1 trip (no intermediate stops) on the way home from the primary destination. Most tour purposes show a higher propensity to make stops on the way back home than on the way from home. Almost 40 percent of work tours include one or more stops on the way home.

Table 1.29   Number of Trips in Second Half Tour by Purpose Type at Primary Destination

# of trips in second half tour * purpose type at primary destination Crosstabulation

% within purpose type at primary destination

		purpose type at primary destination								Total
		work	school	escort	pers.bus.	shopping	meal	social	recreation	
# of trips in second half tour	1	61.1%	76.6%	68.4%	75.0%	78.1%	85.1%	85.0%	83.2%	71.4%
	2	23.1%	15.1%	18.7%	16.5%	15.6%	11.0%	11.5%	12.8%	18.0%
	3	10.3%	5.0%	8.0%	5.1%	3.9%	2.6%	2.6%	2.6%	6.8%
	4	3.4%	1.9%	2.9%	2.1%	1.5%	.8%	.6%	1.0%	2.4%
	5	1.2%	.7%	1.1%	.6%	.9%	.2%	.3%	.2%	.9%
	6	.5%	.3%	.7%	.5%	.1%	.3%		.1%	.4%
	7	.2%	.3%	.2%	.1%	.0%	.0%		.0%	.2%
	8	.1%		.0%					.1%	.0%
	9	.0%	.1%	.0%	.0%					.0%
	10	.0%		.0%	.0%					.0%
	11			.0%						.0%
	12			.0%						.0%
	14	.0%								.0%
	18			.0%						.0%
Total		100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

- **Average trips per tour by tour purpose (Figure 1.3):** The number of trips in the two half tours are added together, and the averages by tour purpose are shown graphically. Work and escort tours are the most "complex," containing about 3 trips per tour on average. Recreation tours are closest to the minimum of 2 trips per tour (no extra stops).

Figure 1.3   Average Trips Per Tour by Main Tour Purpose
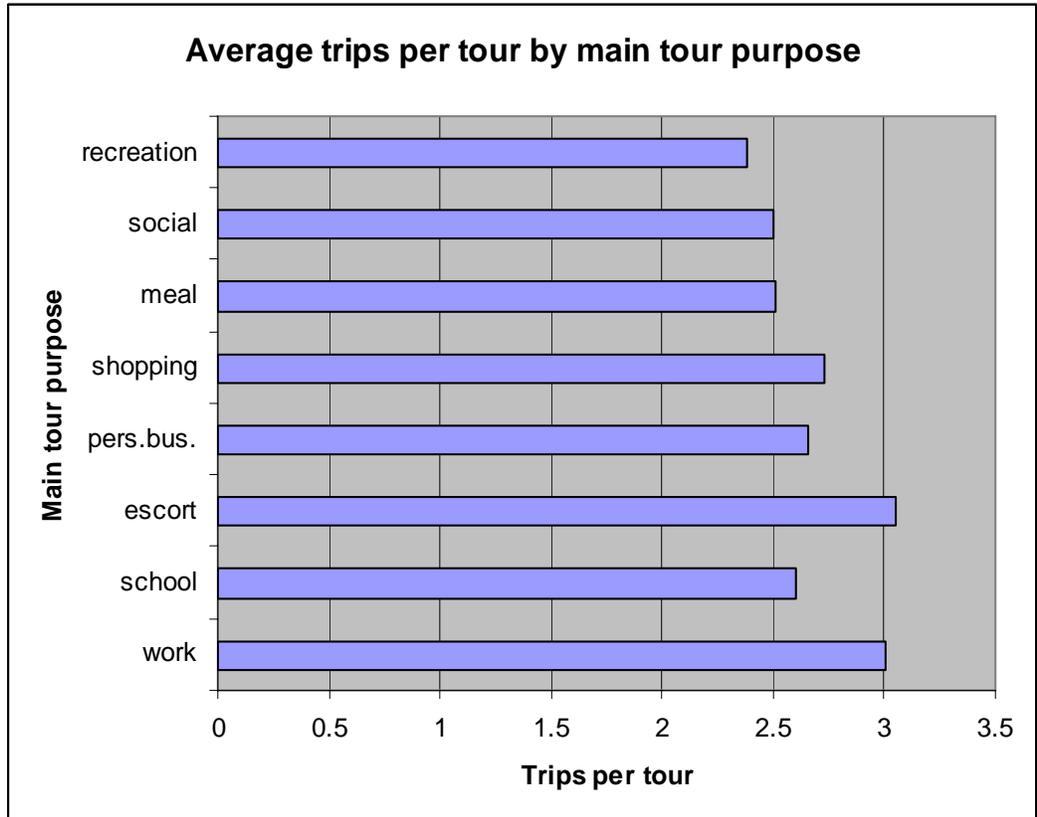
- **Average trips per tour by main tour mode (Figure 1.4).** Walk to ferry and drive to ferry tours are the most complex, with almost 4 trips per tour, on average. Transit trips and shared ride trips also include about 3 trips per tour. Walk and bike tours include the fewest trips. This is partly by definition, since walk and bike trips can be included in other tours, but no other modes can be included in walk and bike tours.

Figure 1.4   Average Trips Per Tour by Main Mode
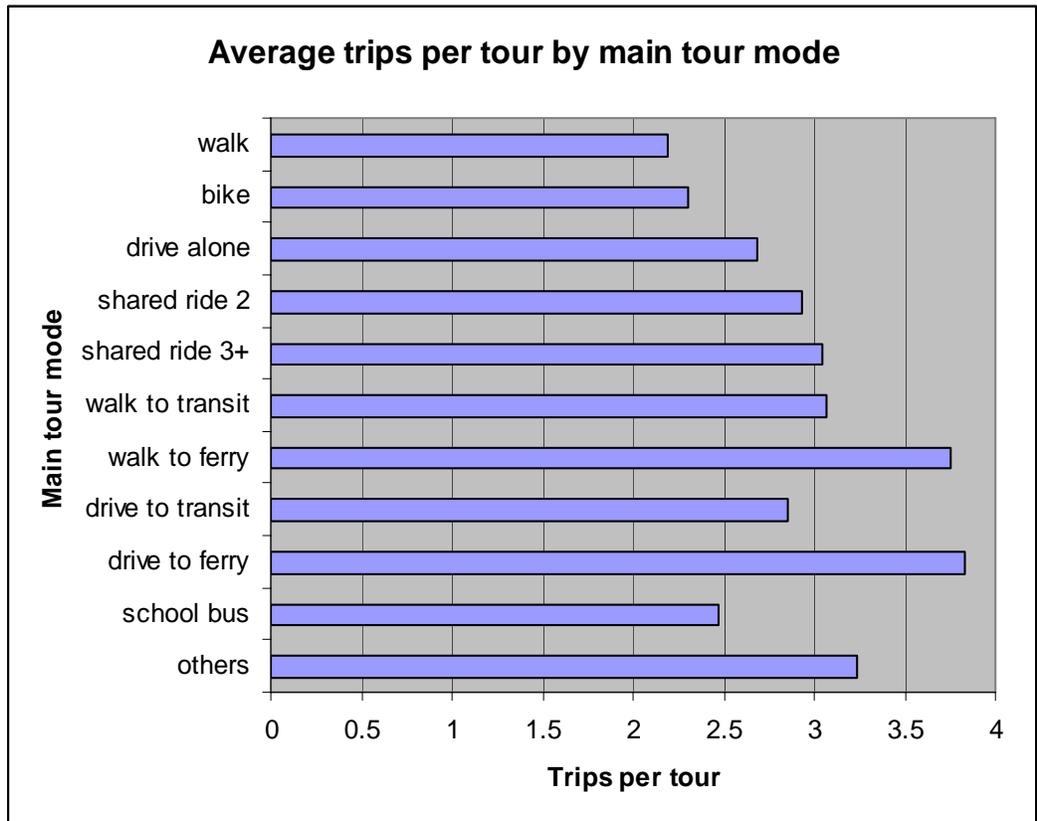
- **Departure hour from the tour origin (home or work) (Figure 1.5).** The departure time to begin the tour shows expected patterns, with spikes in the a.m. peak for work, school, and escort, a spike at midday for meal tours, and spikes in the p.m. peak for meal, social, recreation and personal business.

Figure 1.5   Departure Hour from Tour Origin
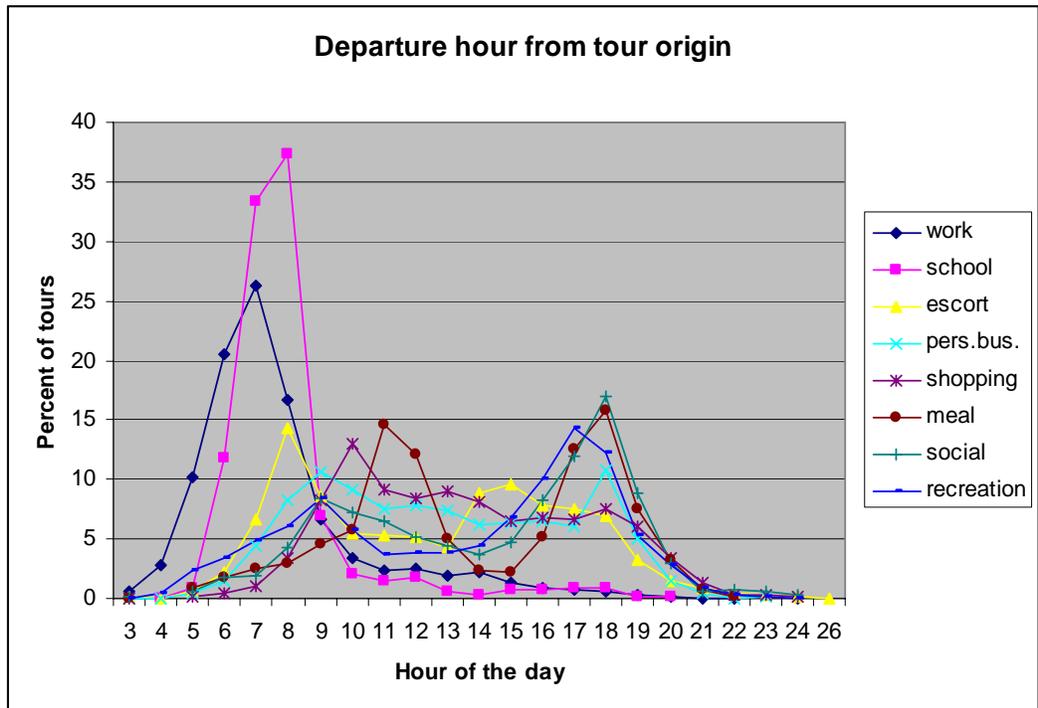
- **Arrival hour back at the tour origin (home or work) (Figure 1.6).** This pattern is somewhat less regular than the tour departure time, probably due to the fact that more people make additional stops on the way back home. There is an early afternoon peak for school and escort tours and a p.m. peak spike for work tours, social, recreation and meal tours tend to arrive home in the evening. Shopping and personal business tend to be spread across the day.

Figure 1.6   Arrival Hour Back at Tour Origin
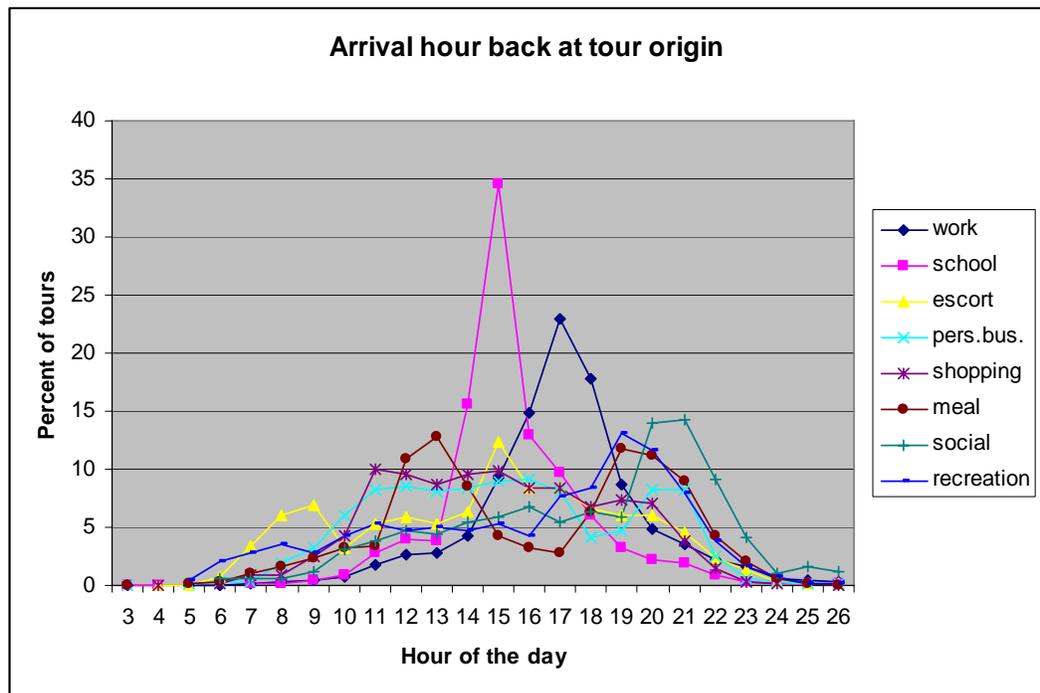
- **Tour duration away from the origin (Figure 1.7).** Escort tours tend to be of very short duration, with less than an hour away from home. Shopping and meal tours also tend to be quite short. School tours show a spike at about 7 hours away from home, and work tours tend to range from 8 to 12 hours away from home.

Figure 1.7   Tour Duration Away from the Origin
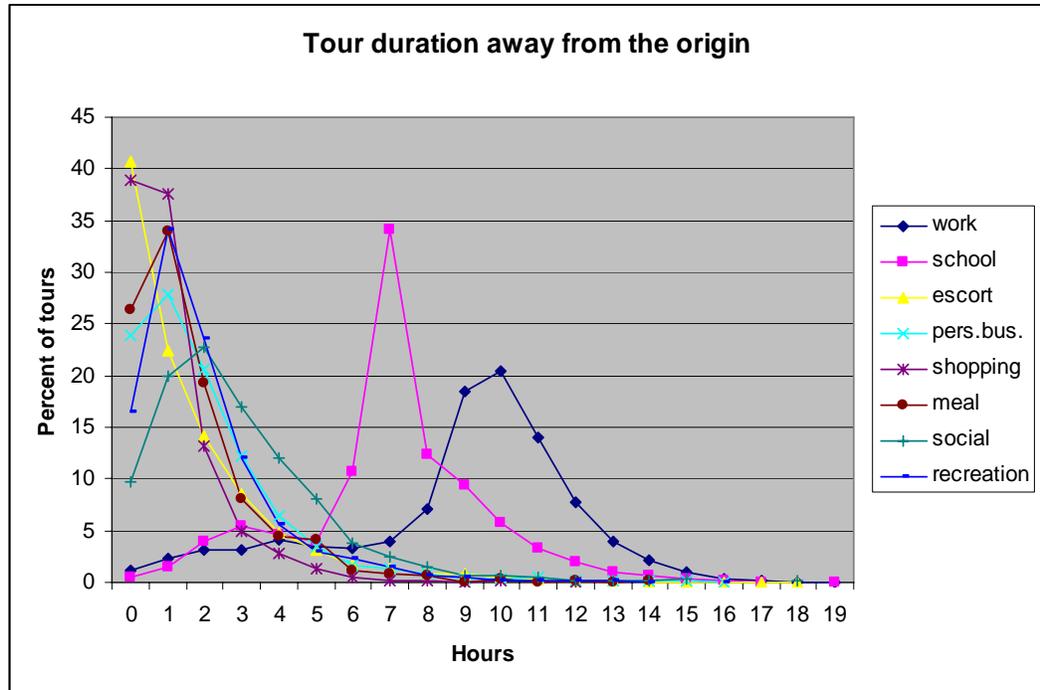
Recent tour-level time of day models can capture these departure time, arrival time, and duration characteristics simultaneously.

1.5   TRIP-LEVEL ANALYSIS

- **Purpose at trip origin by purpose at trip destination.**   Table 1.30 shows absolute numbers of trips in the file that are part of travel tours. There are almost 75,000 trip records in total, representing about 22.83 million expanded trips over 2 days, or 11.41 million trips per day. Just over 26,000 records are trips from home and the same number are trips returning back to home. The other 23,000 trip records are non-home-based, over a very wide variety of origin-destination purpose combinations.

- **Purpose at trip destination by purpose at primary destination (Table 1.31).** Of the trips that make up work tours, 40 percent go to work, 33 percent go to home, and the other 27 percent go to intermediate stops at other types of destinations. The fractions are similar for the other tour purposes, with 40 to 50 percent of trips going to the same type of destination as the tour main purpose, 30 to 40 percent of trips going to home, and the other 15 to 30 percent of trips going to stops for other purposes. (An analogous table for trip origins looks identical to this, since every trip destination along a tour also is the trip origin for the next trip.)

- **Trip destination address type by trip destination purpose (Table 1.32).** About 72 percent of out-of-home work trips go to the usual work primary work address. Other work trips either have a missing address (10 percent) or go to other addresses. Some of these later cases may be secondary work addresses or by workers who do not have a usual work address. About 77 percent of school tours go to the usual school address. Overall, 10 percent of the trips have missing destination address geocodes (no X and Y coordinates), but this makes up about 22 percent of social and recreation trips.

Table 1.30 Purpose at Trip Origin by Purpose at Trip Destination

Count

		purpose at trip destination									Total
		home	work	school	escort	pers.bus.	shopping	meal	social	recreation	
purpose at trip origin	home		6667	3076	4902	4085	2349	1387	1000	2583	26049
	work	5773	1289	28	729	990	918	654	137	399	10917
	school	2720	42	170	300	141	81	90	88	145	3777
	escort	4452	798	280	1698	446	498	376	133	279	8960
	pers.bus.	3786	668	81	373	1488	1171	462	139	221	8389
	shopping	3898	418	20	297	643	1264	290	110	114	7054
	meal	1621	757	59	298	295	339	78	89	146	3682
	social	1171	38	13	135	104	137	103	81	70	1852
	recreation	2628	234	50	227	197	299	242	75	216	4168
Total		26049	10911	3777	8959	8389	7056	3682	1852	4173	74848

Expanded

purpose at trip origin * purpose at trip destination Crosstabulation

Count

		purpose at trip destination									Total
		home	work	school	escort	pers.bus.	shopping	meal	social	recreation	
purpose at trip origin	home		2042369	1122330	1624862	1170886	681637	392595	284992	764139	8083810
	work	1782827	361908	8394	238689	280798	262026	190629	40194	115596	3281061
	school	1013593	17951	52435	107914	48695	26742	29730	27237	42928	1367225
	escort	1471752	258576	103534	549695	140952	149694	117516	41219	82578	2915516
	pers.bus.	1081705	189367	29587	112877	408249	305043	145038	35997	62874	2370737
	shopping	1111794	114510	7096	85472	166315	332988	82875	32143	30744	1963937
	meal	495264	218141	22522	88850	73457	92035	26776	25529	43773	1086347
	social	338468	12282	4703	42422	24442	38619	28464	26740	18803	534943
	recreation	788408	64055	16625	64552	57117	75580	72723	20891	62304	1222255
Total		8083811	3279159	1367226	2915333	2370911	1964364	1086346	534942	1223739	22825831

Table 1.31   Purpose at Trip Destination by Purpose Type at Primary Destination

purpose at trip destination * purpose type at primary destination Crosstabulation

% within purpose type at primary destination

		purpose type at primary destination								Total
		work	school	escort	pers.bus.	shopping	meal	social	recreation	
purpose at trip destination	home	33.1%	38.9%	33.3%	36.9%	36.0%	33.2%	40.1%	41.5%	35.4%
	work	39.5%	.7%	.3%	1.0%	1.2%	8.2%	.3%	.7%	14.4%
	school	.2%	41.3%							6.0%
	escort	8.1%	8.6%	45.9%			.0%			12.8%
	pers.bus.	6.7%	3.3%	6.0%	49.2%	9.8%	6.8%	4.8%	4.3%	10.4%
	shopping	5.7%	1.6%	5.5%	7.8%	48.7%	6.8%	6.5%	4.5%	8.6%
	meal	3.4%	1.8%	4.0%	3.3%	3.0%	42.6%	2.9%	3.5%	4.8%
	social	.8%	1.3%	1.8%	.7%	.7%	.9%	43.8%	.9%	2.3%
	recreation	2.6%	2.4%	3.2%	1.1%	.6%	1.5%	1.6%	44.5%	5.4%
Total		100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

Table 1.32   Trip Destination Address Type by Purpose at Trip Destination

trip destination address type * purpose at trip destination Crosstabulation

% within purpose at trip destination

		purpose at trip destination									Total
		home	work	school	escort	pers.bus.	shopping	meal	social	recreation	
trip destination address type	home	100.0%									35.4%
	usual work		72.4%	.1%	.7%	.4%	.1%	.3%	.6%	.6%	10.6%
	usual school		.2%	76.6%	1.0%	.4%	.0%	.1%	1.7%	1.9%	4.9%
	other		17.2%	15.2%	79.9%	81.0%	85.4%	83.8%	75.9%	74.8%	39.1%
	missing		10.2%	8.1%	18.4%	18.1%	14.4%	15.8%	21.8%	22.6%	9.9%
Total		100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

- **Trip mode by tour main mode (Table 1.33).** The diagonal form of this table shows the hierarchical order of selecting the main mode for a tour. "Other" tours can include trips by all modes, but walk tours can include only walk trips. The most common trips that are not by the main tour mode are drive alone trips made as part of shared ride tours (e.g., a parent driving home alone on the second half of an escort tour after dropping off a child at school). Similarly, there also are shared ride 2 trips as part of shared ride 3+ tours. Note that there are some auto trips on "walk to ferry" and "walk to transit" tours, and further analysis might reveal that it would be better to classify those as drive access trips if the auto trip is in the same half tour as the ferry or transit trip. However, some of those may be cases where a person uses walk to transit for one half tour and then gets a ride in a car for the other half tour.

Table 1.33   Trip Mode by Tour Main Mode

trip mode * tour main mode Crosstabulation

% within tour main mode

		tour main mode											Total
		others	school bus	drive to ferry	drive to transit	walk to ferry	walk to transit	shared ride 3+	shared ride 2	drive alone	bike	walk	
trip mode	others	49.0%											.5%
	school bus	.2%	70.3%										3.3%
	drive to ferry	.3%	.1%	43.6%									.3%
	drive to transit	.7%		.1%	56.5%								.5%
	walk to ferry	.4%		4.2%		56.3%							.1%
	walk to transit	8.4%	.8%	.5%	12.1%	4.6%	64.1%						3.2%
	shared ride 3+	4.5%	13.8%	7.2%	4.3%	1.8%	2.8%	72.9%					19.3%
	shared ride 2	8.9%	10.6%	11.1%	11.3%	3.4%	6.8%	12.4%	73.5%				20.2%
	drive alone	19.9%	.7%	29.1%	11.7%	9.9%	7.0%	12.8%	24.4%	98.7%			43.9%
	bike	.3%	.1%	.3%		2.1%	.5%	.1%	.1%	.1%	96.8%		1.0%
	walk	7.5%	3.7%	3.8%	4.0%	21.9%	18.7%	1.8%	2.0%	1.2%	3.2%	100.0%	7.8%
Total		100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

- **Average trip duration by trip mode (Figure 1.8).** The average walk and shared ride trips last less than 15 minutes, while drive alone trips last almost 20 minutes and bike and school bus trips almost 25 minutes, on average. Walk to transit trips last about 40 minutes and drive to transit trips almost 60 minutes. Ferry trips are the longest, lasting about 90 minutes on average.

Figure 1.8   Average Trip Duration by Mode
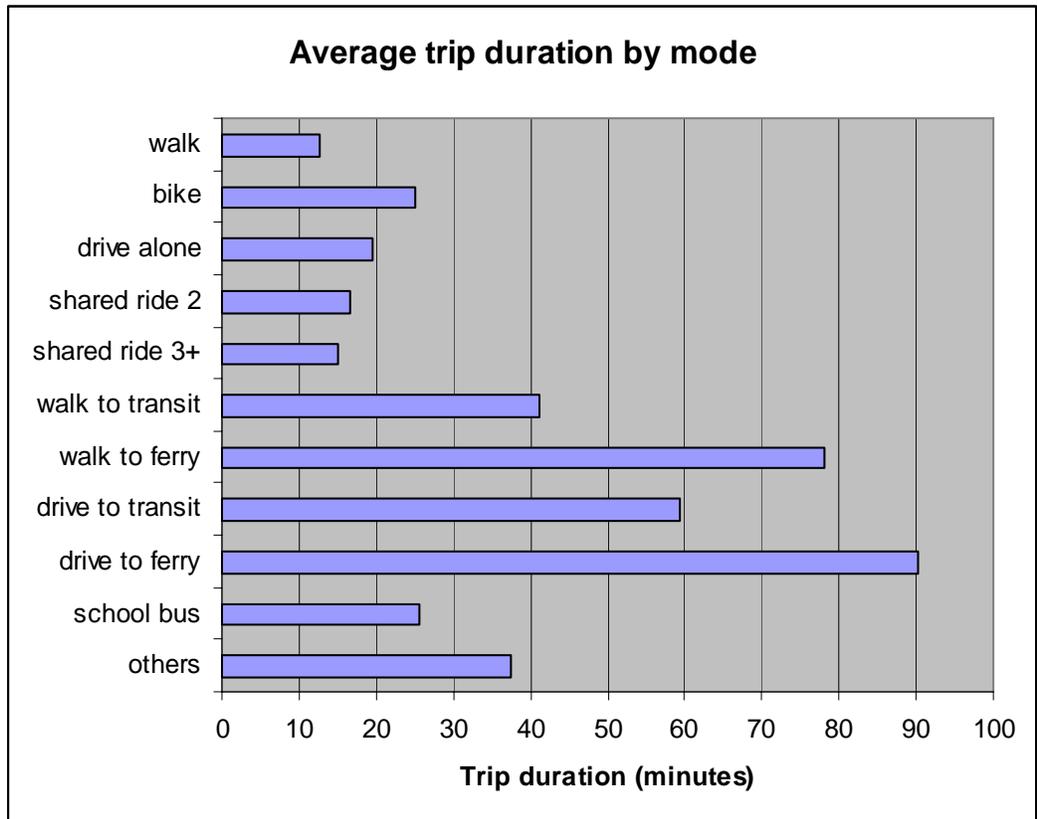
- **Trip departure time by destination purpose (Figure 1.9).** Only trips to work and school occur primarily in the morning, while trips to all other destination types, including home, tend to depart later in the day.

Figure 1.9   Trip Departure Time by Destination Purpose
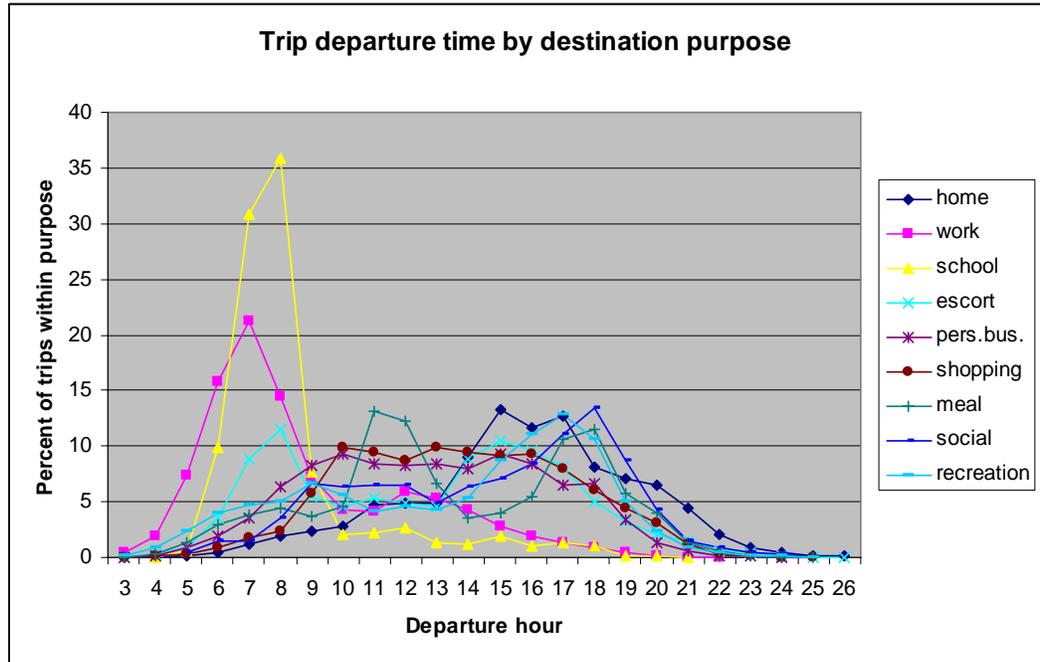
- **Trip departure time by trip mode (Figure 1.10).** School bus and drive to transit trips are the most "peaked" in the a.m. and p.m. Ferry trips and walk to transit trips also follow a fairly peaked departure time profile, reflecting that these are used mainly for work tours and trips. Walk trips and drive alone trips show the steadiest usage across the midday period, with shared ride percentage highest in the evening.

Figure 1.10   Trip Departure Time by Trip Mode
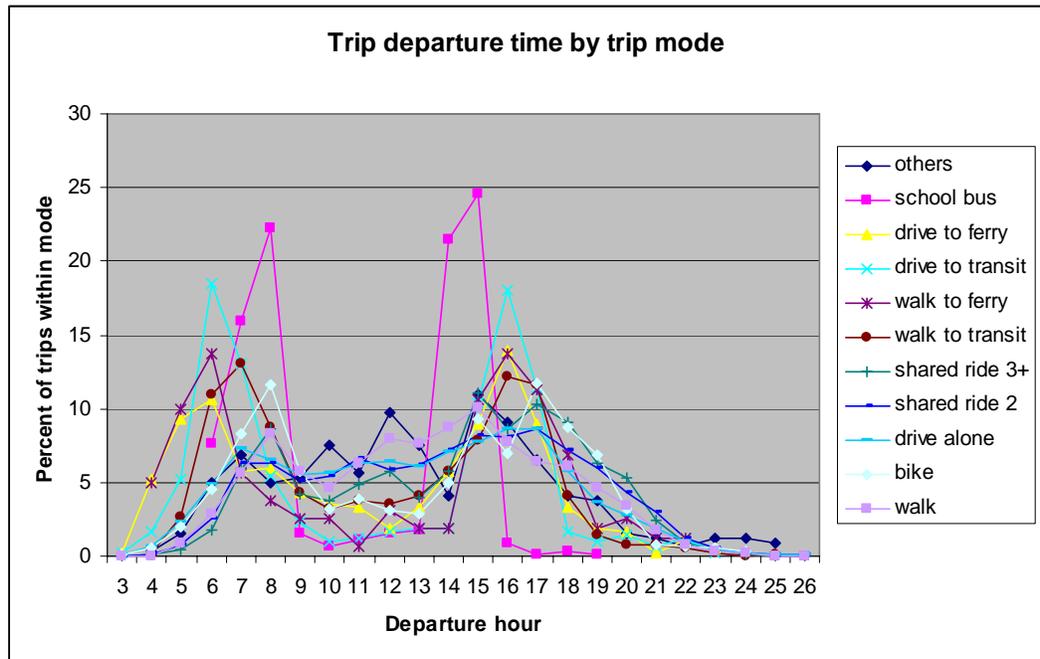
- **Average Trip Distance by Mode (Table 1.34).** For all trips with geocoded trip ends, we have two separate estimates of trip distance. First, there is the distance based on the X and Y coordinates. The table shows the average XY distance by mode, using the sum of the distances along the X and Y axes. Second, we have the zone-to-zone distances from the highway networks. The table also shows this by mode. The average network distance is 20 percent longer than the average XY-based distance. The network distance is likely to be least accurate for very short trips because it is measured between zone centroids rather than actual trip ends. Thus, we see the largest ratio for walk trips, where the average network distance is 72 percent longer than the average XY-based distance. (In the data, there are a small number of walk trips with very long distances, indicating errors in geocodes or trip mode. For this analysis, those distances were capped at 5 miles.)

Table 1.34   Average Trip Distance by Mode (for trips with valid geocodes)

Trip Mode	Average Orthogonal XY Distance (miles)	Average Network Distance (miles)	Ratio of Network to XY Distance
School bus	3.23	4.66	1.44
Drive to ferry	19.16	28.68	1.50
Drive to transit	15.77	17.63	1.12
Walk to ferry	16.27	18.90	1.16
Walk to transit	7.79	8.49	1.09
Shared ride 3+	5.16	6.43	1.25
Shared ride 2	5.81	7.01	1.21
Drive alone	7.63	8.99	1.18
Bike	3.21	3.99	1.24
Walk *	0.79	1.35	1.72
Others	9.46	10.77	1.14
Total	**6.19**	**7.44**	**1.20**

* walk distance capped at 5 miles

- **Average Trip Duration and Speed by Mode (Table 1.35).** For all trips with geocoded trip ends, we have can compare the self-reported trip duration to the computed (XY-based) estimate of trip distance, and thus impute a travel speed. The table shows that average speed is lowest for walk (3.7 mph), school bus (7.5 mph) and bike (8.1 mph). For all the drive modes, the average speed is roughly 22 mph, while for transit trips, the average speed is about 11 mph. The average speed for drive to transit is about halfway between the drive and transit speeds.

Table 1.35   Average Trip Duration and Speed by Mode (for trips with valid geocodes)

Trip Mode	Average Orthogonal XY Distance (miles)	Average Reported Travel Duration (minutes)	Imputed Average Speed (mph)
School bus	3.23	25.94	7.5
Drive to ferry	19.16	103.75	11.1
Drive to transit	15.77	58.12	16.3
Walk to ferry	16.27	86.23	11.3
Walk to transit	7.79	42.05	11.1
Shared ride 3+	5.16	14.66	21.1
Shared ride 2	5.81	15.95	21.8
Drive alone	7.63	20.20	22.7
Bike	3.21	23.81	8.1
Walk *	0.79	12.63	3.7
Others	9.46	30.07	18.9
Total	**6.19**	**19.23**	**19.3**

- **Total Person-Trips and Person-Miles per Mode (Table 1.36).** For any trips in the data with missing geocodes, we can derive an estimate of the trip length by taking the reported travel duration and multiplying it by the average speed for the trip mode. This process was carried out to impute the missing distances, and then each trip was weighted in the analysis by distance in order to get an estimate of total person-miles by mode. The results are shown in the table. The totals in the table represent two days of travel, corresponding to the length of the survey. Overall, people in the region travel roughly 72 million person-miles per weekday, with about 65 million of that by car. If the person-miles for car trips is divided by vehicle occupancy, the resulting total is about 50 million vehicle-miles (VMT) per weekday, with about 78 percent of that in single-occupant vehicles. If we assume that about 70 percent of the drive-to-transit trip miles is in the transit vehicles, then the number of transit passenger-miles per weekday is calculated to be about 3.5 million.

Table 1.36   Total Person-Trips and Person-Miles by Mode

Trip Mode	Person- trips	Percent of person-trips	Person-miles	Percent of person-miles
School bus	744,758	3.3	2,363,283	1.6
Drive to ferry	62,541	0.3	1,106,048	0.8
Drive to transit	118,227	0.5	1,851,963	1.3
Walk to ferry	29,925	0.1	461,987	0.3
Walk to transit	733,035	3.2	5,680,391	3.9
Shared ride 3+	4,399,576	19.3	23,512,510	16.3
Shared ride 2	4,609,129	20.2	28,284,142	19.6
Drive alone	10,015,081	43.9	77,559,402	53.8
Bike	219,773	1.0	737,922	0.5
Walk	1,790,953	7.8	1,446,412	1.0
Others	102,836	0.5	1,092,450	0.8
Total	22,825,836	100.0	144,096,509	100.0

The estimate of 65 million auto passenger-miles and 50 million auto vehicle-miles (VMT) per day in the region is somewhat lower than the PSRC estimate of 72 million VMT. We looked into a few possible reasons for such a discrepancy. First, Table 1-37 shows a few main characteristics of this survey relative to the

most recent household survey in 1999. The population in the region has grown by only 4.9 percent between the two years in terms of households and 6.4 percent in terms of persons. The average number of survey trips in the data for each person-day is nearly identical in the two surveys at 3.6. None of these numbers would suggest any large change in VMT from what was previously expected.

Table 1.37 Key Characteristics of 1999 and 2006 Surveys

	1999 Survey	2006 Survey	Growth
Expanded households	1,313,463	1,377,427	4.9 %
Expanded persons	3,073,503	3,268,902	6.4 %
Trips / person-day	3.6	3.6	0 %

Second, the re-weighting done on the survey records to match Census targets, as described in Appendix E, was somewhat more detailed than that done with the 1999 data. Table 1-38 shows the expanded sample size after expansion to geographic targets only and then again after re-weighting to Census distributions. Re-weighting adjusts for sampling biases by giving more weight to households with children and college students, and less weight to senior citizen households. The result is 4.7 percent higher population, due to an increase in average household size.

Table 1.38   Change in the Expanded Sample Size from Re-weighting

Person Type	Population-Expanded	Expanded and re-weighted	Change from re-weighting
Full Time Worker	1,258,049	1,320,552	+5.0%
Part Time Worker	260,437	288,094	+10.6%
Non- Worker Age 65+	401,668	299,931	-25.3%
Non- Worker Age 18-64	436,471	459,357	+5.2%
College Student	66,859	90,344	+35.1%
Grade School Age 16+	92,699	111,838	+20.6%
Grade School Age 5-15	423,086	483,669	+14.3%
Young Child Age 0-4	184,318	215,117	+16.7%
Total	3,123,586	3,268,902	+4.7%

Table 1-39 shows that the re-weighting gives slightly lower trip rates in all person type categories except college students, due mainly to the larger weights given to households with low income and low car ownership. The small shifts in population and trip rates due to re-weighting are also not large enough to explain any major differences in VMT estimates.

Table 1.39   Change in the Average Trip Rate/Day from Re-weighting

Person Type	Trips/Day-Expanded	Expanded and re-weighted	Change from re-weighting
Full Time Worker	3.80	3.76	-1.1%
Part Time Worker	4.69	4.64	-1.1%
Non- Worker Age 65+	3.02	2.85	-5.7%
Non- Worker Age 18-64	3.86	3.62	-6.0%
College Student	3.95	4.19	6.1%
Grade School Age 16+	3.76	3.73	-0.9%
Grade School Age 5-15	3.33	3.29	-1.3%
Young Child Age 0-4	3.04	2.96	-2.7%
Total	3.68	3.62	-1.5%

It is generally thought that diary-based travel surveys will tend to under-report a certain percentage of trips. In this survey, a subset of households was given GPS devices that were placed in all of the household's vehicles during the diary days. The resulting GPS data was compared to the diary-based data in order to perform an analysis of likely missing diary trips. The analysis is described in some detail in Chapter 5. In Table 1.40, the "correction factors" derived from the GPS-based analysis were applied to all auto trips in the survey. The result is an increase in auto person-miles (PMT) by 20 percent from 66 million to 80 million, and an increase in auto vehicle-miles (VMT) by 19 percent from 50 million to almost 60 million.

Table 1.40   Change in Daily Auto Mileage from GPS-based Correction Factors

Mode	Original PMT	PMT with GPS-based factoring	Change from GPS factoring
Drive Alone	38,783,411	45,781,522	18.0%
Shared Ride 2	14,144,545	17,868,894	26.3%
Shared Ride 3+	11,758,989	14,222,125	20.9%
Drive To Ferry	553,064	636,436	15.1%
Drive To Transit	925,981	1,062,925	14.8%
Total Auto Person-Miles (PMT)	**66,165,991**	**79,571,902**	**20.3%**
Total Auto Vehicle-Miles (VMT)	**49,708,410**	**59,345,887**	**19.4%**

Another possible source of inaccuracy in VMT estimates is in the geocoding of trip ends. One fairly simple method for gauging the reasonableness of the geocodes is to compare the distance between the trip ends to the reported elapsed travel time, and combine the two values to impute a travel speed. For example, if someone reports that they began a trip at 8:10 and arrived at 8:30, and the two geocoded points are 8 miles apart, then the implied average speed is 8 miles / 20 minutes = 24 mph. Tables 1-41 and 1-42 show the distributions of orthogonal distance and imputed speed for all trips with both ends geocoded. If the imputed speed is very high, this is a sign of possible geocoding errors, although it may be the reported arrival and departure times that are in error. In Table 1-42, 2.5 percent of trips have an imputed average speed of greater than 80 mph. Such trips should be looked at in more detail. The same is true for walk trips with average speeds of greater than 10 mph. In general, any corrections or flagging of errors in the geocodes is likely to lower the average trip length in the data, and this would also lower the VMT estimate somewhat.

Table 1.41   Distribution of Orthogonal Distance by Trip Mode for Geocoded Trips

DCAT * trip mode Crosstabulation

% within trip mode

					trip mode							
		others	school bus	drive to ferry	drive to transit	walk to ferry	walk to transit	shared ride 3+	shared ride 2	drive alone	bike	walk	Total
DCAT	0-1 miles	24.5%	16.7%	1.0%	.8%	3.9%	7.4%	20.4%	17.5%	13.5%	32.1%	83.3%	20.8%
	1-3 miles	20.8%	52.3%	2.3%	3.3%	1.1%	24.0%	32.0%	30.5%	26.3%	33.0%	10.3%	27.7%
	3-6 miles	8.7%	20.4%	2.5%	6.5%		27.6%	22.2%	23.3%	20.8%	17.7%	6.4%	20.4%
	6-10 miles	16.9%	6.3%	3.3%	18.0%	19.9%	20.4%	12.8%	13.3%	14.7%	10.9%		12.8%
	10-15 miles	7.7%	1.5%	26.0%	20.5%	23.5%	7.9%	6.2%	6.8%	10.1%	3.8%		7.6%
	15-25 miles	14.1%	1.7%	35.7%	35.6%	36.0%	6.0%	3.7%	5.5%	9.3%	2.5%		6.6%
	25-50 miles	5.4%	.8%	29.1%	14.8%	13.1%	5.6%	2.3%	2.5%	4.4%			3.3%
	>50 miles	2.0%	.2%		.5%	2.5%	1.1%	.4%	.6%	.8%	.1%		.6%
Total		100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

Table 1.42   Distribution of Imputed Speed by Trip Mode for Geocoded Trips

SCAT * trip mode Crosstabulation

% within trip mode

					trip mode							
		others	school bus	drive to ferry	drive to transit	walk to ferry	walk to transit	shared ride 3+	shared ride 2	drive alone	bike	walk	Total
SCAT	0-5 mph	34.8%	57.9%	7.3%	3.7%	9.7%	34.5%	12.9%	10.4%	9.5%	40.4%	86.8%	18.9%
	5-10 mph	11.9%	23.3%	37.7%	14.7%	48.3%	33.9%	19.4%	19.3%	17.0%	41.3%	5.2%	18.1%
	10-15 mph	13.3%	9.8%	24.1%	32.1%	32.3%	13.6%	21.4%	20.7%	19.4%	13.6%	2.3%	18.3%
	15-20 mph	13.8%	4.1%	19.4%	30.1%	2.6%	6.7%	16.6%	18.2%	17.3%	1.3%	1.0%	15.2%
	20-30 mph	12.1%	1.9%	6.0%	12.1%	.7%	5.4%	17.6%	18.3%	21.3%	1.1%	2.5%	17.1%
	30-40 mph	3.2%	1.0%	3.7%	3.6%	.4%	1.8%	5.1%	6.3%	8.2%	.3%	.4%	6.1%
	40-60 mph	5.8%	.8%	.9%	1.7%		1.7%	3.4%	3.1%	3.9%	.3%	1.1%	3.2%
	60-80 mph	1.3%	.3%		2.1%	.3%	.2%	.7%	1.1%	.8%	1.2%	.1%	.8%
	80-100 mph		.2%	.6%		1.8%	.3%	.5%	.6%	.5%	.4%	.3%	.5%
	>100 mph	3.8%	.7%	.4%		3.9%	1.9%	2.4%	2.0%	2.1%	.1%	.5%	2.0%
Total		100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

2.0 Transit Market Characteristics

2.1 INTRODUCTION

The household travel survey provides many insights into the nature of transit use in the PSRC region. This section of the report describes the transit trip and traveler characteristics measured in the survey effort. The first subsection describes the characteristics of region residents that use transit and compares these individuals to residents that do not use public transit. The following subsection then summarizes transit usage from the trip and tour perspectives by comparing how trips of different types are completed and by comparing the residents who make different types of trips.

2.2 TRANSIT USERS

The household travel survey collected data on transit usage in two ways. First, individuals were simply asked if they had used a public transit mode in the past 30 days. Second, the 48-hour travel diary captured travel by all modes, including transit, so we could identify transit users based on their travel diary responses.

The diary summary is useful because specific trip information was collected about trips as they occurred. We could therefore classify transit trips pretty accurately, and avoid recall problems to a large extent. The problem with the diary data is that these data pertain to only a small time period, so trips that happen infrequently, such as many people's transit trips, are far less likely to be captured during the data collection.

The 30-day recall question captures infrequent trips better than the diaries, but the responses to this question are more prone to recall error, time compression by respondents (where respondents include trips from before the recall period in their responses), and differing transit definitions by respondents. Since the transit usage recall question did not specify which public transportation modes are included in the definition, it is likely that some respondents would include modes such as school buses, taxis, and ferries, while other respondents would not.

Figures 2.1 and 2.2 show the estimated transit usage percentages based on the household survey. Based on the weighted survey results, about eight percent of the region's population use public buses and trains over a 48-hour weekday period. Nine percent of those who traveled during the diary period used transit at least once during the period (excluding ferry). About 27 percent of residents reported using public transit sometime over the previous 30 days.

Figure 2.1   Percent of Respondents Reporting Transit Use in Their Travel Diaries
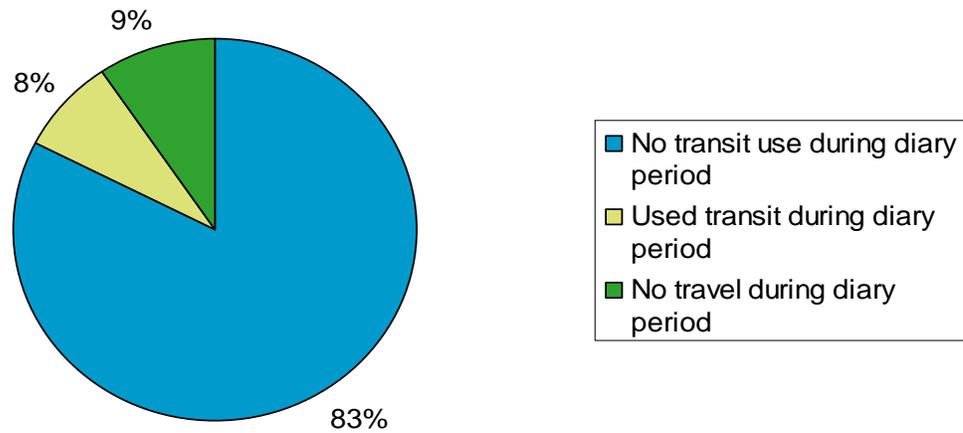
Figure 2.2   Percent of Respondents Reporting Transit Use in the Past 30 Days
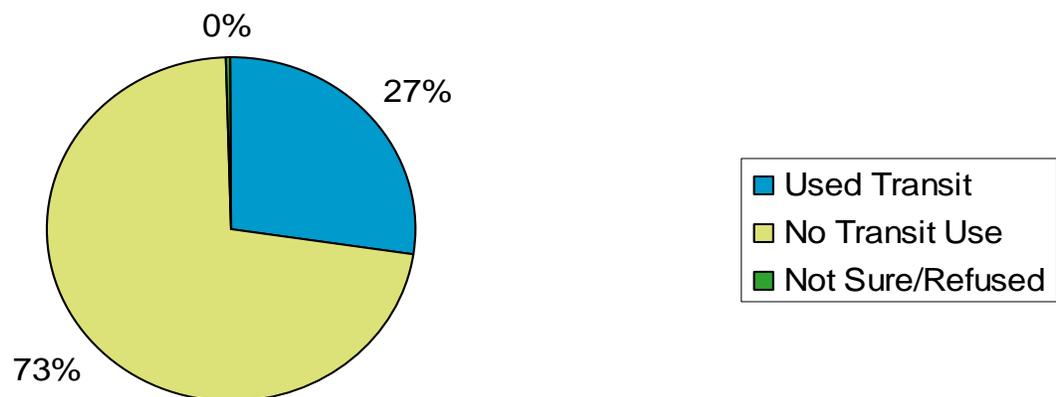
Home Location Profile of Public Transportation Users

Figure 2.3 compares transit use by the home location of respondents. Based on the survey results, of the 534,000 Seattle residents that make trips outside their homes, 21 percent, or about 112,000 use transit over a 48-hour weekday period. About 85,000 of the slightly more than one million residents of King County outside of Seattle that travel outside their homes use public transit at least once during a 48-hour period (8 percent). Six percent of Snohomish County residents, five percent of Pierce County residents, and three percent of Kitsap County residents that reported making trips during the diary period reported at least one trip on public transit (not including ferry).

Figure 2.3   Transit Usage by Locations of Respondent Home
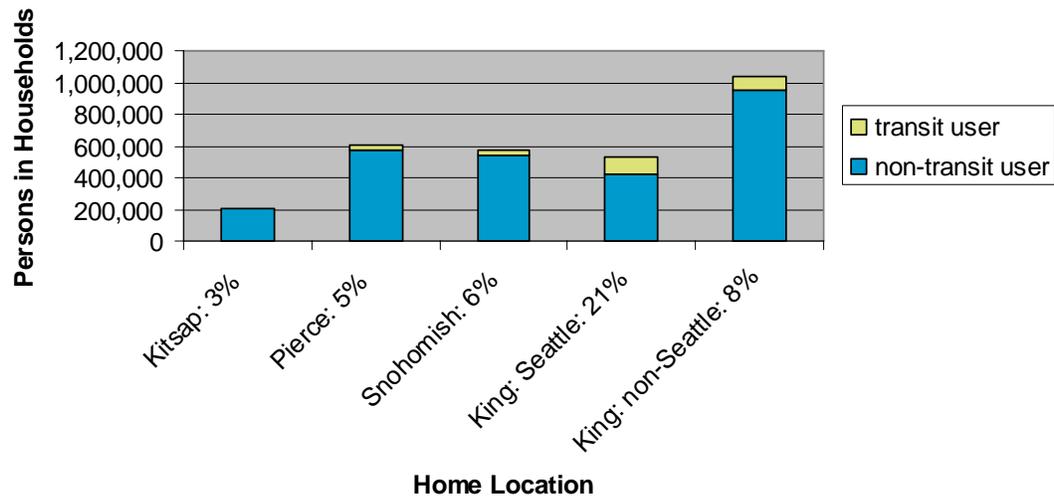
Note: The percentages shown indicate the transit usage percentage in each area..

Based on the weighted survey results, about one-half of Seattle residents have used public transit in the past 30 days. Twenty-three percent of other King County residents have used transit in the past 30 days, as have 19 percent of Snohomish County residents and 18 percent of Pierce County residents. Almost half of Kitsap residents indicated using transit in the past 30 days, but this is almost certainly including ferries, and since ferries could include both walk-on and drive-on boarding modes, it is difficult to make direct comparisons for these residents.

Comparison of transit use by the home area type, as shown in Figures 2.4 and 2.5 is consistent with the home location comparison. Area type is defined as urban,

suburban, or rural/exurban based on the respondent's response to their current home location. Fourteen percent of urban area residents used public transit during the diary period, while eight percent of suburban residents and only 3 percent of rural residents did so. This means that about 137,000 urban area residents, 113,000 suburban residents, and 16,000 rural residents were transit users for at least some of their diary period trips.

Figure 2.4   Transit Usage by Area Type of Respondent Home
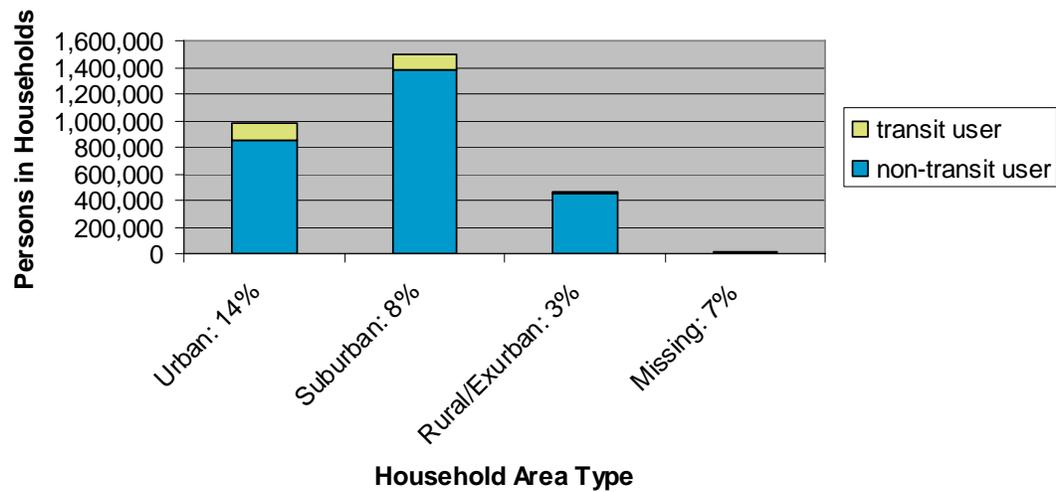
Note: The percentages shown indicate the transit usage percentage in each area type. The missing category is respondents who did not provide a home location.

Figure 2.5   Transit Usage by Location Type of Respondent Home
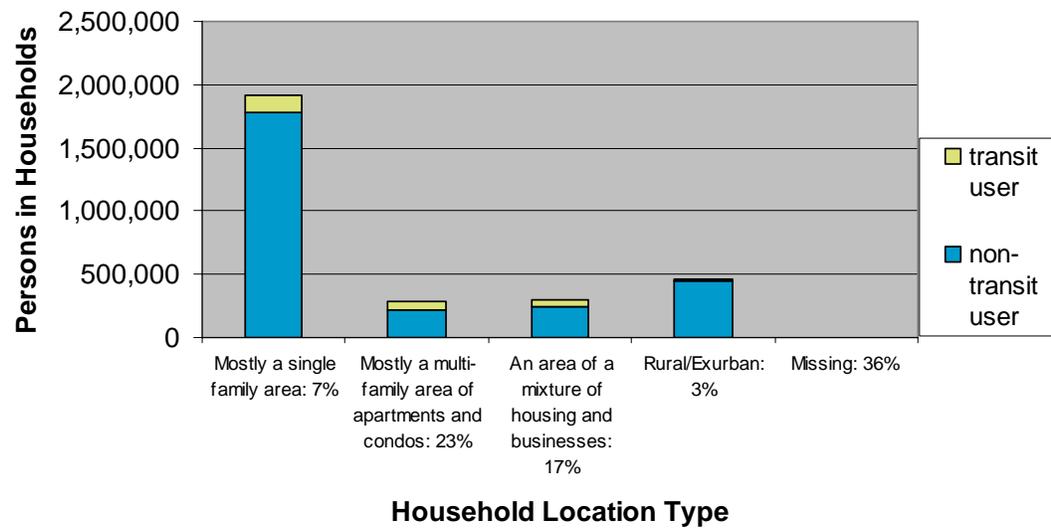
Note: The percentages shown indicate the transit usage percentage in each location type. The missing category is respondents who did not provide a home location.

Within these area types, the survey indicated that residents of neighborhoods that are predominantly comprised of multifamily units, apartments, and condominiums are more likely to be transit users, as are residents of neighborhoods that have a mix of homes and businesses. Only 7 percent of the traveling residents of neighborhoods that are comprised of mostly single family homes (the most common neighborhood type by far) used transit during the diary period.

Based on the transit recall question, about 40 percent of residents of neighborhoods with predominantly multifamily homes, apartments, and condominiums and neighborhoods with mixed land uses have used transit in the past 30 days. About 23 percent of residents in predominantly single-family neighborhoods have used transit in the past 30 days.

One tool that PSRC staff has used in studying the differences between neighborhoods and area types is to divide the region based on preset small area grids, and to calculate land use and transportation densities in the grids of interest and in adjacent grids. Figure 2.6 compares transit use for households based on the housing density. To analyze small geographic areas around specific points, PSRC's GIS analysts apply a grid summary technique for which a 150 meter-by-150 meter grid centered on the point of interest is applied and population, housing, employment, and transportation supply measures are summarized for the grids. Analyses are commonly performed for individual grids (150m X 150m), 3-by-3 grids (450m X 450m), and 5-by-5 grids (750m X 750m). Figure 2.6 shows the household density in a three-by-three (or 450m X 450m) grid centered on the household. The effects of density on transit use can be clearly seen. Only 5 percent of respondents from households with fewer than 100 households in their three-by-three grid used transit during the diary period. The percentage use increases consistently as density levels increase until nearly 40 percent of respondents in the most household-dense areas reported transit use in the diary period.

Figure 2.6   Transit Usage by Household Density Around Respondent Homes
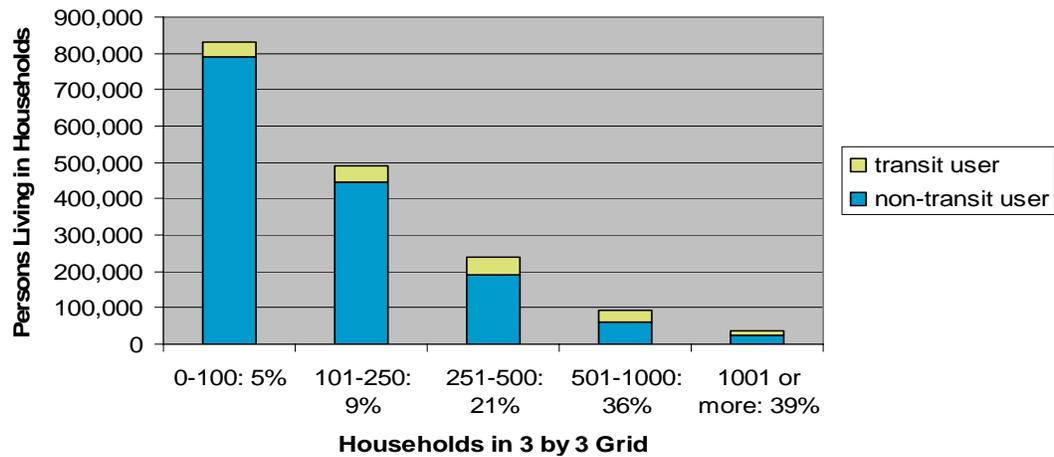
Note: The percentages shown indicate the transit usage percentage in each number of households category.

Household Characteristics of Public Transportation Users

Transit usage by travelers' dwelling types (Figure 2.7) is consistent with the neighborhood findings. Transit usage is significantly higher among residents of multifamily dwelling types on a percentage basis, but the overall share of these dwelling types for PSRC region residents is quite small.

Figure 2.7   Transit Usage by Household Dwelling Type
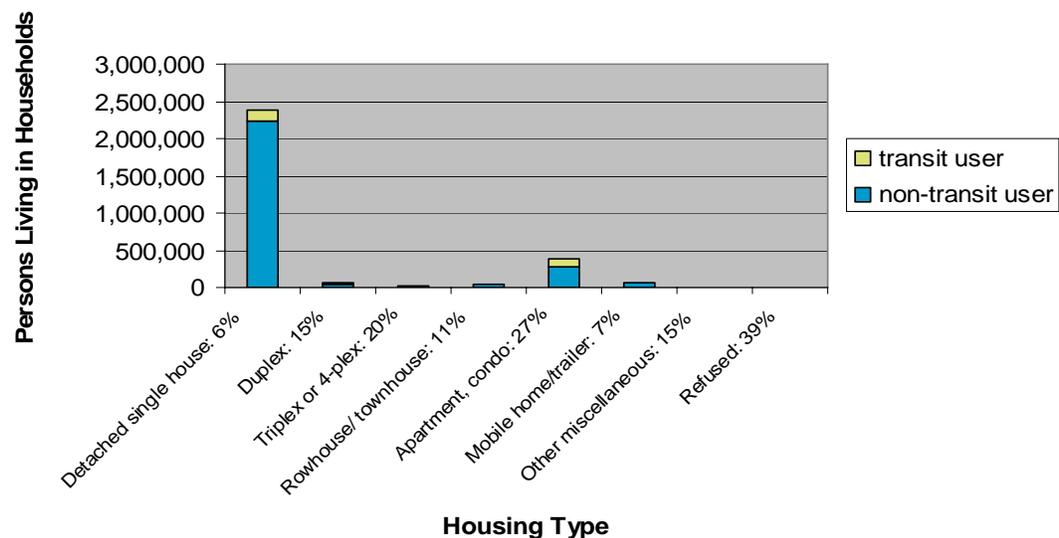
Note: The percentages shown indicate the transit usage percentage in each housing type. The refused category is respondents who did not provide a dwelling type.

Six percent of residents that own their homes used transit over a 48-hour period, while 22 percent of those who rented their homes used transit in the diary period (Figure 2.8).

Figure 2.8   Transit Usage by Household Tenure (Own Versus Rent)
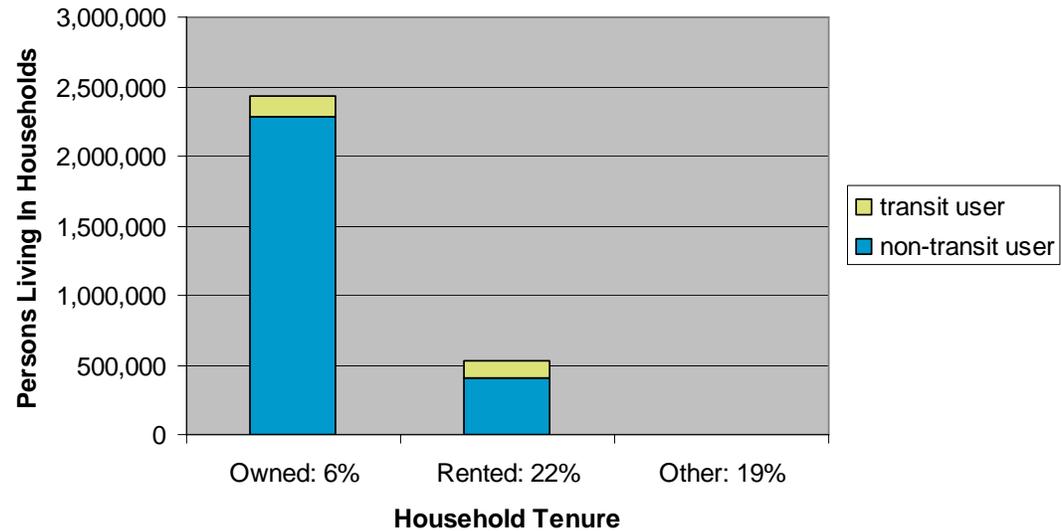
Note: The percentages shown indicate the transit usage percentage in each household tenure type. The other category represents the small number of respondents who indicated less formal tenure relationships, as well as those who did not respond to the survey question.

The composition of the people in travelers' households also helps to explain transit use.   As Figure 2.9 shows, transit usage declines as household size increases. Residents of single-person households are about twice as likely to use transit as residents of two-person households, and about four times as likely as residents of four or five person households. Reported transit usage over the past 30 days is also significantly different by household size. Thirty-nine percent of residents of one-person households reported using transit in the past 30 days, while about 25 percent of other residents did. Reported transit usage over the last 30 days was collected as part of the household travel survey.

Figure 2.9   Transit Usage by Household Size
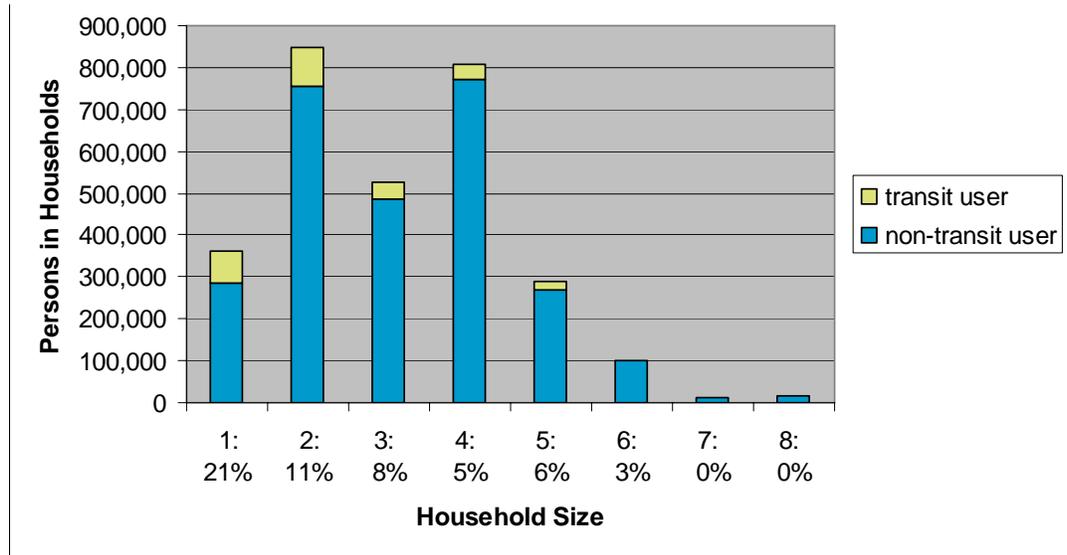
Note: The percentages shown indicate the transit usage percentage in each household size category.

Small variations in transit use by number of workers in the traveler's home were measured, but there was not a consistent pattern.   Figure 2.10 shows slightly higher transit usage by members of zero-worker and one-worker households and by members of households with more than three workers.

Figure 2.10   Transit Usage by Household Workers
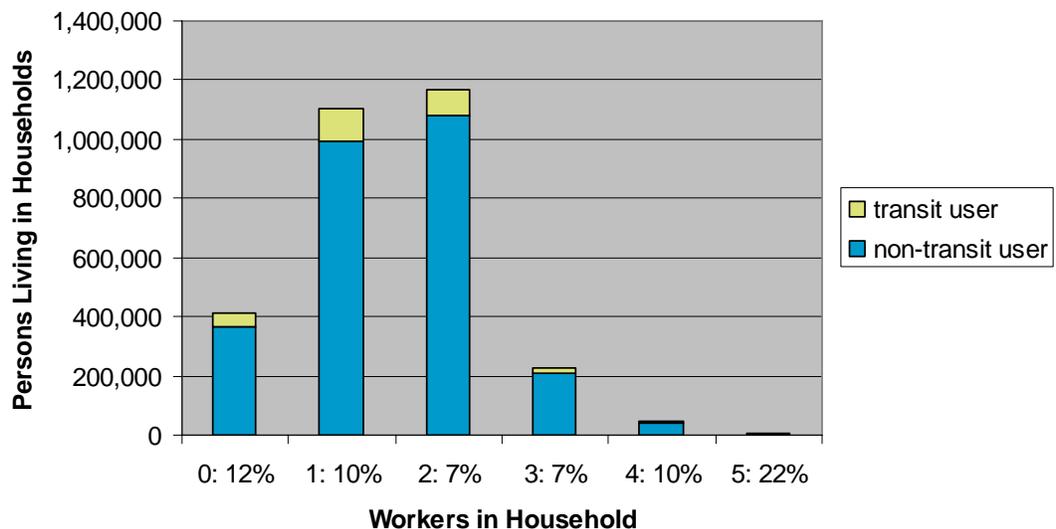
Note: The percentages shown indicate the transit usage percentage in each number of workers category.

Figure 2.11 shows the percent transit use by household vehicle availability.   As one would expect, transit use by members of zero-vehicle households is very

high. Sixty-five percent of zero vehicle household members used transit at least once during the travel diary period. Fourteen percent of one-vehicle household members used transit, but less than five percent of members of households with two or more vehicles used transit during the diary period. Over the previous 30 days, 84 percent of members of zero-vehicle households used transit.

Figure 2.11 Transit Usage by Household Vehicles Available
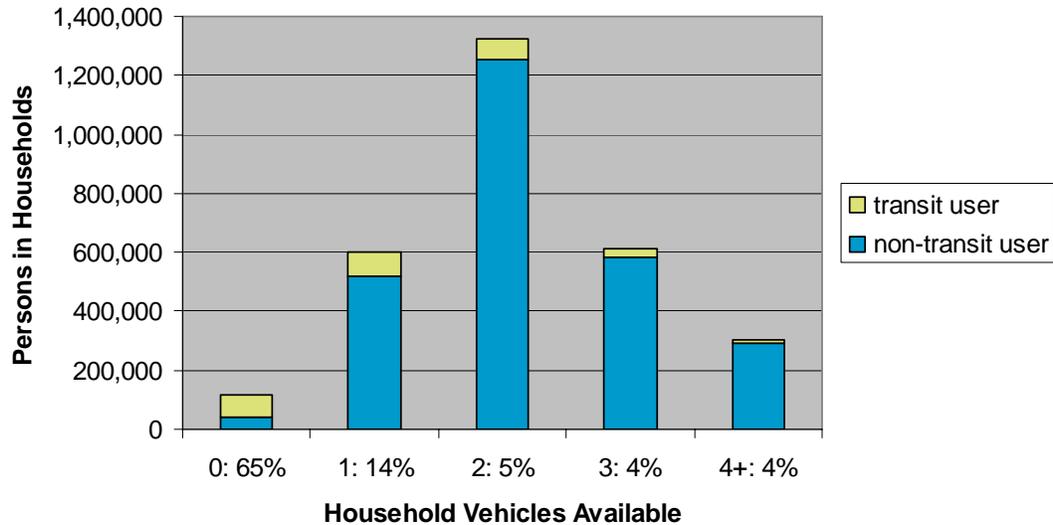
Note: The percentages shown indicate the transit usage percentage in each vehicle availability category.

As shown in Figure 2.12, members of households with household incomes of less than $50,000 are twice as likely to have used transit at least once during the diary period as others. However, the difference in transit usage by residents with household incomes between $50,000 and $100,000 and residents with higher incomes is insignificant. The respondents that did not provide income information had similar transit usage rates as households with income levels over $50,000 per year.

Figure 2.12 Transit Usage by Household Income Level
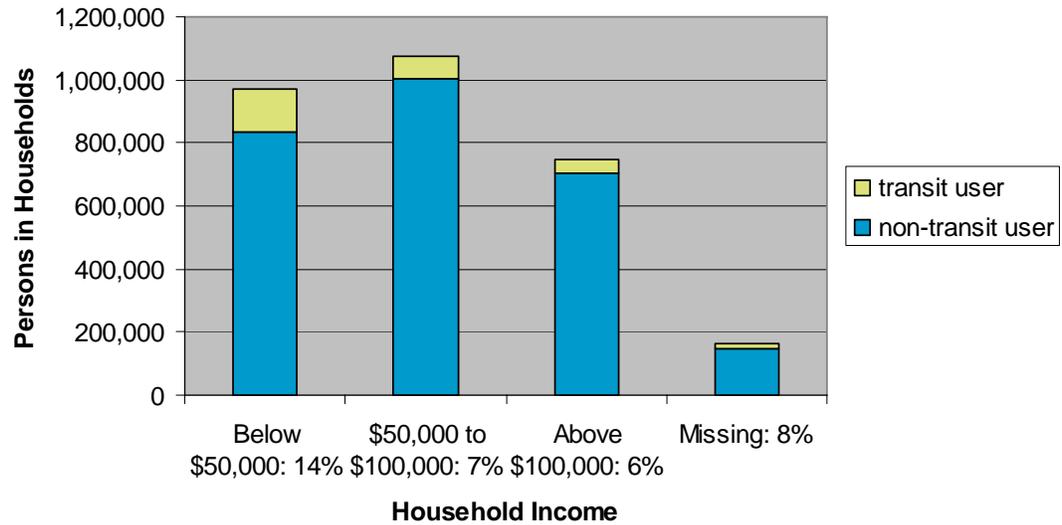

Note: The percentages shown indicate the transit usage percentage in each household income category. The missing category is respondents who did not provide a household income.

Personal Characteristics of Public Transportation Users

Men and women are equally likely to have used transit at least once during a 48-hour weekday period (Figure 2.13). This also is the case for reported transit use over the previous 30 days, where 28 percent of men and 27 percent of women reported using transit.

Figure 2.13 Transit Usage by Gender
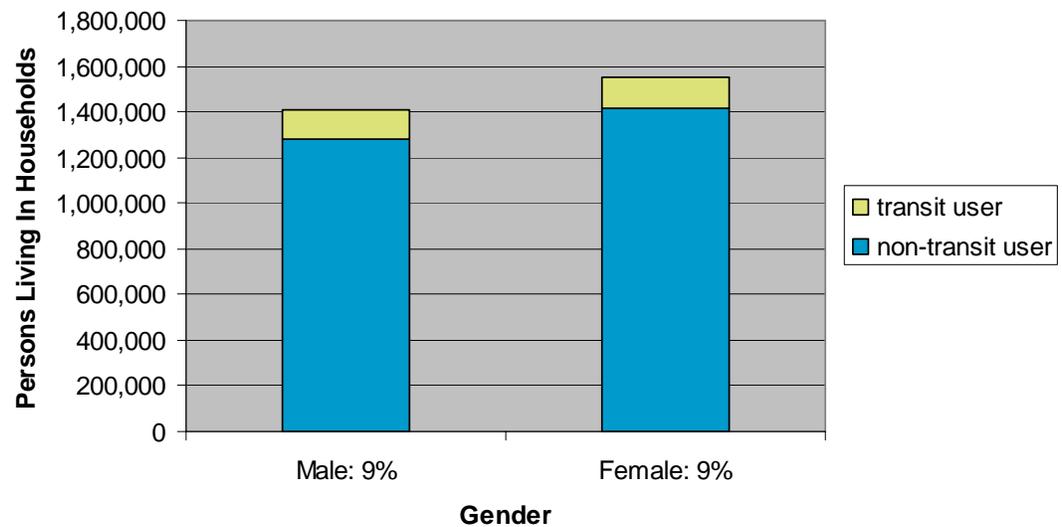
Note: The percentages shown indicate the transit usage percentage in each gender.

In terms of age categories (Figure 2.14), 18 to 24 year olds are most likely to have used transit during the diary period. The use of transit declines slightly after that as respondents get older until they reach 35 years old. The percent transit use of respondents from 35 to 74 remains at about 10 percent. After 74, the use of transit declines slightly. Children and teenagers under 18 are much less likely to have used transit.

Figure 2.14   Transit Usage by Age Category
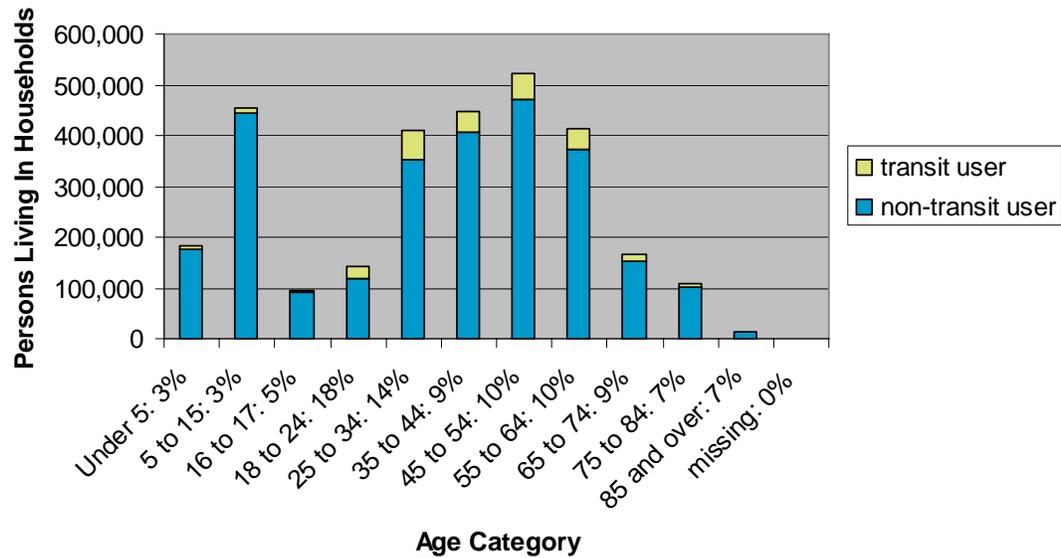
Note: The percentages shown indicate the transit usage percentage in each age category. The missing category is respondents who did not provide age.

Figure 2.15, showing transit usage by educational attainment level, indicates only small differences in transit usage by category.   Respondents that did not complete high school and those that did not provide their educational background were more likely than others to use transit, but they represent a small percentage of the population.   Usage levels for the other categories of adults are between 9 percent and 12 percent.   As noted above, transit usage by school aged children is less prevalent.

Figure 2.15   Transit Usage by Educational Attainment Category
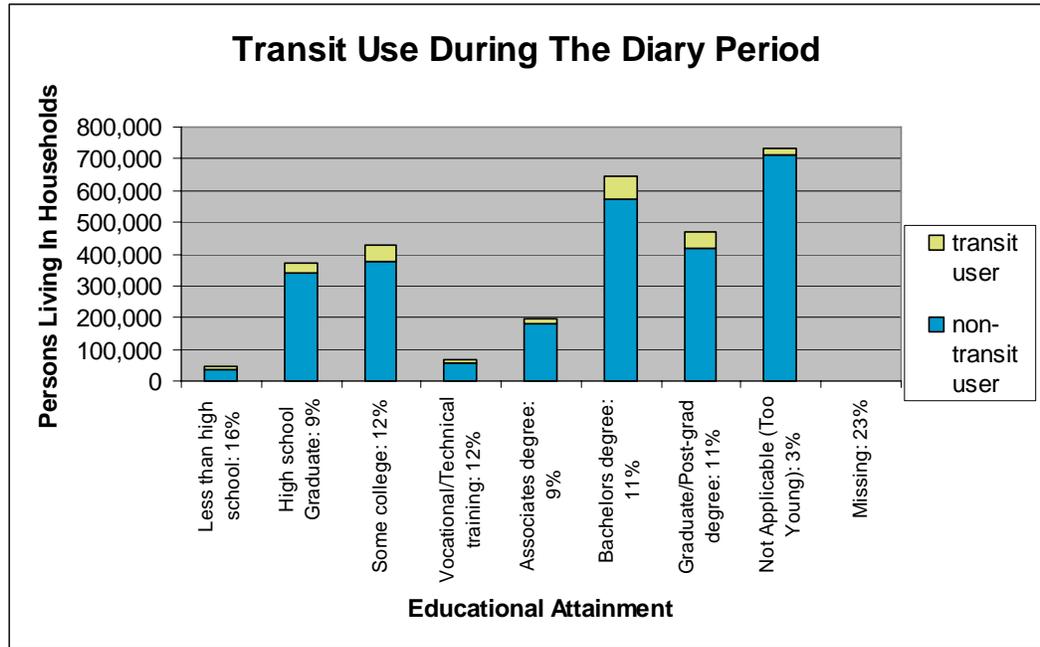
Note: The percentages shown indicate the transit usage percentage in each education category. The missing category is respondents who did not provide an education level.

Even though there was no clear pattern of transit use by number of workers within the household, as Figure 2.16 shows, employed persons were two times more likely to have used transit during the 48-hour diary period than those that are not employed. This difference is negated for the 30-day retrospective – about 27 percent of both those who were employed and those that were not indicated that they used transit in the past 30 days. One difference in these questions is the inclusion of weekends for the 30-day retrospective compared to the 48-hour diary period, which is focused on weekday travel. Another difference is that non-workers probably use transit less frequently than workers, and are therefore less likely to be captured on the 48-diary responses as using transit.

Figure 2.16   Transit Usage by Employment Status

Persons Living in Households
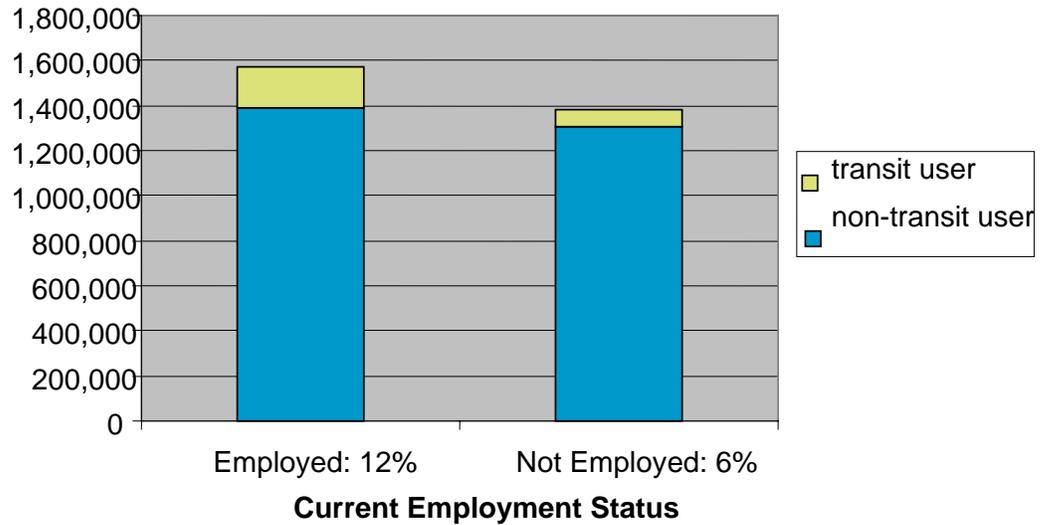
Note: The percentages shown indicate the transit usage percentage in each category.

Among employed people, an important explanatory factor in whether transit is used is the density of jobs near the primary job location.   Figure 2.17 shows transit usage by categories of the number of jobs nearby respondents' primary job locations, using the PSRC's 3-by-3 grid scheme. People working at locations with more than 5,000 nearby jobs are significantly more likely to have used transit at some point during the travel diary period.

Figure 2.17 Transit Usage by Job Density Near Primary Place-of-Work

Jobs in 3 by 3 Grid Around Primary Place-of-Work
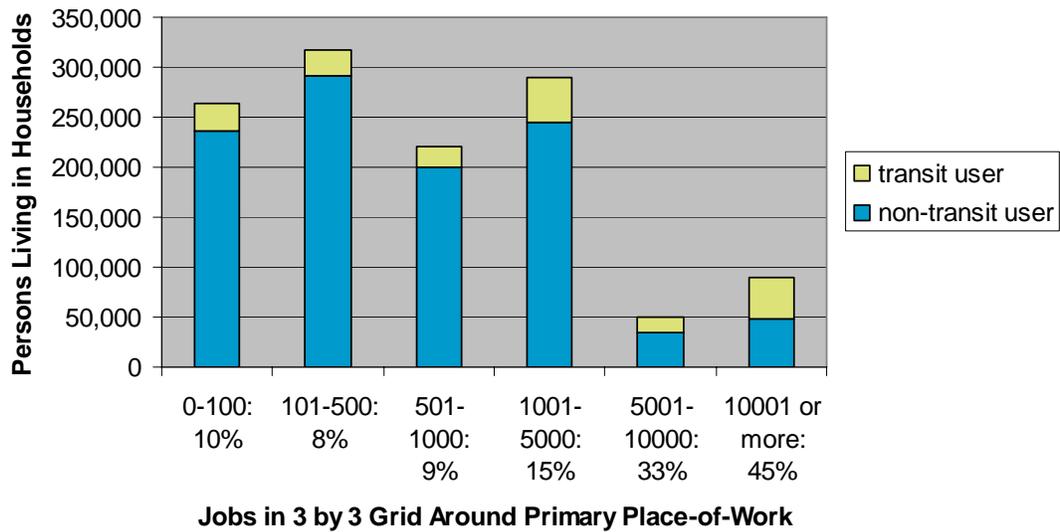
Note: The percentages shown indicate the transit usage percentage in each number of jobs category.

Figure 2.18 shows that, not surprisingly, those without driver's licenses are significantly more likely to have used transit at some point in the diary period than those with a driver's license (34 percent versus 9 percent). About 60 percent of those without driver's licenses reported using transit in the past 30 days.

Figure 2.18 Transit Usage by Driver's License Status

Driver's License Status
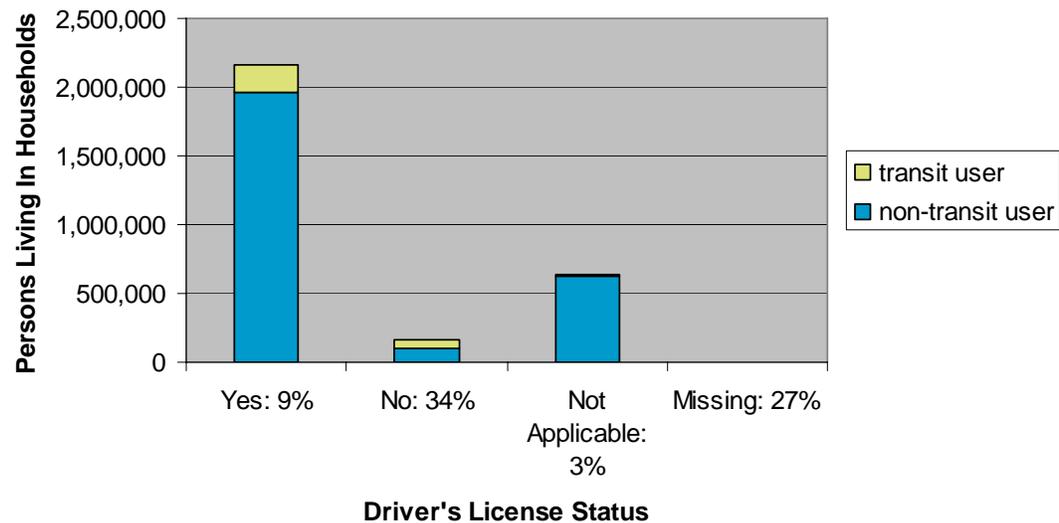
Note: The percentages shown indicate the transit usage percentage in each driver's license category. The missing category is respondents who did not provide a license status.

Finally, in terms of personal characteristics, Figure 2.19 shows transit usage by person type categories. Analysts have found this classification scheme to be

useful in explaining travel behavior differences. On a percentage basis, adult students are the most likely to have used transit during the diary period, with 27 percent usage. Full-time workers are slightly more likely to have used transit than part-time workers, and both classes of workers are significantly more likely to have used transit during the diary period than non-workers. There was only a negligible difference between retired non-workers and younger non-workers in terms of transit use probability.

Figure 2.19   Transit Usage by Person Type
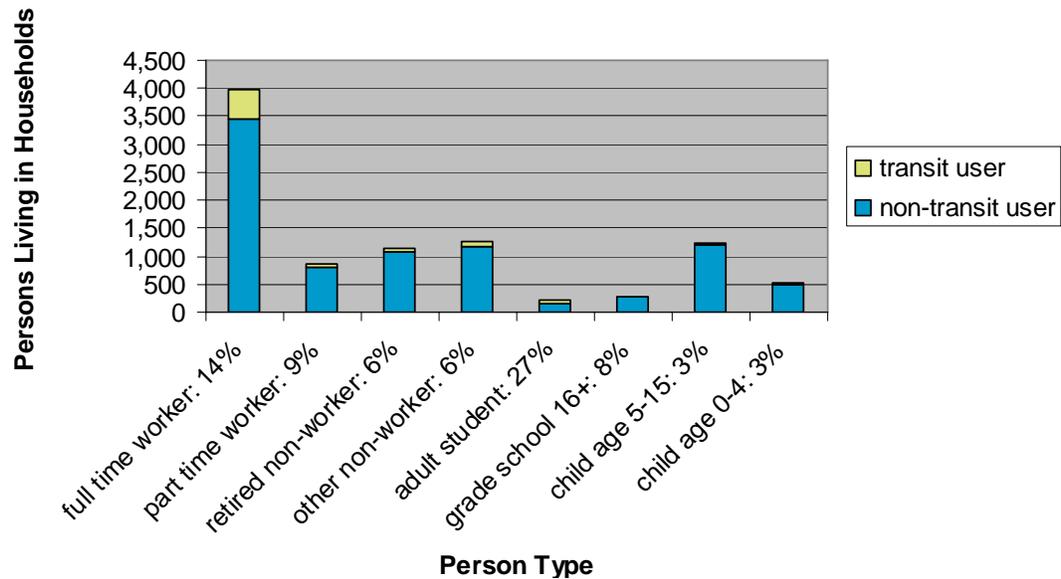
Note: The percentages shown indicate the transit usage percentage in each person type category.

Availability of Transit Options for Public Transportation Users

As one would expect, transit usage rates measured in the survey depend in part on the availability of nearby transit service options. Figures 2.20 and 2.21 show how the percent of travelers using transit at least once during the diary period differs based on the availability of transit services near the traveler's home, as measured using the PSRC 5-by-5 (750m X 750m) grids around respondents' home locations.

Figure 2.20 Transit Usage by AM Peak Period Transit Availability
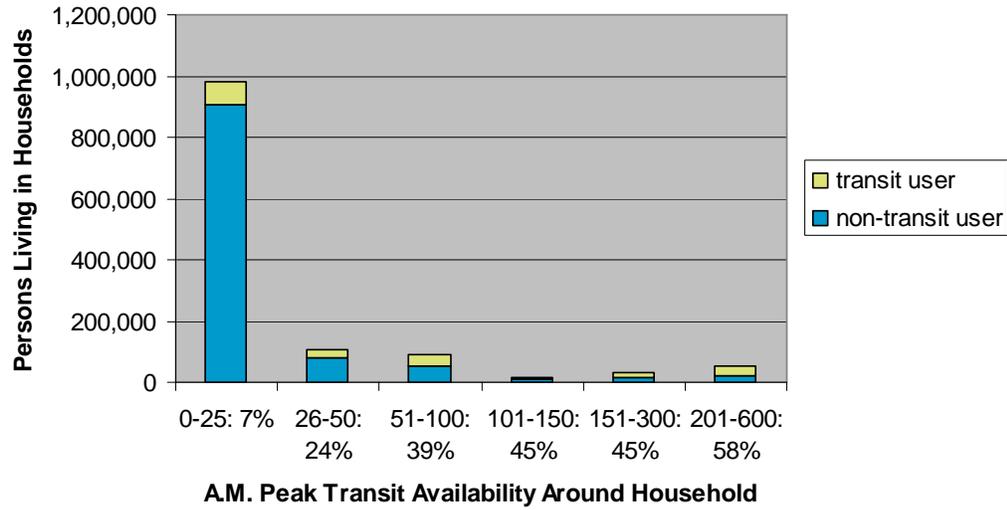
Note: The percent shown indicate the transit usage percent in each category.

Figure 2.21 Transit Usage by Midday Transit Availability
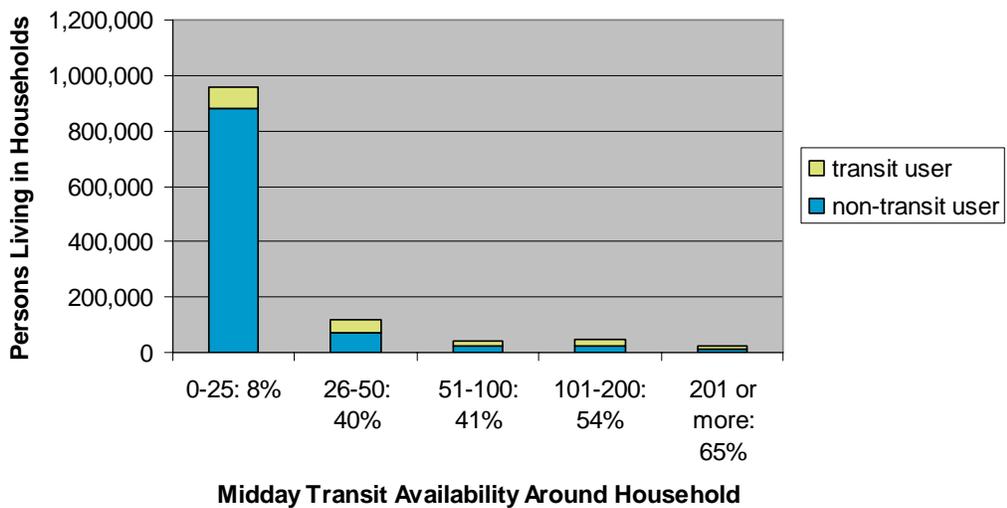
Note: The percent shown indicate the transit usage percent in each category.

The availability of transit service near the traveler's home is clearly only one part of the availability question, since it depends on whether the available transit services go to the destinations that the traveler is interested in. Nonetheless, this is a means to evaluate transit service options for public transportation users.

2.3 TRANSIT TRIPS

As shown in Figure 2.22, the expanded travel diary data indicate that on a regional basis, four percent of trips made by household residents of the region are made by public transit (either walk-to-transit or drive-to-transit) and an additional 0.4 percent of trips are made by ferry. Over the two day diary period, the survey estimates that 851,262 transit trips are made by household residents, for an equivalent of 425,631 per day. The transit trips in the survey have an average of 1.02 boardings per trip, so the estimated number of transit boardings from the survey is 434,569.

Figure 2.22   Reported Trips by Mode for the Diary Period
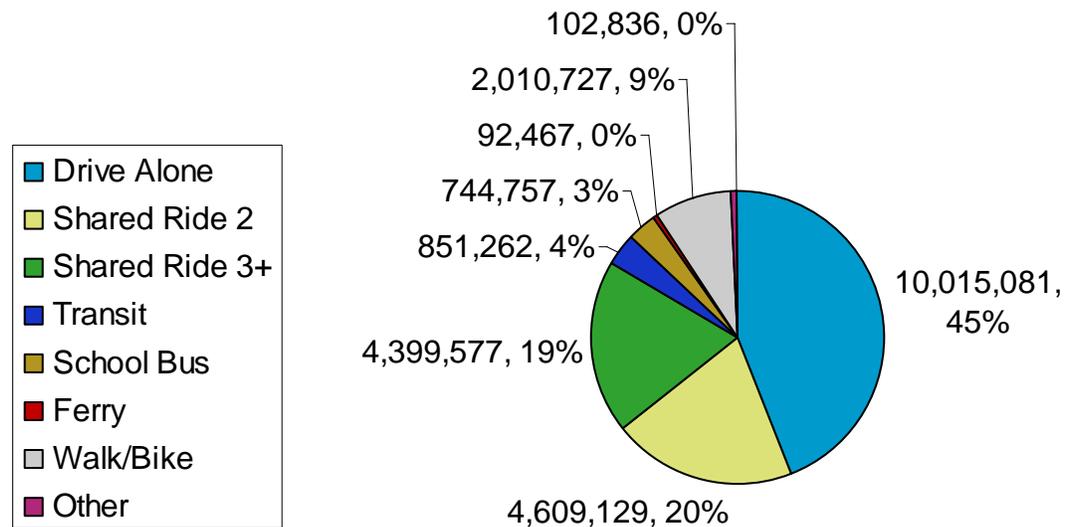
The survey derived estimate of transit trips is close to recent linked transit trip estimates used for the year 2000 model validation effort. The transit boardings estimates used in the model validation are shown in Table 2.1.

Table 2.1   Transit Boardings Estimates Used for Model Validation

| Transit Operator | 2000 Model Boardings | | | 2000 Observed Boardings | |
	A.M.	MD	Daily	Daily	Percent Difference
King County Metro	110,807	93,267	351,574	329,913	7%
Pierce Transit	11,851	13,220	42,861	45,265	-5%
Community Transit and Everett Transit	13,078	9,870	39,650	33,318	19%
Kitsap Transit	4,766	5,541	17,601	11,889	48%
Washington State Ferries	10,043	1,904	21,251	21,000	1%
Sound Transit	12,622	7,437	34,883	see note	N/A
Total	163,167	131,239	507,819	441,385	15%

Notes: Observed boardings are from the National Transit Database (NTD). Sound Transit boardings were reported in NTD under other operators, King County Metro, Pierce Transit, and Community Transit.

The Kitsap Transit boardings were derived from local sources and do not include other aspects of Kitsap service, in particular demand response (worker/driver), vanpool, and ferry. If you add non-fixed route demand estimates to the 11,889 you get a total demand of 14,566 (a 20% difference between model and observed.

Daily model boardings are estimated from diurnal factors and are not derived directly from the model.

Transit Trip Characteristics

Seattle residents are far more likely to make transit trips and tours than residents of other areas. Eight percent of the trips and 12 percent of the tours made by Seattle residents had transit as the main mode. Only four percent of the tours made by King County residents outside Seattle and Snohomish County residents were transit tours. Three percent of Pierce County resident tours and two percent of Kitsap residents were transit tours.

While the evaluation of transit tours by area is interesting, the evaluation of transit trips by area is charted for trips rather than tours because this is the most

useful means of evaluating transit usage. As Figure 2.23 shows, the implication of these usage rates is that 43 percent (368,493/851,262) of the region's transit trips are made by Seattle residents; 31 percent of the region's transit trips are made by King County residents living outside Seattle; Snohomish County residents make 13 percent of the transit trips in the region; Pierce residents 11 percent; and Kitsap residents 2 percent.

Figure 2.23   Transit Trips by Traveler County of Residence
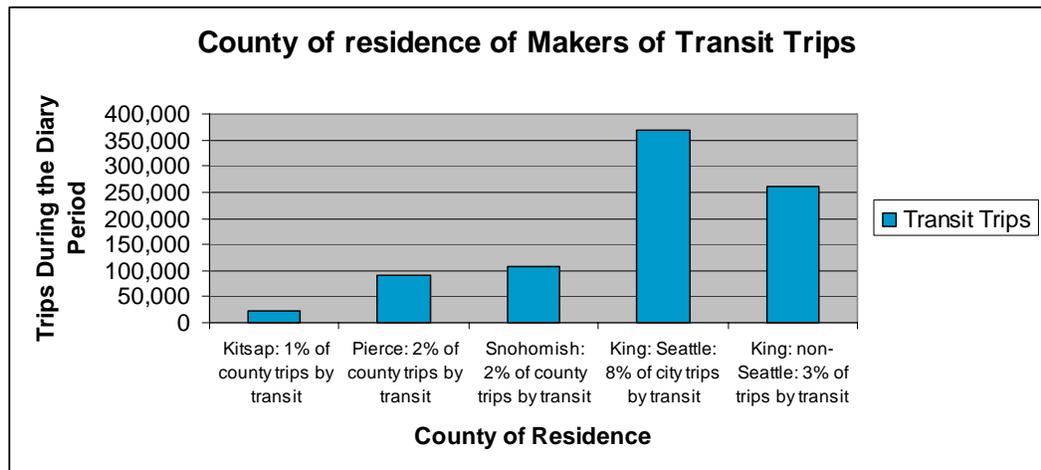
Note: The percent of transit trips by county is provided on the X-axis.

The geographic distribution of the reported transit usage at the planning district level is shown in Figure 2.24. In the figure, the concentration of transit trips within the same planning districts is shown by the color of the districts, with the dark green districts having the most intra-district trips. The most prevalent longer distance transit trips are shown by the yellow lines.

Figure 2.24 Reported Tours With Transit as the Main Mode

Legend

Planning Districts

Number of Short Distance Trips

- 0
- 1 - 100
- 101 - 500
- 501 - 1000
- 1001 - 2808
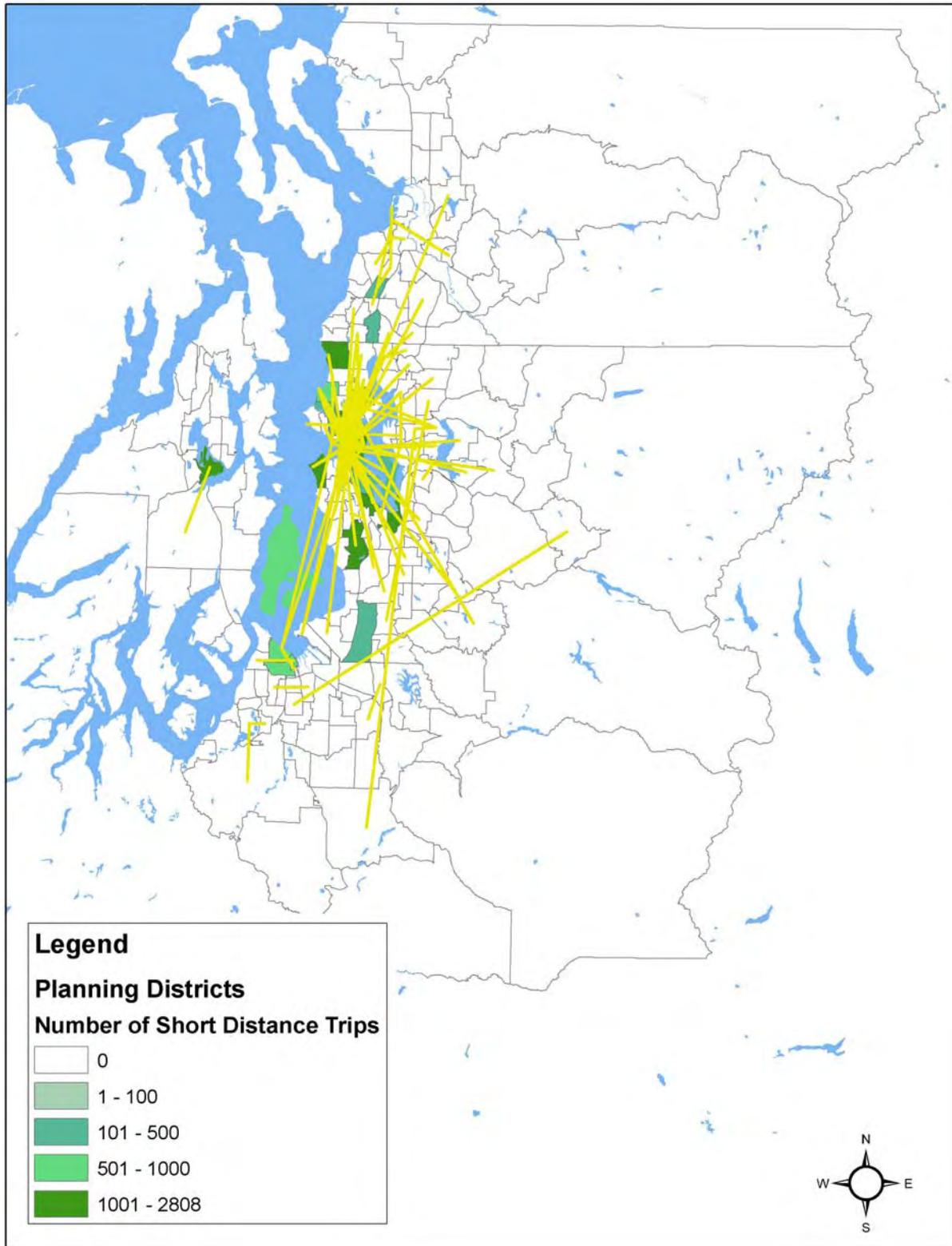
We also compare the demographic data for auto, transit and other trips in Table 2.2. These demographic data are derived from PSRC land use sources using the PSRC grid cell system. As noted above, these grid cells are defined by PSRC as 150 meter by 150 meter divisions, centered on the points of interest. Thus, a 3-by-3 destination grid is a 450 meter by 450 meter area around each destination. A 5-by-5 destination grid is a 750 meter by 750 meter area centered on each destination. As we would expect, Table 2.2 shows that transit trip destinations are far more likely to be at locations with greater household, population, and employment densities (as well as with better transit service).

Table 2.2   Comparison of Destination Grid Variables for Auto, Transit, and Other Trips

Grid Variable	Auto Trip Destinations		Transit Trip Destinations		Other Trip Destinations	
	Mean	Std. Dev.	Mean	Std. Dev.	Mean	Std. Dev.
Households in 3 by 3 grid	162.11	198.23	382.32	447.03	257.17	367.53
Households in 5 by 5 grid	430.58	481.55	1,011.35	965.91	682.66	846.23
Persons in 3 by 3 grid	352.85	327.60	648.79	604.02	483	512.29
Persons in 5 by 5 grid	936.33	783.06	1,717.67	1,285.17	1,288.79	1,179.77
Jobs in 3 by 3 grid	576.72	2,034.63	3,043.88	6,228.47	1,323.55	3,959.68
Jobs in 5 by 5 grid	1,157.38	4,016.77	6,714.82	13,016.05	2,805.91	8,220.08
Intersections in 5 by 5 grid	35.62	22.67	59.23	41.05	44.6	31.78
Transit services – AM Peak	15.22	43.51	79.14	136.29	40.71	94.15
Transit services – Midday	9.85	20.32	42.33	61.09	23.38	43.00

The time-of-day distribution of transit trips also varies from that of trips by the other modes. Figures 2.26 through 2.28 show the distribution of trip departure times for auto, transit, and other mode trips. The transit trips are more concentrated in the peak-periods, particularly the a.m. period, with about one-third of the trips in the day departing during the a.m. peak, compared to less than 10 percent of auto trips during the evening and night time hours.

Figure 2.25   Time-of-Day Distribution of Trip Departure Times for Auto Trips
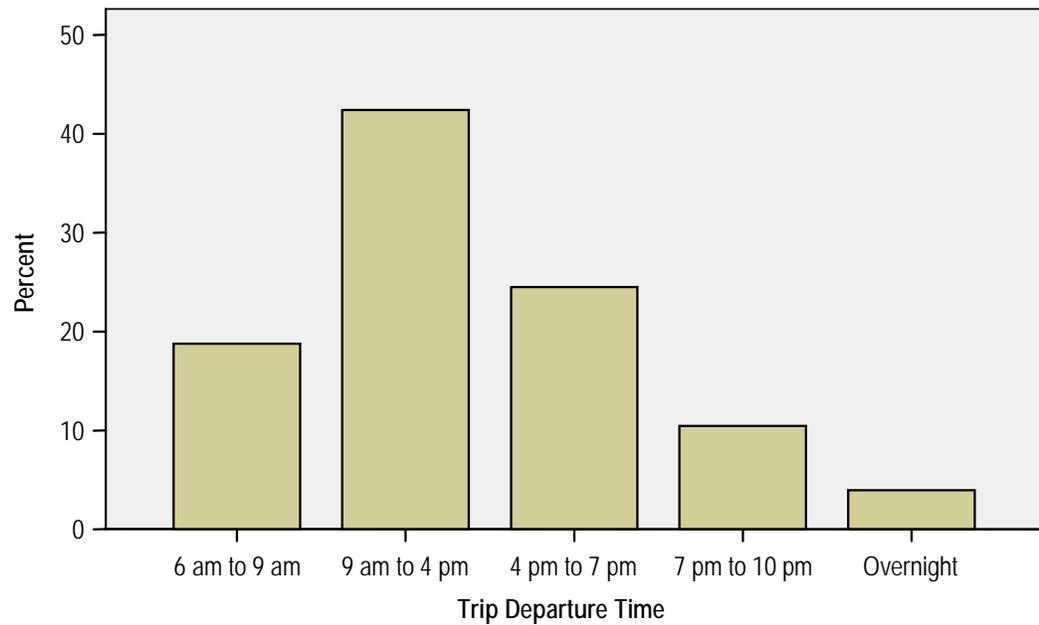
Cases weighted by household expansion factor to match various targets

Figure 2.26   Time-of-Day Distribution of Trip Departure Times for Transit Trips
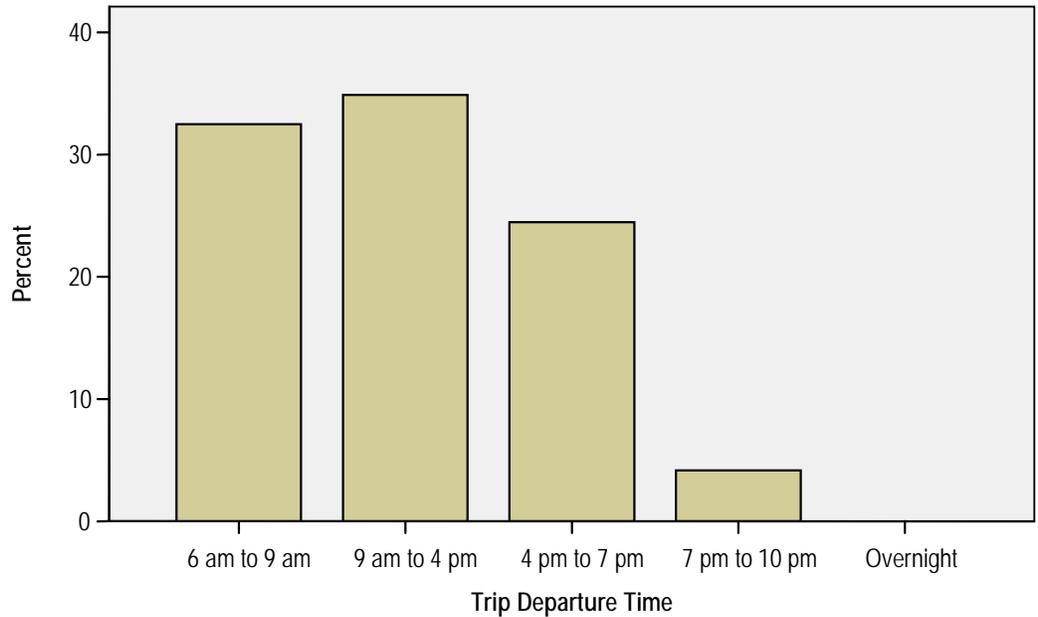
Cases weighted by household expansion factor to match various targets

Figure 2.27   Time-of-Day Distribution of Trip Departure Times for Trips by Other Modes
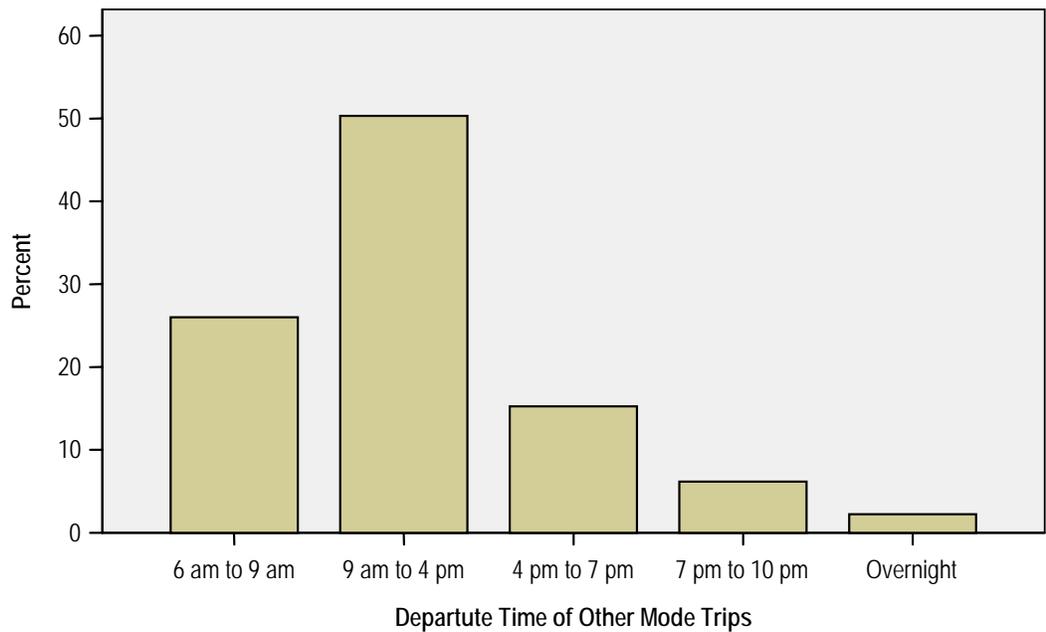
Cases weighted by household expansion factor to match various targets

Transit Trips by Traveler Household and Personal Characteristics

The socioeconomic and demographic factors that affect transit usage are described above. From the perspective of the trip, differences in transit usage among the different groups means that overall transit ridership is skewed compared to the overall population. For instance, transit trips account for 38 percent of trips made by residents in zero vehicle households, but only 6 percent of trips by people in one-vehicle households, two percent of trips by people in two or three vehicle households, and one percent of trips by people in four or more vehicle households were made by transit. Even though only about three percent of all trips are made by people in zero-vehicle households, 31 percent of transit trips are made by people in zero-vehicle households. About 32 percent of transit trips are made by people in one-vehicle households; 24 percent are made by people in two vehicle households; and 12 percent of transit trips are made by people in households with three or more vehicles.

Six percent of the trips made by members of households with incomes less than $50,000 per year were transit trips. Three percent of trips made by people with incomes between $50,000 and $100,000 and two percent of trips made by higher income residents were transit trips. This means that about 56 percent of transit trips are made by people with household incomes of less than $50,000 per year. This group makes only 33 percent of all trips in the region. Only 16 percent are made by people with household incomes of above $100,000 per year. The high income group makes 28 percent of the region's trips by all modes.

In addition:

- Fifty-six percent of the region's trips are made by employed persons, but 71 percent of the region's transit trips are made by people who are employed;

- Seventeen percent of the region's trips are made by people who rent their homes, but 48 percent of the transit trips are made by people who rent; and

- Twelve percent of the region's trips are made by people living in single person households, but 31 percent of the transit trips are. Forty-two percent of the region's trips are made by people living in households with four or more people, and 20 percent of the transit trips are.

2.4 CAPTIVE AND CHOICE TRANSIT CUSTOMERS

Transit riders are sometimes classified as either *choice customers* or *transit captive customers*. Choice customers are those that evaluate the relative advantages and disadvantages of auto options and transit options, and then make mode choice decisions based on their assessments of the options. Transit captive customers are those riders that do not have a viable auto option during the mode choice process. They must use a public transportation mode or non-motorized mode to complete the trip. The classification of transit customers has important implications for transit marketing and promotion efforts and for transit service design, because the so-called captive riders are theoretically bound to the transit system, at least in the short term, while transit provider marketing and service activities can affect choice customer decisions, and thus affect ridership levels.

The choice customer versus transit captive customer classification also has implications for modeling mode choice, because these models seek to simulate the actual behavioral choice process. However, most mode choice models either ignore transit captivity or capture the effects of transit captivity only indirectly by interacting model parameters with household vehicle availability.

One important reason that transit captivity is not generally addressed in the mode choice modeling context is that classifying specific trips as transit captive trips is not necessarily straightforward. Theoretically, using the available trip diary information, we can identify trips for which no household vehicle was available at the trip origin and classify those trips as non-auto captive and identify the trips for which there is a vehicle available at the trip origin and classify those trips as choice trips, but this analysis would be flawed because it ignores important factors in the trip-making decision process, including the joint decision-making process of many households, in which decisions about who will use the available vehicles and for which trips are made. A traveler may not have an auto option even if there is a vehicle present at the beginning of his or her trip, because the auto may be reserved for use by a different household member with an overlapping trip. On the other hand, travelers without access to household vehicles frequently will complete trips by auto using non-household vehicles, traveling as a passenger or in some cases as the driver. About 15 percent of the

trips made by members of households without vehicles available were trips by private auto (about 36 percent of their trips were transit trips).

Because of the difficulty in identifying situational transit captivity, it is probably more helpful to consider household structures that contribute to different levels of potential captivity. The household travel survey data allow us to classify households into five categories that are relevant for better understanding transit captivity:

- Households with no vehicles;

- Households with fewer vehicles than licensed drivers;

- Households with at least one vehicle for each licensed driver, but fewer vehicles than driving age adults;

- Households with at least one vehicle for each driving age adult; and

- Households with at least one vehicle for each household member

Table 2.3 summarizes the PSRC region households by these groups. About 7.5 percent of households in the region have no vehicles available to them. They are less active in terms of their trip making, completing about 3.2 percent of the region's trips. These households are sometimes defined as transit captive, and indeed they make a disproportionate number of the region's transit trips. However, as noted above, they still make a significant number of trips using non-household autos, so defining all of their travel as transit captive would not be accurate.

Ten percent of the region's households have more licensed drivers than vehicles. While to a lesser extent than the zero vehicle households, these households are likely to have mode choice decisions that are limited by situational auto availability because there will be times when a driving member of the household will not have a vehicle available to them. In addition, non-licensed adults and children under the driving age will face constrained travel choices. On a proportional basis, this group makes more of the region's transit trips than the region's overall trips. The 5.6 percent of the region's households that have at least one vehicle for each licensed driver, but that have non-driving adults for which no vehicle would be available are similar in terms of the trip shares to the households with fewer vehicles than licensed drivers.

Table 2.3   Household Vehicle Availability Groups

Household Group	Percent of Households	Percent of Reported Trips	Percent of Reported Transit Trips
No vehicles available	7.5%	3.2%	31.5%
Fewer vehicles than licensed drivers	10.0%	11.5%	18.0%
At least one vehicle for each licensed driver, but fewer vehicles than driving age adults	5.6%	7.0%	10.0%
At least one vehicle for each driving age adult	20.1%	36.0%	11.5%
At least one vehicle for each household member	56.8%	42.3%	29.0%

Source: Analysis of the 2007 PSRC Household Travel Survey.

The 20 percent of the region's households that have at least one vehicle for each adult in the household account for 36 percent of the region's trips, but for only about 11.5 percent of the region's transit trips.   While this group includes households with children under the driving age, which theoretically could face transit-captive situations, and the overwhelming percentage of the group's travel involves autos.

Finally, 57 percent of the region's households have at least one vehicle for every member of the household.   For this group, virtually all trips are choice trips, rather than public transportation captive trips.   Because this group is more likely to include smaller households than the previous group, the overall number of regional trips made by these households is smaller than their share of households.   They make about 43 percent of the region's trips.   They also make about 29 percent of the region's transit trips.

The relative shares of trips and transit trips made by each group would seem to support, including at least three (if not all five) vehicle availability market segments in the analysis of mode choices: zero vehicle households (most limited mode choice sets); households with fewer vehicles than driving age adults (some situational limitations in mode choice sets); and households with at least one vehicle for each driving age adult (virtually no limitations in mode choice sets).

As one would expect, the household groups differ in composition.   Tables 2.4 through 2.7 compare the groups by household characteristics.   We see the

expected differences between zero vehicle households and the other groupings (more urban, fewer household members, lower incomes, higher level of renting). However, the households that are most likely to have auto as a choice are not necessarily the opposite. In terms of characteristics, the highest choice group tends to be closer to the second and third groups that have some limitations on their choice, rather than the fourth group. Since this high choice group provides a large percentage of the transit trips in the region, transit agencies should be actively promoting service to this group. So, the fact that the group's characteristics are similar to the semi-captive more-traditional transit customers will help in marketing transit.

Table 2.4   Household Vehicle Availability by Household Size

Household Group	One Person	Two People	Three People	Four or More People
No vehicles available	79%	12%	5%	2%
Fewer vehicles than licensed drivers	0%	52%	17%	31%
At least one vehicle for each licensed driver, but fewer vehicles than driving age adults	0%	40%	23%	37%
At least one vehicle for each driving age adult	0%	5%	26%	69%
At least one vehicle for each household member	41%	44%	10%	5%

Source: Analysis of the 2007 PSRC Household Travel Survey.

Table 2.5   Household Vehicle Availability by Annual Household Income

Household Group	Less Than $50,000	$50,000 – $100,000	More Than $100,000
No vehicles available	95%	4%	1%
Fewer vehicles than licensed drivers	54%	31%	15%
At least one vehicle for each licensed driver, but fewer vehicles than driving age adults	53%	35%	12%
At least one vehicle for each driving age adult	27%	43%	30%
At least one vehicle for each household member	44%	34%	22%

Source: Analysis of the 2007 PSRC Household Travel Survey.

Table 2.6   Household Vehicle Availability by Annual Household Tenure

Household Group	Own	Rent	Other
No vehicles available	22%	77%	1%
Fewer vehicles than licensed drivers	68%	32%	0%
At least one vehicle for each licensed driver, but fewer vehicles than driving age adults	70%	30%	0%
At least one vehicle for each driving age adult	87%	13%	0%
At least one vehicle for each household member	81%	19%	0%

Source: Analysis of the 2007 PSRC Household Travel Survey.

Table 2.7   Household Vehicle Availability by Household Area Type

Household Group	Urban	Suburban	Rural
No vehicles available	61%	32%	7%
Fewer vehicles than licensed drivers	49%	40%	11%
At least one vehicle for each licensed driver, but fewer vehicles than driving age adults	38%	46%	16%
At least one vehicle for each driving age adult	27%	58%	15%
At least one vehicle for each household member	36%	47%	17%

Source: Analysis of the 2007 PSRC Household Travel Survey

3.0 Analysis of Attitudinal Data

3.1 INTRODUCTION

The stated-preference and attitudinal portion of the survey was carried out as a follow-up to the main PSRC 2006 Household Activity Survey. The stated-preference (SP) survey has three main components:

- A series of 25 attitudinal statements, rated on a 10 point disagree/agree scale;

- A series of 4 Stated-preference choice tasks between car and transit options; and

- A series of 4 Stated-preference choice tasks between car tolled and non-tolled options.

Respondents were selected to receive either one or both of the transit and toll SP choice exercises, depending on which choices were relevant for an actual trip that they reported in their travel diary. Section 3.2 describes how the choice tasks were designed and customized to each respondent's actual trip characteristics.

A total of 903 surveys were completed, with 552 completing the transit SP exercises and 752 completing the toll SP exercise. These are well over the target sample size of 500 per SP exercise. Section 3.3 provides a summary description of the sample characteristics.

The attitudinal data was used in descriptive analyses to gain insight into residents' attitudes regarding travel in the Puget Sound region. It also can be used to segment the market along subjective dimensions that are not available in typical objective data related to income, age, household size, and so forth. The analysis of the attitudinal data is reported in Section 3.4.

The data from both of the SP choice exercises was used to estimate logit discrete choice models explaining the importance of each design variable in the choices made. The data proved to be very successful in explaining the SP choices. The analysis of the transit SP choices is reported in Section 3.5, and the analysis of the toll SP in Section 6.

3.2 SURVEY DESIGN

As a follow-up to the household activity survey, selected respondents were asked to participate in an attitude and stated-preference survey. This survey was designed to provide additional insights into why respondents make the travel choices that they do and to obtain data about how respondents would make choices among transportation options that do not currently exist or exist only for a very small percentage of regional residents. Specifically, the attitude and stated-preference survey was designed to obtain information about mode choices related to new transit options and about route choices in the presence of toll options.

Working with PSRC staff, the project team identified several transportation corridors where transit improvements and the implementation of toll road or toll lane facilities are currently under study or could be studied in the future. As shown in Figure 3.1, we identified five "transit corridors," where future major transit improvements may make sense, and 12 "toll road corridors," where potential toll lane and toll road options are being assessed. For each corridor, we identified the PSRC Travel Demand Model traffic analysis zone pairs that are included in each corridor that were at least three miles away from each other.

Respondents with trips between these zone pairs in the corridors were included in the attitude and stated-preference survey sample. By focusing on trips within these corridors (and the respondents who make these trips), we tried to increase the likelihood that respondents would view the hypothetical SP choices as potentially feasible and relevant, and thus make their choices more realistic. The attitudes and preferences that were collected in this survey pertain to the respondents that are most likely going to be affected by major transit and tolling investments.

The drawback of focusing the survey on travelers in the specific corridors is that the data gathered in this follow-up survey does not represent the population, as a whole. The survey participants were drawn randomly from travelers making trips in these key corridors that gave permission to be re-contacted for additional surveys, but most household survey respondents did not travel between origins and destinations in these corridors.

Figure 3.1   Transit and Toll Corridors
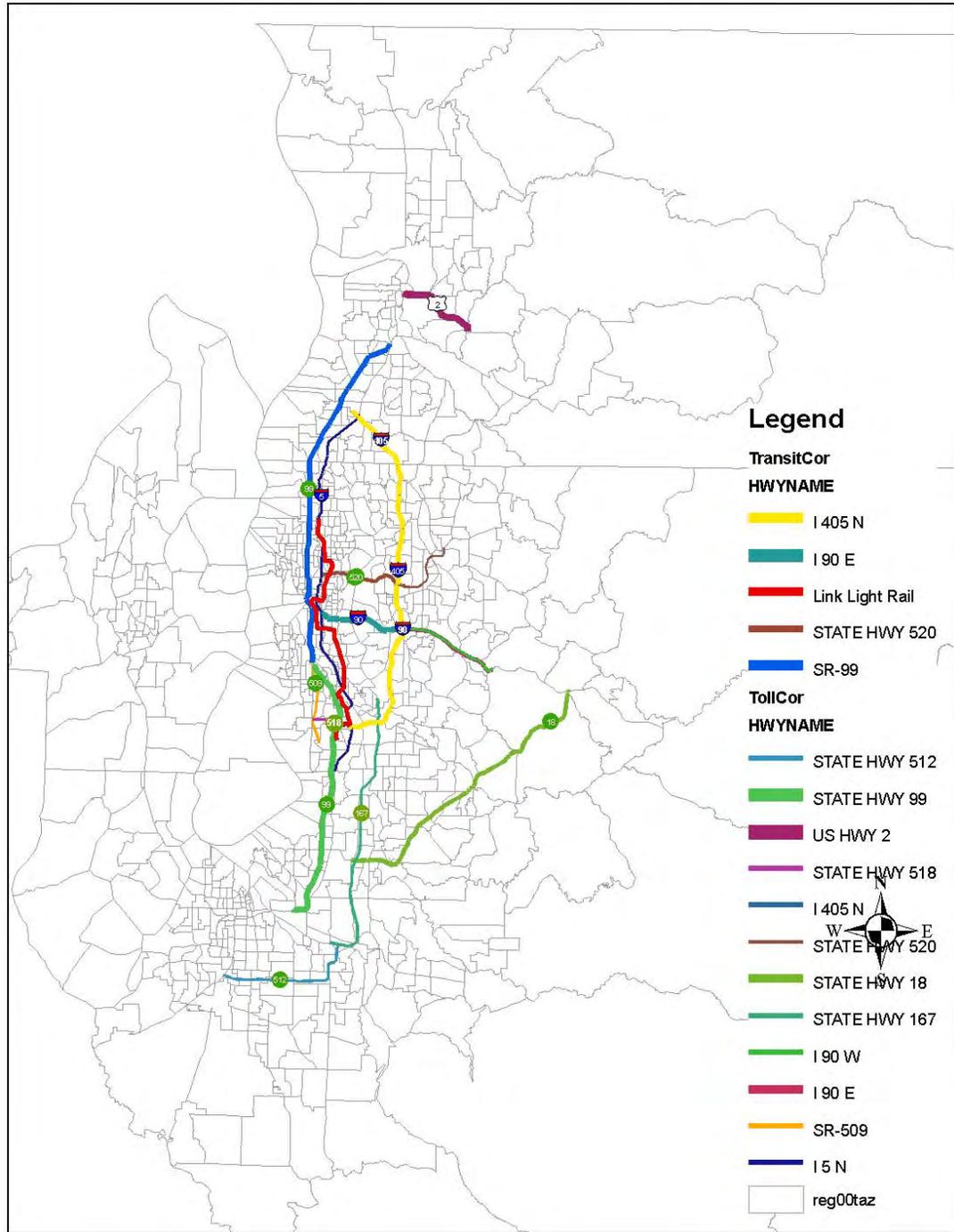
A sample of 1,342 respondents with qualifying corridor trips was selected with the following qualifications:

- Respondents for the follow-up survey were 18 years old or more;

- Respondents gave permission to be re-contacted during the household survey retrieval;

- Respondents made one or more trip in an identified corridor of more than three miles;

- Since the sample selection was based on the qualifying trips, respondents' probability of selection was proportional to their numbers of qualifying trips.

All respondents of the follow-up survey were asked to answer 25 attitude rating questions. In addition, respondents were split into two groups, to receive either one or both of the transit and toll SP choice exercises, depending on which choices were relevant for the actual sampled trip that they reported in their travel diary.

In August and September 2006, the follow-up survey sample respondents were contacted by telephone and were asked to be aware of the survey that was being mailed to them. The mail survey consisted of a cover letter, the attitudinal questions, and the customized choice exercises. Respondents were asked to complete the questionnaire and mail it back. Those who did not respond by mail after several days were contacted by telephone and encouraged to respond. These respondents were given the alternative option of providing their responses by telephone, rather than through mail back. A total of 903 surveys were completed and deemed usable for analysis, for a follow-up survey response rate of 67 percent. Usable surveys were fully completed.

3.3 SAMPLE CHARACTERISTICS

Table 3.1 shows a breakdown of the survey sample along several different dimensions. Overall, of the 903 respondents who completed the survey, 16.7 percent received the transit SP exercise, 38.9 percent received the toll SP exercise, and 44.4 percent received both. About 80 percent of the respondents mailed back the survey form, while the rest gave their responses over the telephone.

Table 3.1   Stated-Preference Survey Sample Characteristics

Transit SP exercise only	16.7% (151)
Toll SP exercise only	38.9% (351)
Both SP exercises	44.4% (401)

Trip Purpose Type	
Traveled by car	89.4%
Traveled by bus	8.6%
Traveled by bus + car	1.4%
Traveled by bus + bike	0.3%
Traveled by rail	0.1%

Travel party Type	
Traveled alone	77.0%
Shared ride	23.0%

Trip Time of Day	
Traveled before 6 a.m.	3.5%
Between 6 and 9 a.m.	33.6%
Between 9 a.m. and 3 p.m.	33.0%
Between 3 p.m. and 7 p.m.	23.4%
Traveled after 7 p.m.	6.5%

Trip Purpose Type	
Home to work trip	34.0%
Work to home trip	5.1%
Home to other trip	27.9%
Other to home trip	10.5%
Other to work trip	1.9%
Work to other trip	8.2%
Other to other trip	12.4%

Transit Corridors	
TrC1-Seattle-Northgate	27.6%
TrC3-Seattle-Bellevue	6.0%
TrC5-Seattle-Bellevue	9.5%
TrC7-Tukwila-Lynnwood	9.6%
TrC9-Everett-Seattle	28.6%

Toll Corridors	
ToC2-Seatac-Lynnwood	41.9%
ToC4-Seatac-Issaquah	8.9%
ToC6-Seattle-Redmond	13.8%
ToC8-Tukwila-Lynnwood	10.0%
ToC10-Seattle-Seatac	1.3%
ToC11-Burien-Tukwila	1.9%
ToC12-Renton-Sumner	6.3%
ToC13-Everett-Snohomish	3.0%
ToC14-W.Seattle-Seattle	11.0%
ToC15-Auburn-Snoqualmie	3.0%
ToC16-Tacoma-Puyallup	1.7%

Total Sample Size	903

Data Retrieval Type	
Phone retrieval	18.6%
Mail retrieval	81.4%

Age Group	
Age under 35	10.7%
Age 35-44	21.6%
Age 45-54	26.7%
Age 55-64	22.8%
Age 65+	**17.6%**

Gender	
Male	40.6%
Female	**59.4%**

Employment Status	
Full-time worker	56.8%
Part-time worker	13.3%
Non-worker	29.9%

Household Auto Ownership	
0 vehicle HH	**1.9%**
1 vehicle HH	32.9%
2 vehicle HH	42.7%
3+ vehicle HH	22.5%

Household Size	
1 person HH	29.0%
2 person HH	35.3%
3 person HH	15.5%
4+ person HH	20.2%

Household Workers	
0 worker HH	19.8%
1 worker HH	40.8%
2 worker HH	34.1%
3+ worker HH	5.3%

Household Income	
Income $0-50K	27.7%
Income $50-100K	43.1%
Income $100-150K	17.6%
Income over $150K	7.2%
Income missing	4.4%

Residence Area	
Live in city of Seattle	43.1%
Live in rest of King County	32.2%
Live in Pierce County	9.6%
Live in Snohomish County	14.4%
Live in Kitsap County	0.7%

Note: The corridor summaries do not sum to 100 percent because some trips can be in more than one corridor. Of the five transit corridors used to select the sample, the most common ones in the sample are Seattle-Northgate and Seattle-Everett, both with roughly 28 percent of the sample. The two Seattle-Bellevue corridors comprise about 16 percent. The most common toll corridor by far is the Seatac-Tukwila-Lynnwood corridor, with 42 percent of the sample. Ten other toll corridors all had various percentages ranging from 1.3 to 13.8 percent, as shown in the table.

The survey was customized around a specific trip that the respondent reported making in a relevant transit and/or highway corridor. The key characteristics of that trip were related back to the respondent on the survey form, including the mode used, the time-of-day, the origin and destination activity types, and the origin and destination addresses.

About 90 percent of the respondents actually traveled by car, with the rest traveling by bus, save for a single respondent who used rail. Most of the bus trips were walk or bike access, with only 1.4 percent auto access. Most of the car trips were SOV, with only 23 percent shared ride.

Just over half of the trips were made during the peak hours, with the "peaks" as defined in the toll SP exercise. Around 33 percent traveled in the a.m. peak (6 to 9 a.m.), and another 23 percent traveled in the p.m. peak (3 to 7 p.m.). The rest traveled mainly in the midday period.

Overall, roughly half of the trips had one end at the workplace, with 33 percent home to work, 5 percent work to home, and 12 percent work-based other trips. About 40 percent of trips were home-based other, split fairly evenly across shopping, personal business and recreation purposes. About 12 percent were other non-home-based trips.

Most of the respondents were in the age range 35 to 64, with about 11 percent under age 35 and 18 percent age 65 and older. Almost 60 percent of respondents were female, and 70 percent employed, mostly full-time.

Only two percent of respondents were from households with no cars, and about 65 percent had 2 or more cars in the household. Twenty-nine percent of respondents were single person households and 35 percent were from two person households. Twenty percent were from households with no workers. The sample tended to be fairly high income, with only 28 percent from household with income less than $50,000 and 24 percent with income over $100,000.

The majority (75 percent) of the sample lived in King County, with 43 percent in the City of Seattle. Pierce (10 percent) and Snohomish (14 percent) counties are both represented, while only six respondents were from Kitsap County.

3.4 ATTITUDINAL STATEMENTS

A series of 25 attitudinal statements were selected to be used in this survey, based on which ones seemed most useful in segmentation in past studies. A few different versions of the survey were created with different orderings of the statements to prevent order bias in the scores. The average and standard deviation of the scores are shown alongside the statements in Table 3.2 (The number of cases is typically around 895 out of 903, as there are a few cases of missing responses for each statement). The statements are sorted in the table from the highest to the lowest average score.

Almost everyone agreed that transit can help the environment, although fewer people said they would switch to a different mode or pay more to help the environment. Very few people said they were usually anxious when traveling, but quite a few people said that driving on area highways is stressful, and that they avoid traveling during certain times because of stress.

When looking at the distributions, it is interesting that most of the scores tend to be bunched toward the middle range, particularly the statements related to delays and to the environment. Some, however, tend more toward the extreme ends of the scale. These tend to be the statements related to the stress of driving, to the need for a flexible schedule, and to knowledge of using public transportation. These statements seem to discriminate more, and thus may be most useful in segmentation.

The statement that "people who drive alone should pay more" elicited some strong disagreement. Further analysis showed that people in one person households tended to disagree more often, presumably feeling that they should not be penalized for not having a ready supply of passengers.

Survey responses were tabulated and cross tabulated by key demographic differences and behavioral attributes. Three that turned out to be particularly relevant in this study are the respondent's age, number of vehicles, previous use of public transit, and to a lesser extent variables such as place of residence (urban, suburban, rural).

Table 3.2   Summary of Attitudinal Scores

Descriptive Statistics	Mean	Std. Dev.
Use of transit can help improve the environment	8.33	2.16
I wouldn't mind walking a few minutes to get to my destination	8.02	2.43
If my travel option is delayed, I want to know the cause and length of the delay	7.47	2.28
I am comfortable riding a bus	6.81	2.75
I need to have the flexibility to make many trips during the day if necessary	6.79	2.95
I would change my form of travel if it would save me some time	6.66	2.80
I use the most convenient form of transportation regardless of cost	6.59	2.69
I avoid making certain trips at certain times because it is too stressful to make the trip	6.56	2.95
I need to make trips to a wide variety of locations each week	6.38	3.01
I would be willing to pay more when I travel if it would help the environment	6.04	2.51
I would switch to a different form of transportation if it would help the environment	5.88	2.49
I need to make trips according to a fixed schedule	5.86	3.06
I am usually in a hurry when I make a trip	5.82	2.47
I don't mind taking a longer trip if I could make productive use of my time when I travel	5.80	2.70
Driving on Puget Sound freeways is stressful for me	5.76	2.80
I always take the fastest route to my destination even if I have a cheaper alternative	5.63	2.68
I don't like to drive but it is usually the fastest way to get where I need to go	5.60	3.22
Having a stress-free trip is more important than reaching my destination quickly	5.53	2.51
People who drive alone should pay more to help improve traffic congestion situation	5.20	3.02
I wouldn't mind the traffic congestion if it was predictable from day-to-day	5.08	2.66
I don't mind delays as long as I am comfortable	4.84	2.53
I don't know how to reach my destination using public transportation	4.62	3.40
I prefer to make trips alone because I like time to myself	4.26	2.60
I would use another form of transportation if I could afford it	3.87	2.76
I am usually anxious and unsettled when traveling	3.23	2.19

3.5 ANALYSIS OF ATTITUDINAL DATA

Awareness of Public Transportation

The first requirement of public transit use and adoption is awareness of public transit options and how to reach one's destination using transit. The survey revealed that half of the respondents feel they know how to reach their destination using public transit, 29 percent do not know how, and the remaining 21 percent fall in an ambiguous category in between knowing and not knowing.

Q4: I don't know how to reach my destination using public transportation
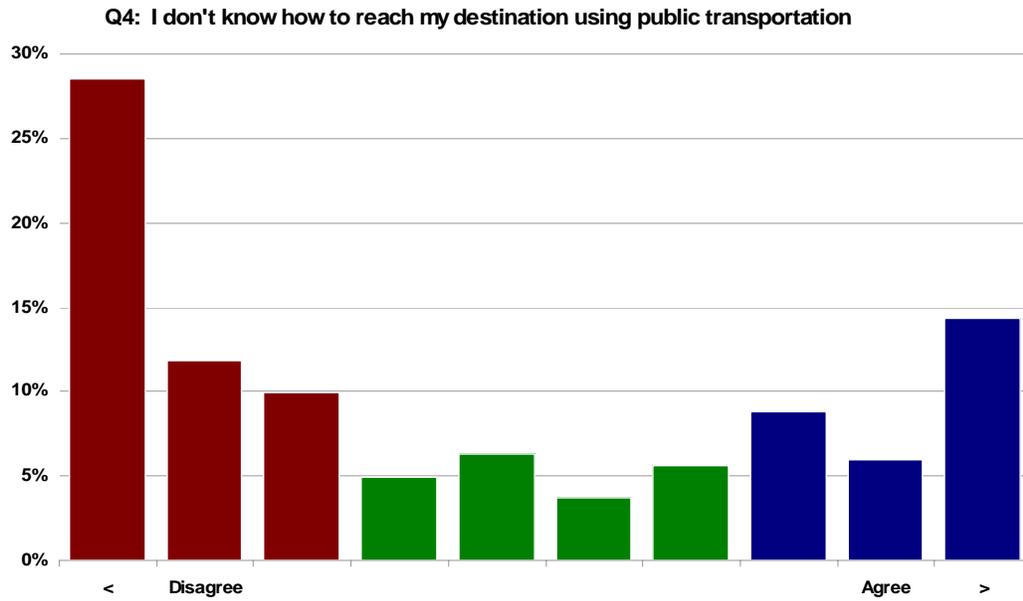
This information gap is most pronounced among residents who own vehicles. While only six percent of respondents who do <u>not</u> own a vehicle report that they do not know how to reach their destination using public transit, whereas about 30 percent of those with one or more vehicles available for their use say they can do so. Awareness also is strongly correlated with age – younger residents are far

more likely to know how to reach destinations using public transit than older respondents. While only about 20 percent of those under age 35 cannot find their destination on public transit, this percentage climbs with age, particularly after 65.
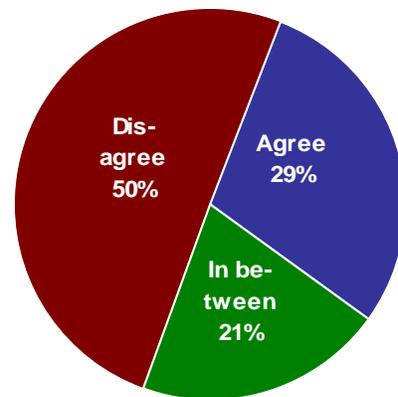
Q4: I don't know how to reach my destination using public transportation (percent who agree with statement, by age)
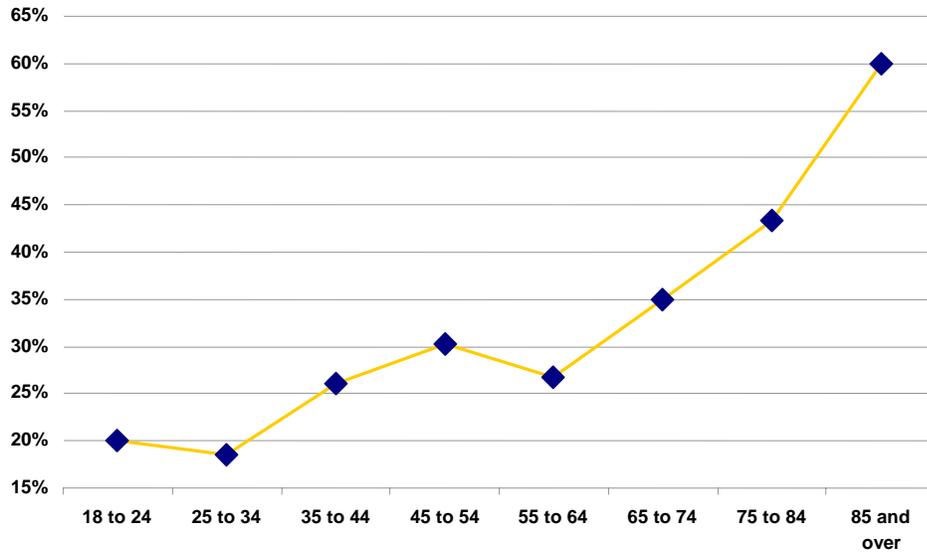
The surveys revealed, to no surprise, that people who have used public transportation in the past month, and/or who use a bus pass, are 3 to 4 times as likely to know how to reach their destination using public transportation (bar chart below). Urban residents are somewhat more likely to know how to reach their destination than suburban and particularly rural residents. People who are currently employed are slightly more likely to know how to reach their destination using public transportation.

Q4: I don't know how to reach my destination using public transportion (by number of vehicles)
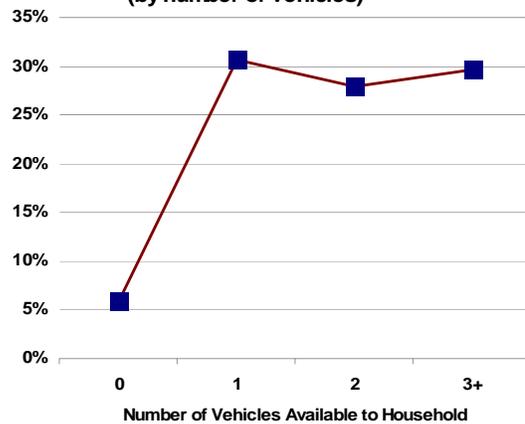
Q4: I don't know how to reach my destination using public transportation (percent who agree with statement, by transit usage)
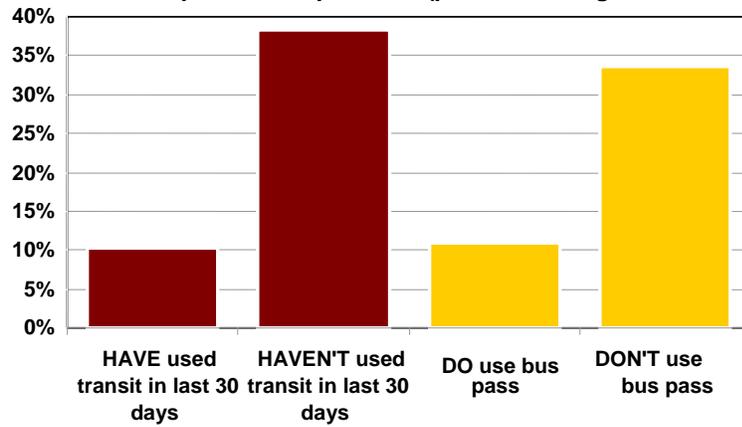
Q4: I don't know how to reach my destination using public transportation (percent who agree with statement, by type of community)
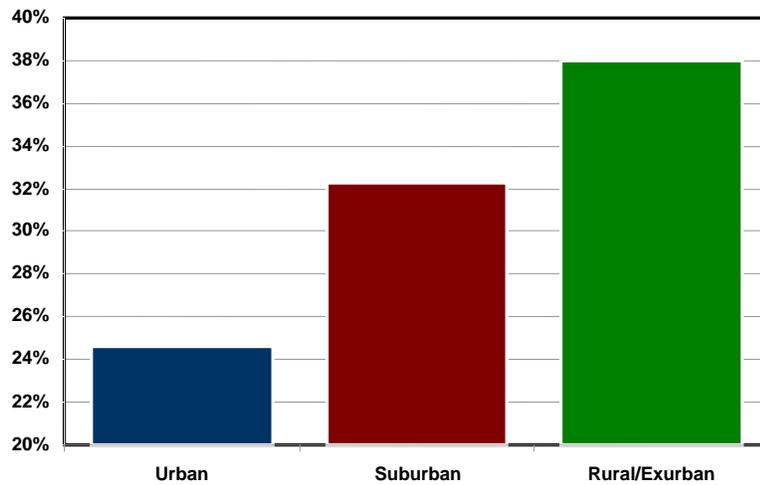
Travel Flexibility

This section reports survey findings related to travel flexibility; in particular the need to reach different locations, the balancing of travel flexibility with time, and the willingness to walk to reach a destination.

Need to Reach Different Locations

Half of the survey respondents say that they must have the flexibility to make many trips during the day. This need was found to be lowest before age 35, then peak in the age 35 to 44 age range, and decline for older age ranges. The need for this kind of flexibility peaks at an age when most adults have entered their prime working years, and are most likely to have children living at home, both of which demand travel flexibility.

Q6: I need to have the flexibility to make many trips during the day if necessary

Q6: I need to have the flexibility to make many trips during the day if necessary (percent who agree with statement, by age)
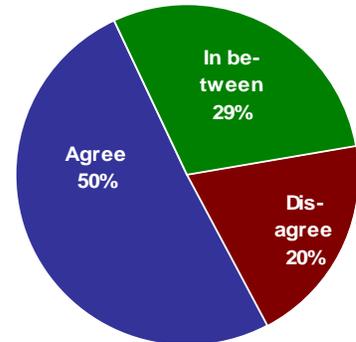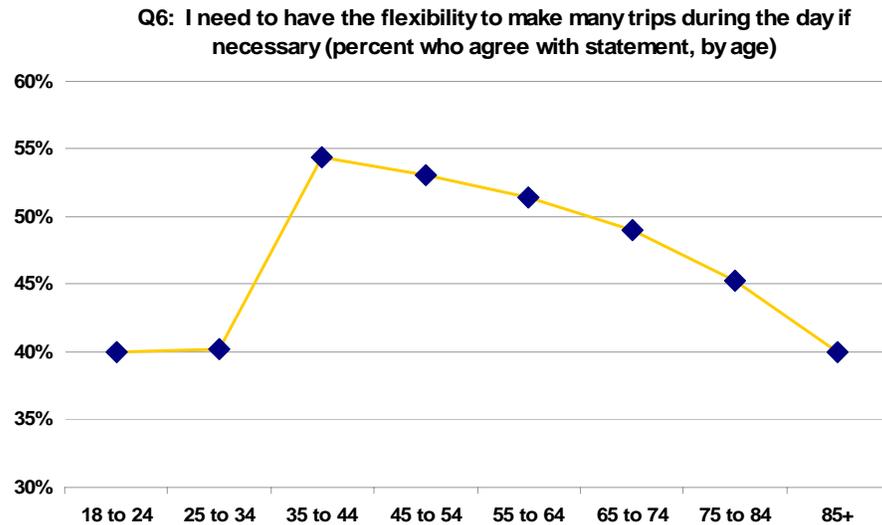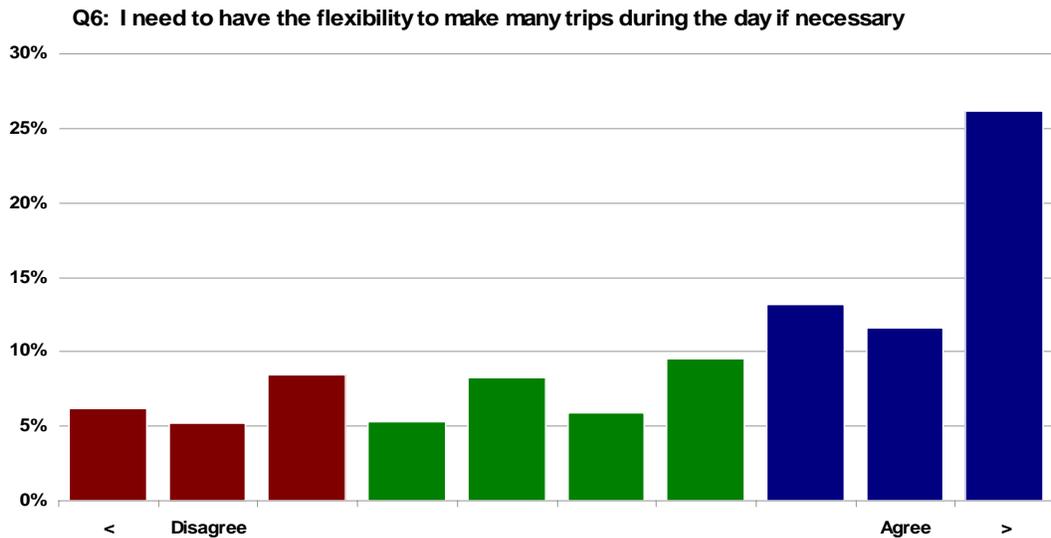
The stated need for flexibility to make trips during the day was found to be correlated with the number of vehicles available to an individual. While it may be that people whose lives require the most flexibility are especially motivated to own cars, it also is possible that those who do <u>not</u> own cars have a different perception of what they "need." In other words, if a car is not available (it is unaffordable or the individual has elected to forgo ownership) then people make do, and report less urgency for flexible trip making throughout the day. A related finding is that people who have not used public transit in the past month and/or do <u>not</u> use a bus pass are about twice as likely to say that they must have this kind of flexibility.

Q6: I need to have the flexibility to make many trips during the day if necessary
(percent who agree with statement, by vehicles available)

Number of Vehicles Available to Household

Q6: I need to have the flexibility to make many trips during the day if necessary
(percent who agree with statement, by number of people in household)

Number of People in Household
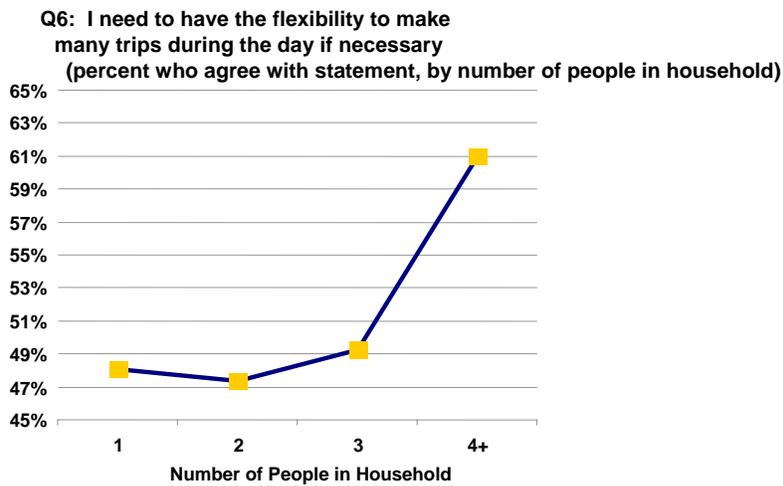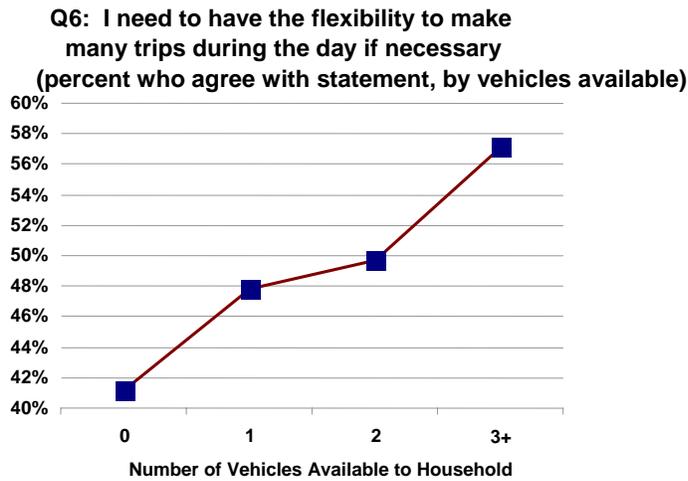
Family size would appear to be a factor, with 61 percent of the respondents that have four or more household members saying they require this flexibility to make many trips during the day if necessary, as compared to fewer than 50 percent for respondents with fewer members.

Females in the survey were found to be slightly more likely than males in the survey to say that such flexibility is important (44 percent females versus 40 percent of males).

A related survey question asked residents how much they agreed with the statement that they need to make trips to a wide variety of locations each week.

About one quarter <u>strongly</u> agreed, and 43 percent generally agreed. Less than one quarter of respondents disagreed with this statement. This finding is generally consistent with the reported need for flexibility to make multiple trips during the day, described above. Again, residents who do <u>not</u> use public transit or have a bus pass are far more likely to say that they need to make trips to a variety of locations each week.

Q5: I need to make trips to a wide variety of locations each week
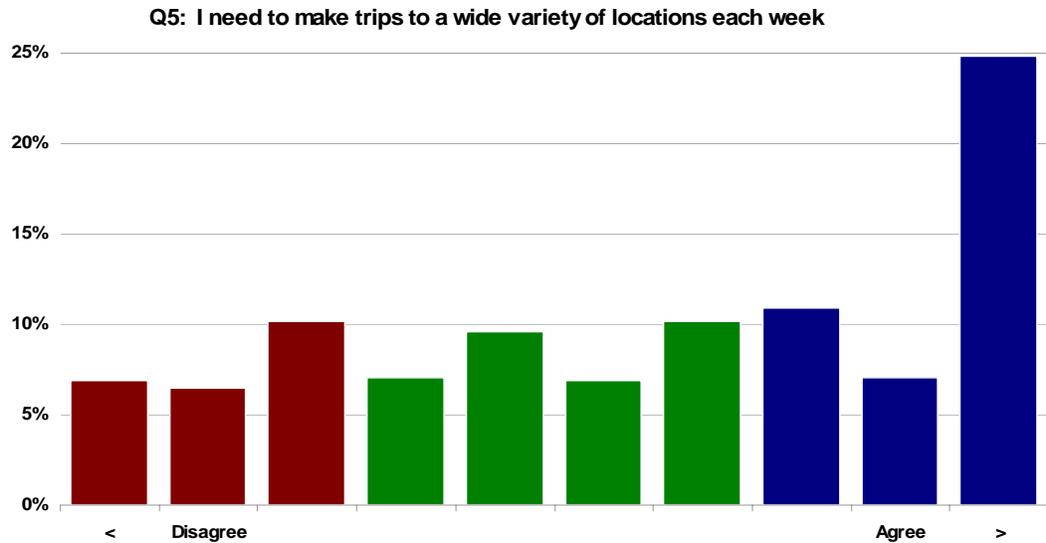
The need to make these trips to a wide variety of locations is correlated with age. Respondents in the 35-65 age range were the most likely to believe that such trips are critical. By age 75, this need drops off swiftly, with respondents less likely to be engaged in full-time work or have children living at home.

**Q5: I need to take trips to a wide variety of locations each week
(percent who agree with statement, by age)**
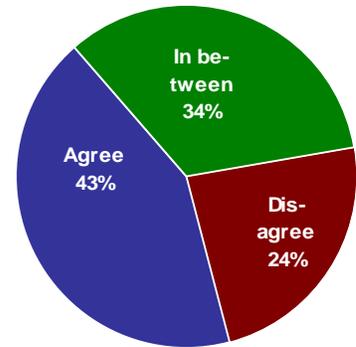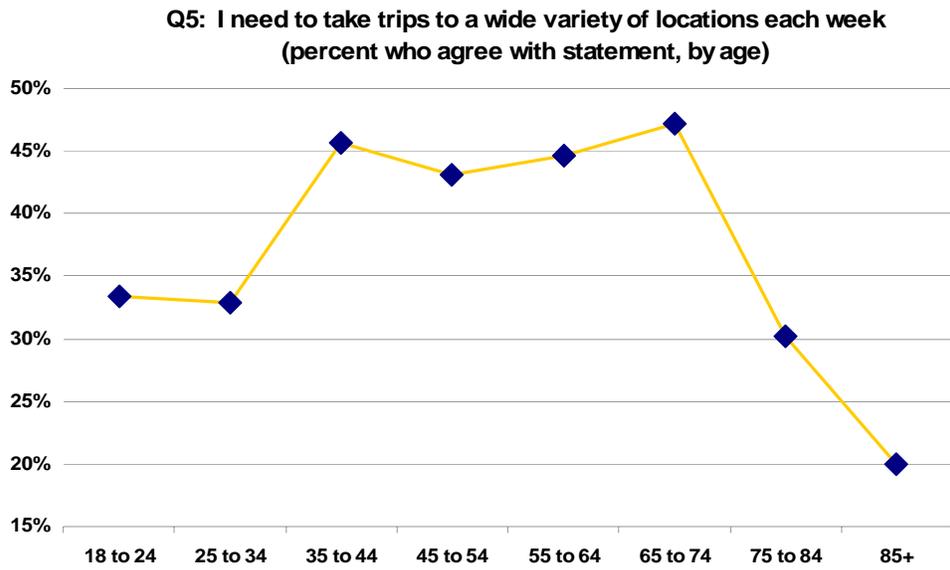
Survey respondents were asked whether they agreed with the statement, "I need to make trips according to a fixed schedule." Results were divided, with 39 percent agreeing with the statement, 28 percent disagreeing, and the remaining one third in between. The need to make trips on a fixed schedule declines somewhat with age, with those in the 18-24 age group (college and early adulthood) the most likely to say this is important, and those over 65 the least likely. Other variables, such as vehicle ownership or use of public transportation were not strongly correlated.

Q17: I need to make trips according to a fixed schedule
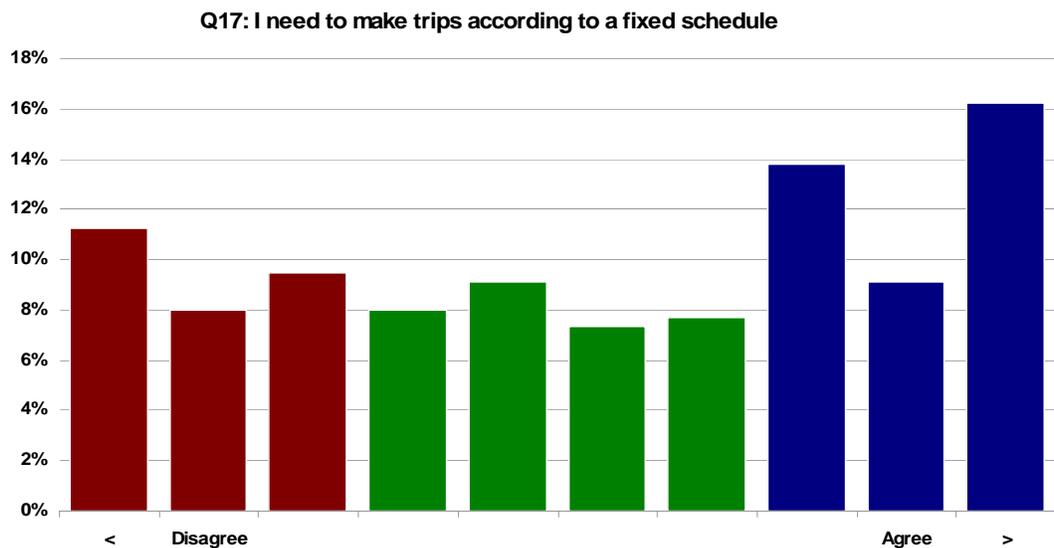
**Q17: I need to make trips according
to a fixed schedule (percent who
agree with statement, by age)**
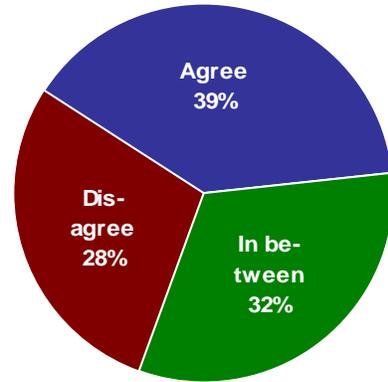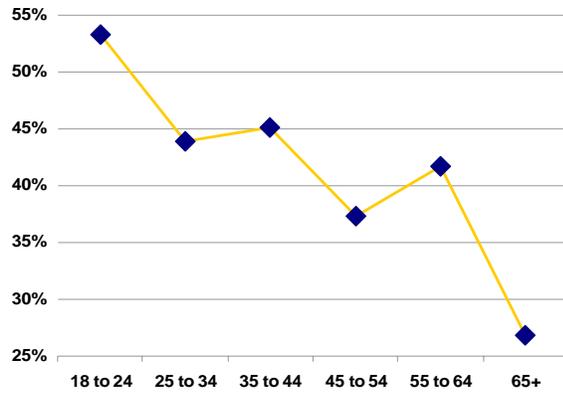
Willingness to Make Changes

The surveys asked several questions to ascertain the willingness of respondents to make changes in their travel patterns. In one question, respondents were asked whether they would change their form of travel if it would save them some time. It appears that nearly half would do so, 17 percent would not, and the remaining 36 percent are somewhere in between. Residents who use public transit are

Agree 47%

In between 36%

Disagree 17%

somewhat less likely to be motivated to change their form of travel to save time.
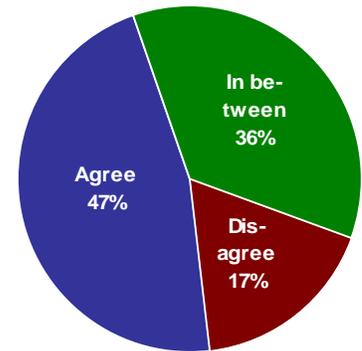
Q18: I would change my form of travel if it would save me some time
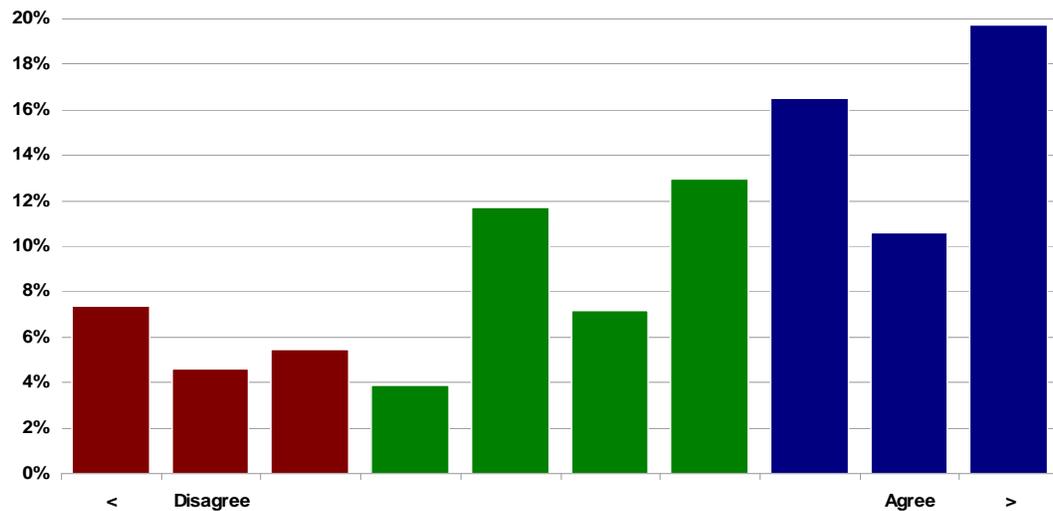
Q18: I would change my form of travel if it would save me some time (percent who agree with statement by transit usage)
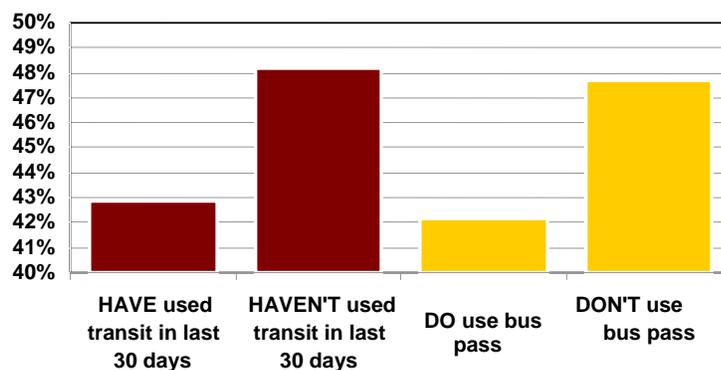
As residents age they are less likely to change their form of travel to save time. Since many older residents do not use public transit or even know how to reach their destinations this way, we can expect they would be less motivated to switch from driving to public transit. We also learned from other survey questions that elders tend to place less of a premium on time, supporting the finding from this survey question.

Q18: I would change my form of travel if it would save me some time
(percent who agree with statement, by age)
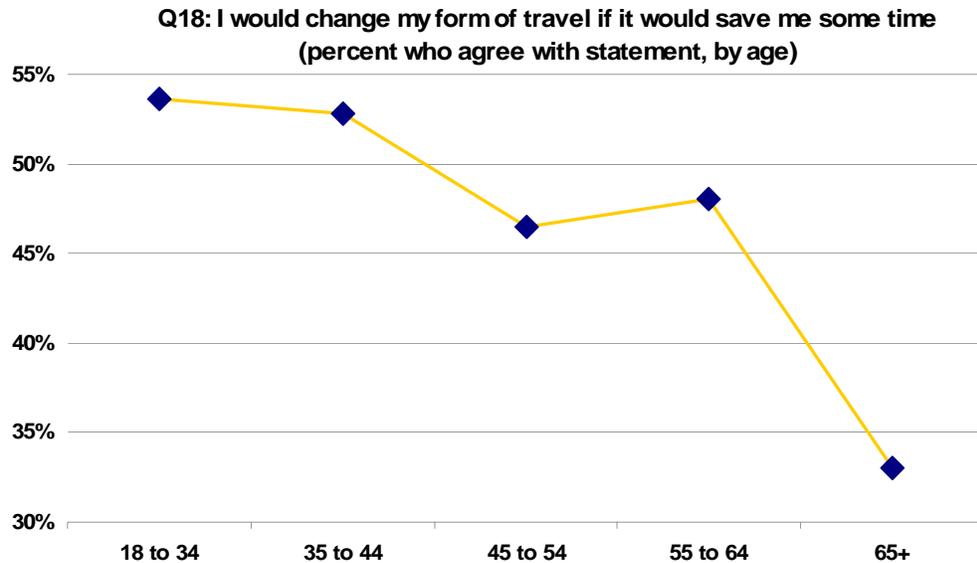
The surveys revealed that residents who own more vehicles are somewhat more likely to be willing to change their form of travel to save time. This is presumably because they have more travel options available to them. In some cases, there is evidence that these folks place a higher premium on time as well. People who have no vehicle and ride public transit often have fewer transportation options and are consequently less likely shift their form of travel.

Q18: I would change my form of travel if it would save me some time (percent who agree with statement, by number of vehicles)

Number of Vehicles Available to Household
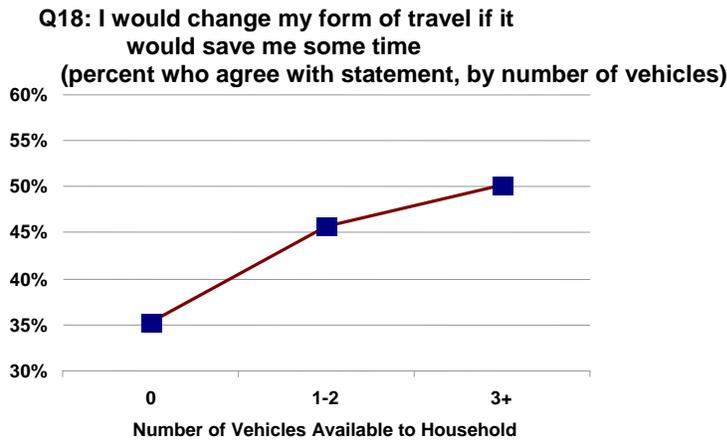
In another question, residents were found to be divided as to whether they would mind taking a longer trip if they could make productive use of travel time. While nearly one third said that they would not mind a longer trip, 45 percent fell into the ambivalent range and 23 percent disagreed with the statement. Those who use public transit and those who possess a bus pass were somewhat more likely to say that they would not mind a longer trip under these circumstances.

Q20: I don't mind taking a longer trip if I can make productive use of my time when I travel (by number of vehicles)

In be-tween 45%

Agree 32%

Dis-agree 23%

Number of Vehicles Available to Household
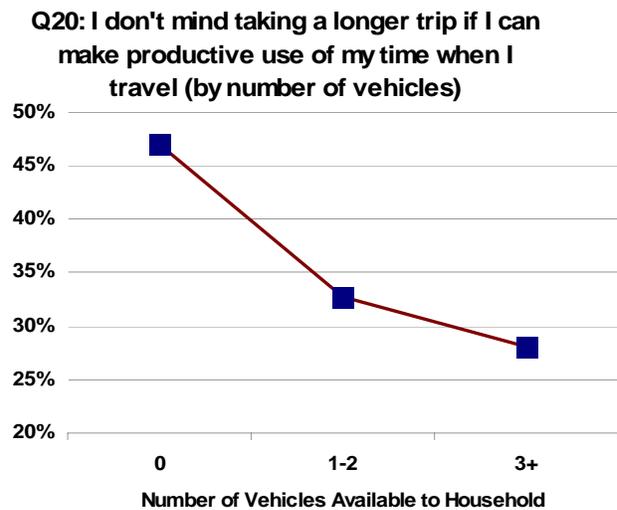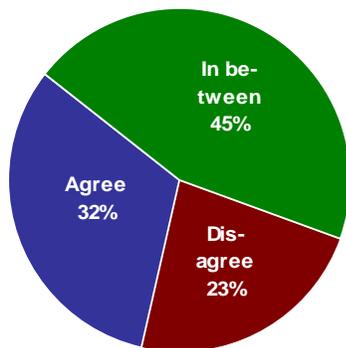
People who do not own a vehicle were considerably more likely to say that they would not mind the longer trip, in part because many already take public transit and make productive use of their travel time. Women were slightly more likely

then men to say that they would not mind the longer trip, with 34 percent agreeing with this statement compared to 29 percent of men.

Q20: I don't mind taking a longer trip if I can make productive use of my time when I travel
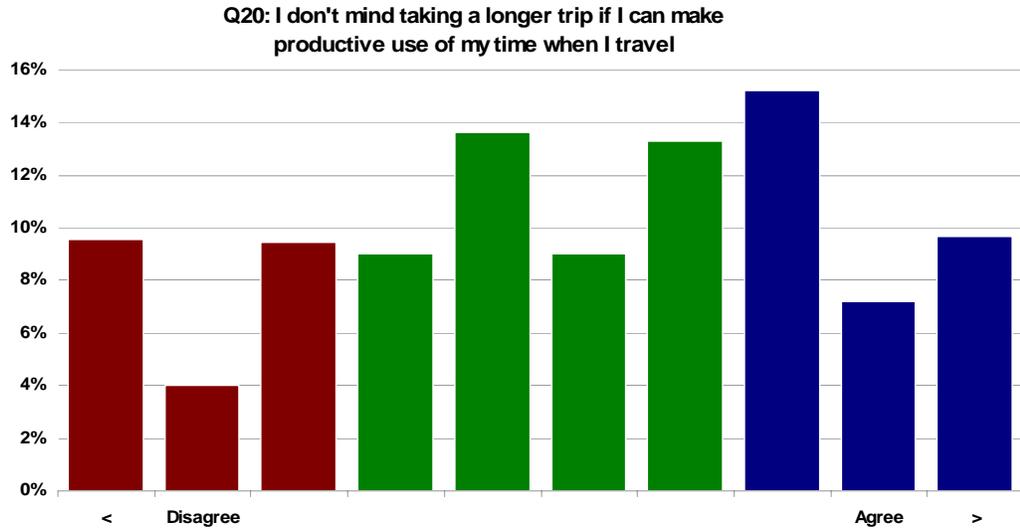
Willingness to Walk

Fully 73 percent of those surveyed reported that they would not mind walking a few minutes to reach their destination, and only 18 percent disagreed with a statement to this effect. Residents who have used transit in the past month and those who possess a bus pass were more likely to say that they do not mind. Those who had access to a vehicle were less likely to be interested in walking.

Q3: I wouldn't mind walking a few minutes to get to my destination

Q3: I wouldn't mind walking a few minutes to get to my destination (by transit usage)

Q3: I wouldn't mind walking a few minutes to get to my destination (by number of vehicles)
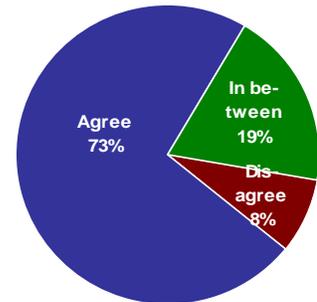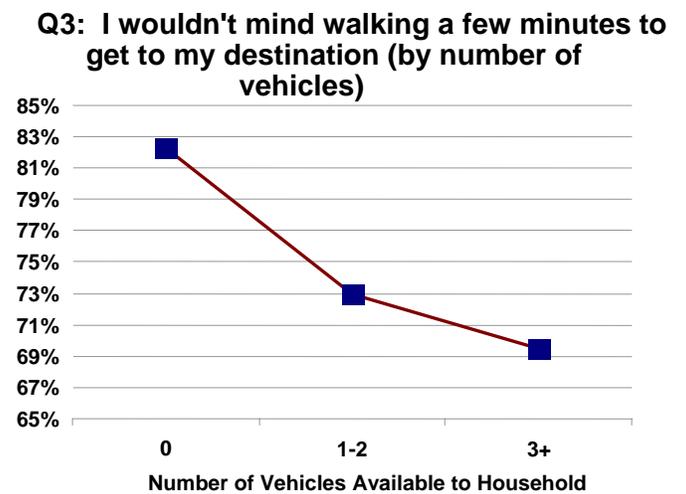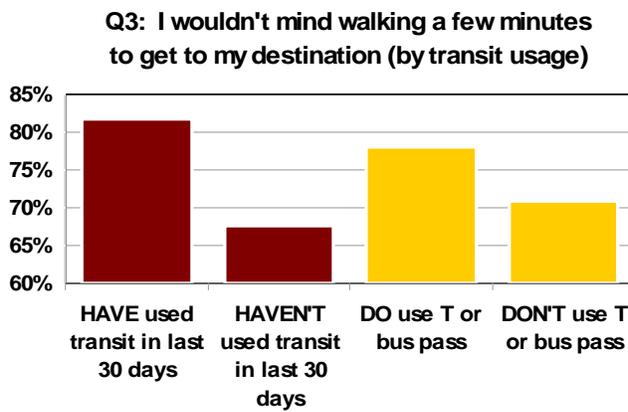
Stress and Travel

A number of survey questions explored the issue of stress and travel to better understand travel behaviors. This section analyzes responses related to questions about hurriedness when traveling, stress avoidance, generalized travel anxiety and response to traffic congestion.

Getting There Fast

The surveys asked respondents the extent to which they agreed with the statement, "I am usually in a hurry when I make a trip." Eight percent of the respondents <u>strongly</u> agreed with the statement that they are usually in a hurry, and 28 percent generally agreed. The majority, 52 percent, were somewhere in between agreeing and disagreeing, and the remaining 19 percent
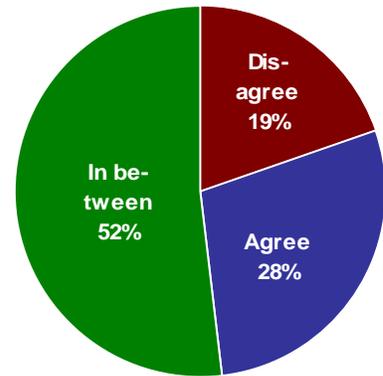
disagreed. Although we learned from other survey responses that many residents place a significant value on their time, it appears from this question that the majority are <u>not</u> usually in a huge hurry when traveling. It would seem that respondents are by and large choosing options that do not leave them feeling extremely rushed.

Q7: I am usually in a hurry when I make a trip
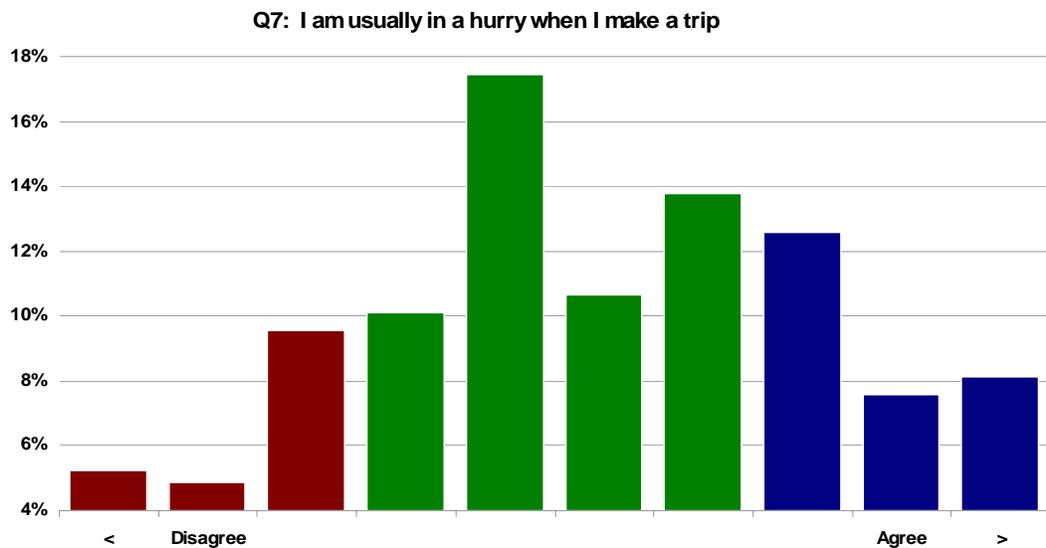
There is a significant difference between people who are over age 65 and their younger counterparts in terms of how they respond to this statement. Generally

speaking, those between ages 18 and 64 were in more of a hurry when they take a trip. Survey respondents who have <u>not</u> used public transit in the last month and those who do not possess a bus pass (in other words, people who typically drive) tend to be in a bigger hurry. While it is possible these people choose to drive in order to exert more control over schedule, they are the ones who report being the most hurried.

Q7: I am usually in a hurry when I make a trip (percent who agree with statement, by age)
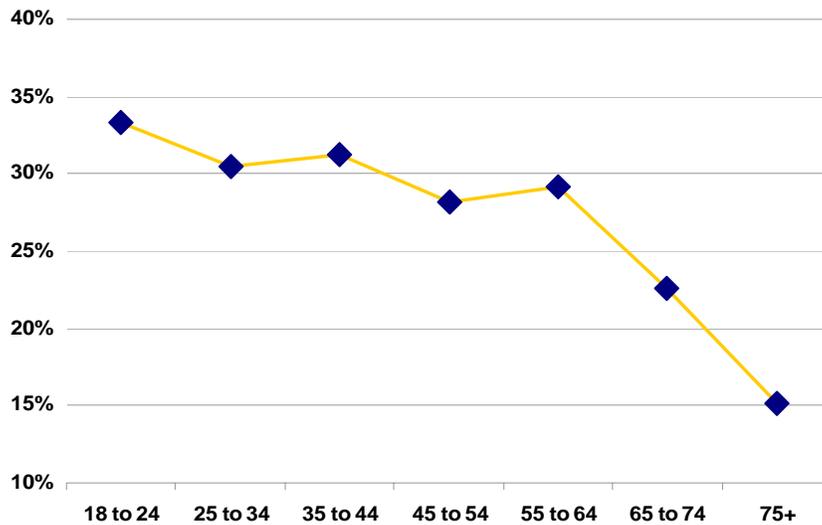
Q7: I am usually in a hurry when I make a trip (by transit usage)
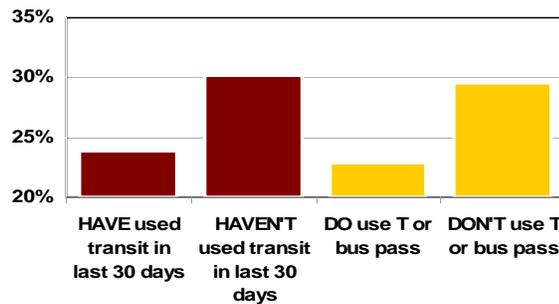
Q7: I am usually in a hurry when I make a trip (by gender)
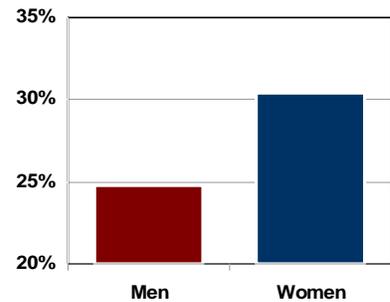
The surveys found that women were more likely than men to be in a hurry when making a trip, with nearly 25 percent of men saying they were, compared to over 30 percent of women. No other meaningful differences by subgroup within the sample were found to exist.

Another survey question asked people to respond to the statement, "I don't like to drive, but it is usually the fastest way to get where I need to go." Respondents were roughly divided, with about one third agreeing, one third disagreeing, and one third somewhere in between. Those with access to vehicles and who tended to drive were more likely to say that they did <u>not</u> like driving, yet did so in the interest of time.

Q19: I don't like to drive but it is usually the fastest way to get where I need to go

Q19: I don't like to drive but it is usually the fastest way to get where I need to go (by number of vehicles)

Number of Vehicles Available to Household
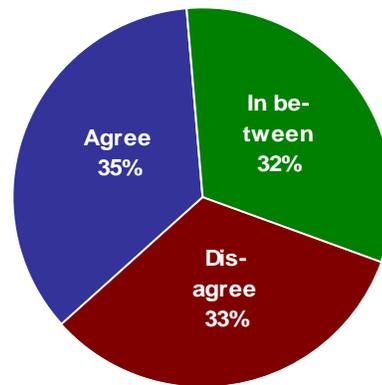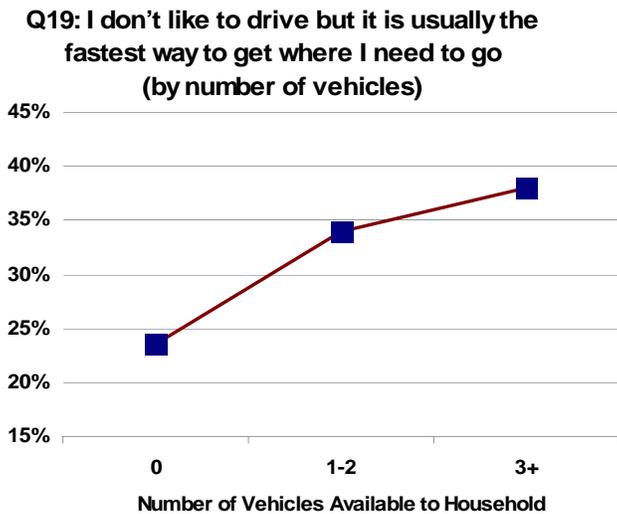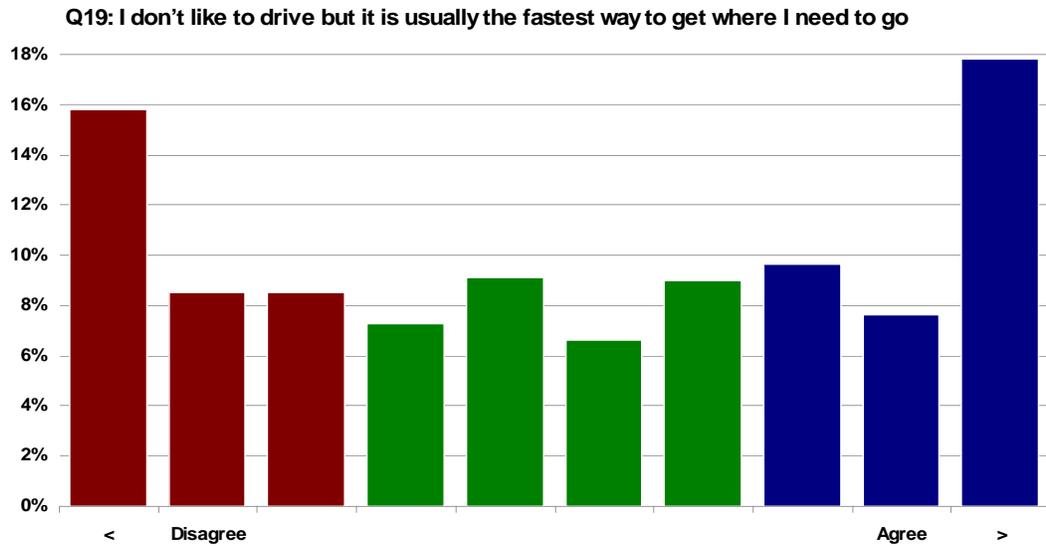
Feeling Anxious

Travel-related stress is a well known phenomenon. The survey asked respondents whether they agreed with the statement that a stress free trip is more important than reaching a destination quickly. Reaction was spread evenly across the spectrum, with one quarter agreeing, one quarter disagreeing and half somewhere in between. Respondents who have used public transit in the past month or have a bus pass were somewhat more likely to agree that a stress-free trip is more important than speed.

Q23: Having a stress-free trip is more important than reaching my destination quickly

Q23: Having a stress-free trip is more important than reaching my destination quickly (by transit usage)
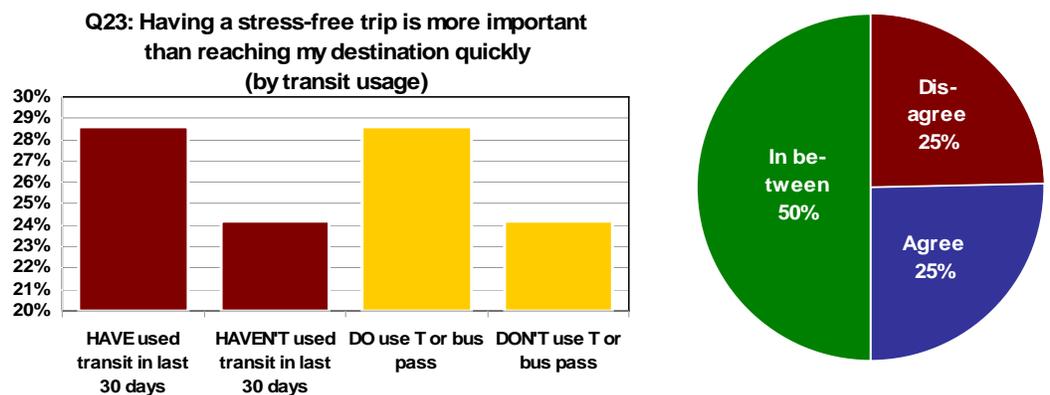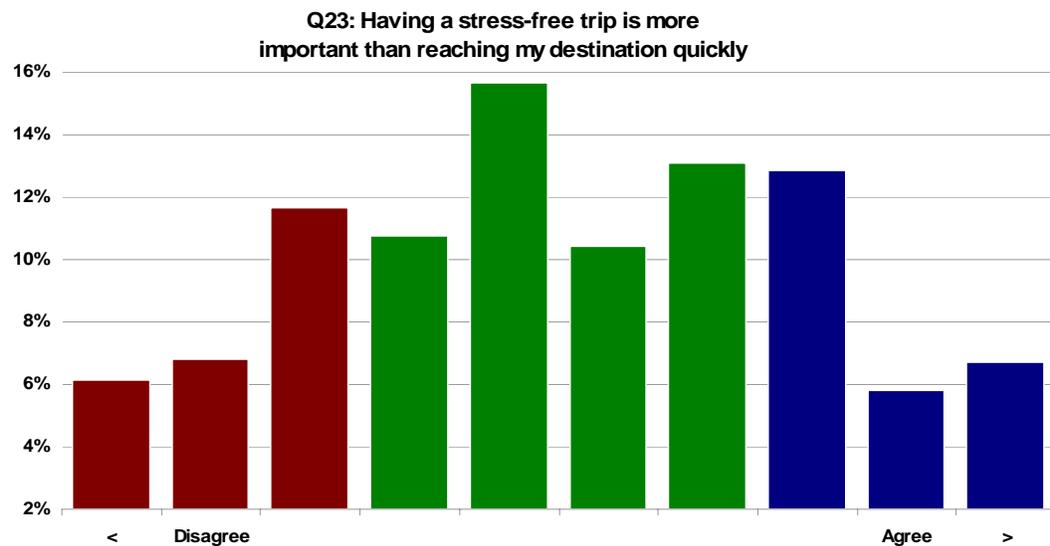
Although driving stress is clearly an issue, the majority of respondents did not say that they are particularly "anxious and unsettled" when traveling. Only a small minority feel strongly that this is true, as shown below. The differences

between men and women were too small to be meaningful – with just five percent of men and six percent of women report feeling anxious and unsettled when traveling.

Q10: I am usually anxious and unsettled when traveling
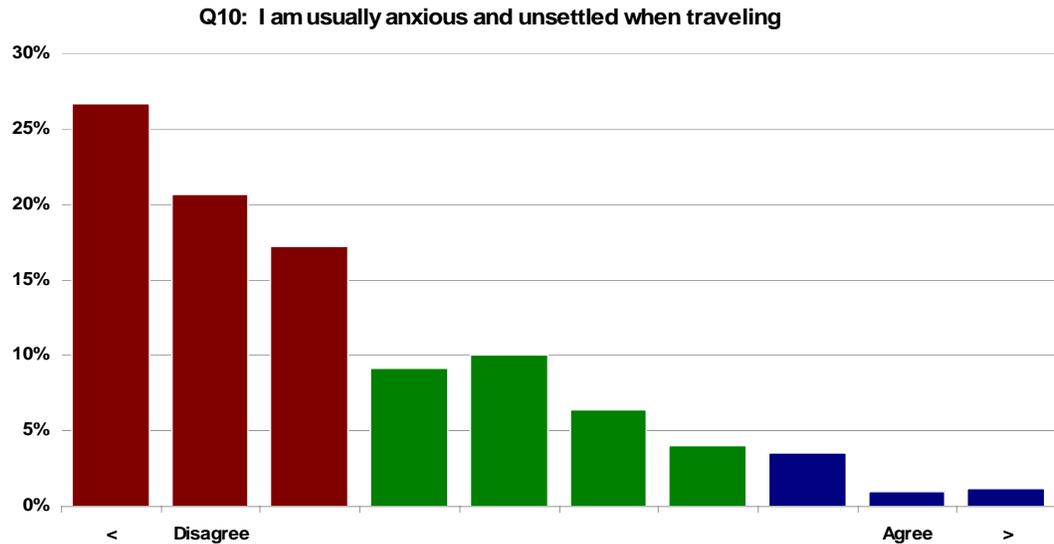
Respondents vary in the extent to which they consider driving in the Puget Sound region stressful. Drivers in the 18-24 age range (the youngest group surveyed) find it the <u>least</u> stressful.[1]
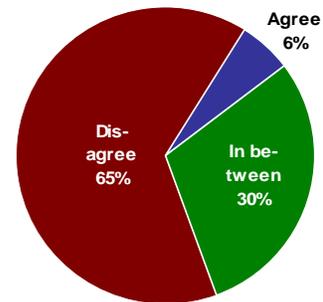
Respondents who live in Seattle were somewhat more likely to say that they find driving on Puget Sound freeways stressful, perhaps because they more frequently drive these roads.

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[1] The survey did not assess driving skill so it is impossible with this data to test the hypothesis that driving stress and driving skill might be inversely related, at least in this age range.

Q11: Driving on Puget Sound freeways is stressful for me

Q11: Driving on Puget Sound freeways is stressful for me (percent who agree with statement, by age)

Q11: Driving on Puget Sound freeways is stressful for me (percent who agree with statement, by place of residence)

Cambridge Systematics, Inc.
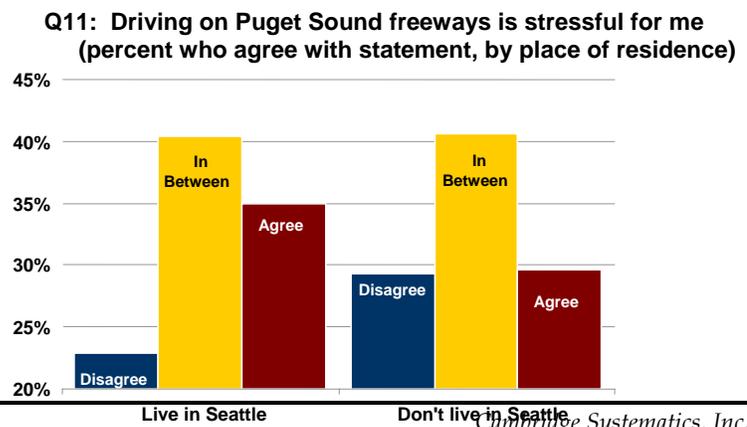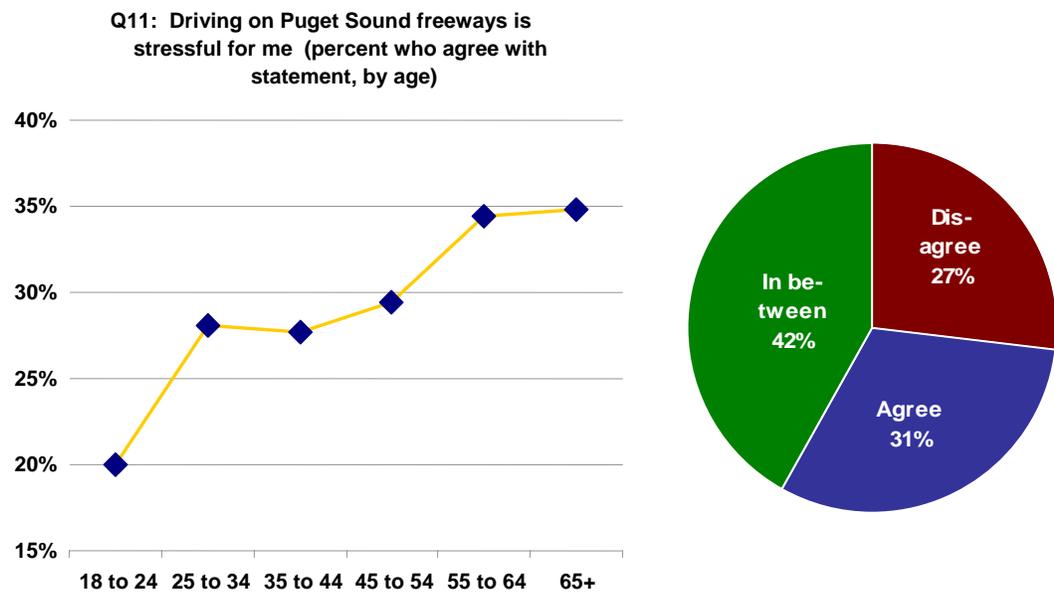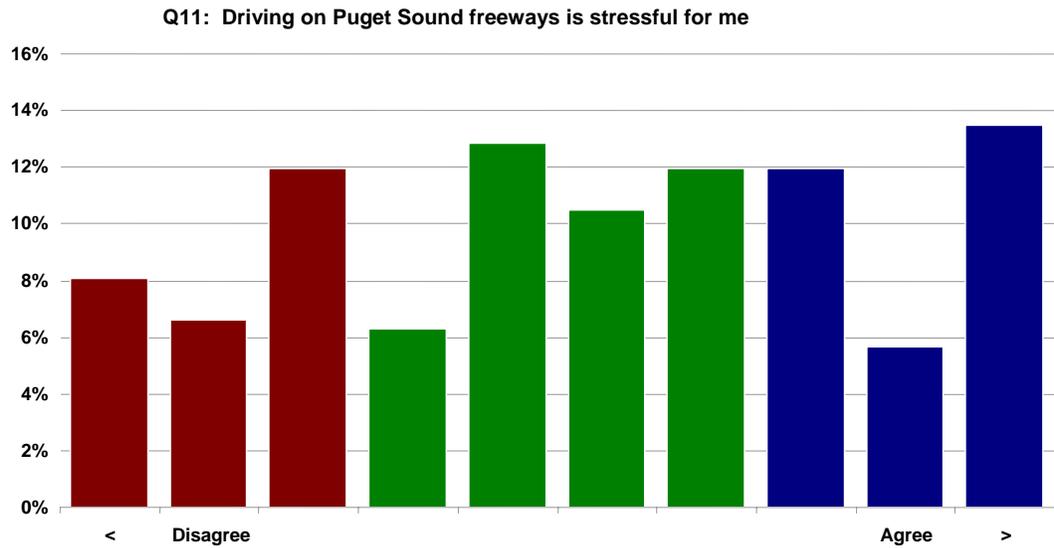
Survey respondents were asked whether they avoided making certain trips at certain times. Nearly half of those surveyed said that they do this, 22 percent do not and the remaining 30 percent are somewhere in between. Respondents with vehicles available to them were twice as likely to say that they avoid such trips.
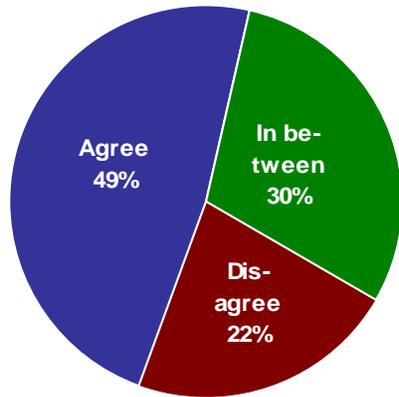
Q22: I avoid making certain trips at certain times because it is too stressful
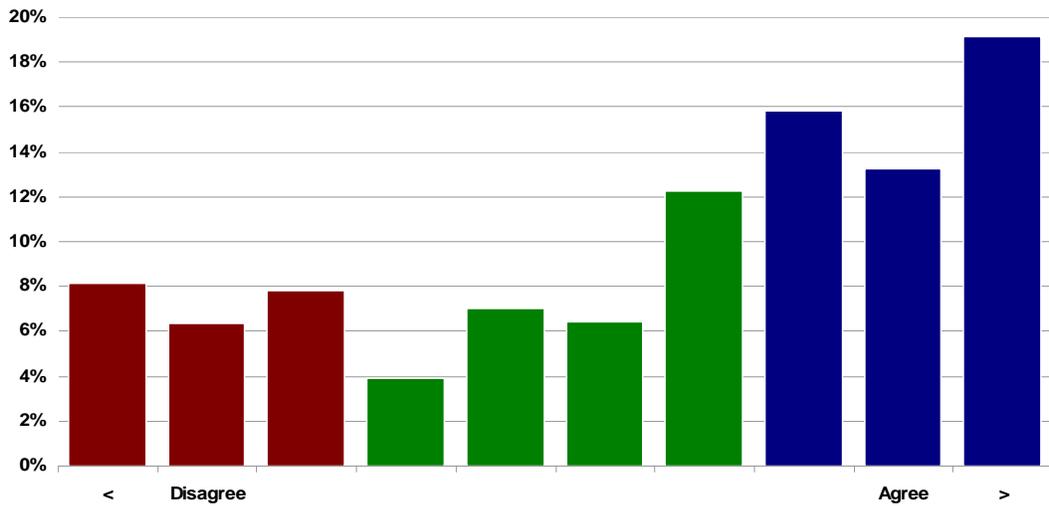
Q22: I avoid making certain trips at certain times because it is too stressful (by number of vehicles)

Number of Vehicles Available to Household
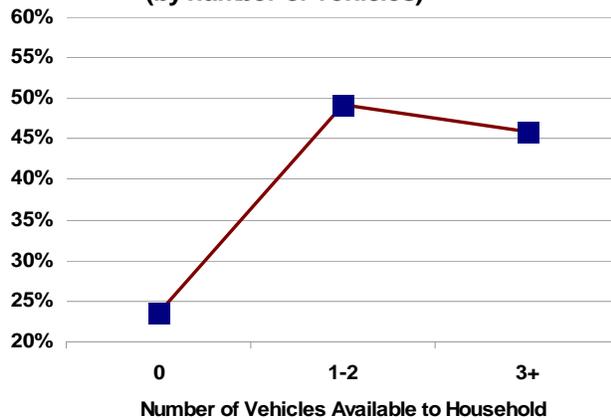
The issue of comfort on a bus was explored to understand how an individuals' experience of transportation-related stress might be a factor in (or possible deterrent to) the use of public transit. Half of the people who were asked to respond to the statement, "I am comfortable riding on a bus" agreed, 16 percent disagreed and 33 percent were in between.

Q16: I am comfortable riding on a bus

Q16: I am comfortable riding on a bus (by transit usage)
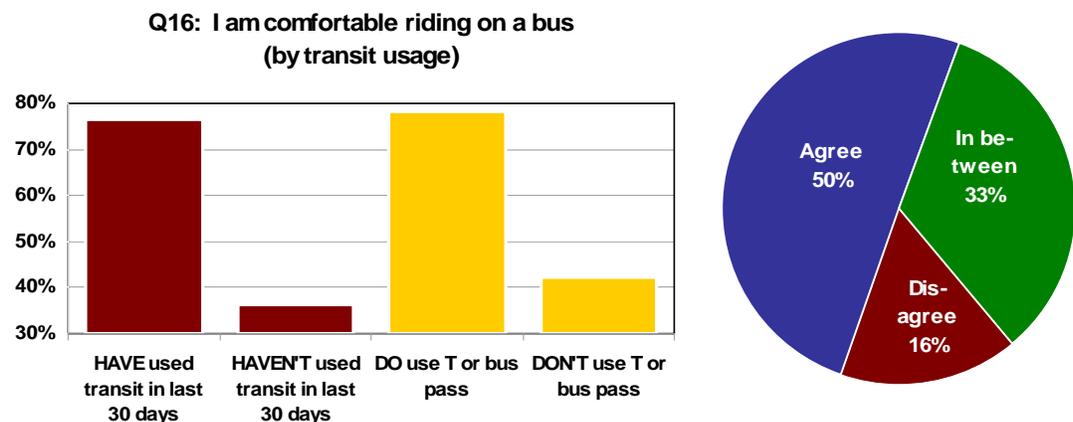
The surveys revealed that people who use public transportation are more comfortable riding a bus than people who normally drive (no surprise). While only 36 percent of those who have <u>not</u> been on transit in the past month say they are comfortable on a bus, 76 percent of those who have used transit say they are comfortable. Similarly, 42 percent of the respondents who do not use a bus pass are comfortable on a bus compared to 78 percent who possess a pass. Comfort on a bus peaks in early adulthood, 64 percent of respondents aged 18 to 34 say

they are comfortable riding a bus, then this comfort plateaus in the middle age years, and declines after age 75.

Q16: I am comfortable riding on a bus
(percent who agree with statement, by age)
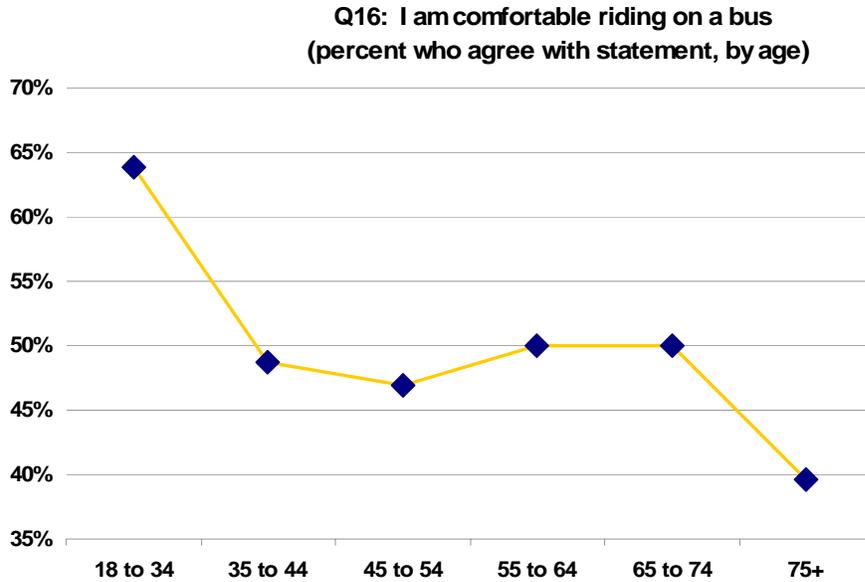
Respondents who do not own a vehicle, and consequently use public transit, report far greater comfort on buses than people who have one or more cars available to them. While 94 percent of the people who do not own a vehicle are comfortable on a bus, only 52 percent of the people with one to two cars and 40 percent of

Q16: I am comfortable riding on a bus
(by number of vehicles)
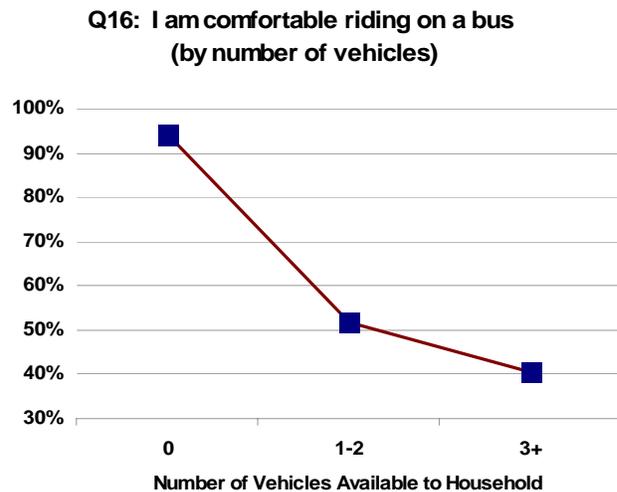
people with three or more cars report feeling comfortable. One explanation is that people who ride buses, become comfortable on buses through personal experience. Those with multiple vehicles on hand, and presumably little need to ride buses, are the least comfortable doing so.

It was a surprise that only 14 percent of the survey respondents said that they prefer to make trips alone to have time to themselves. This means there must be other compelling explanations for the high number of single occupancy vehicles

on the road. Respondents in both the lowest and in the high age ranges were somewhat less likely to say that they like to be alone when making trips.

Q15: I prefer to make trips alone because I like time to myself
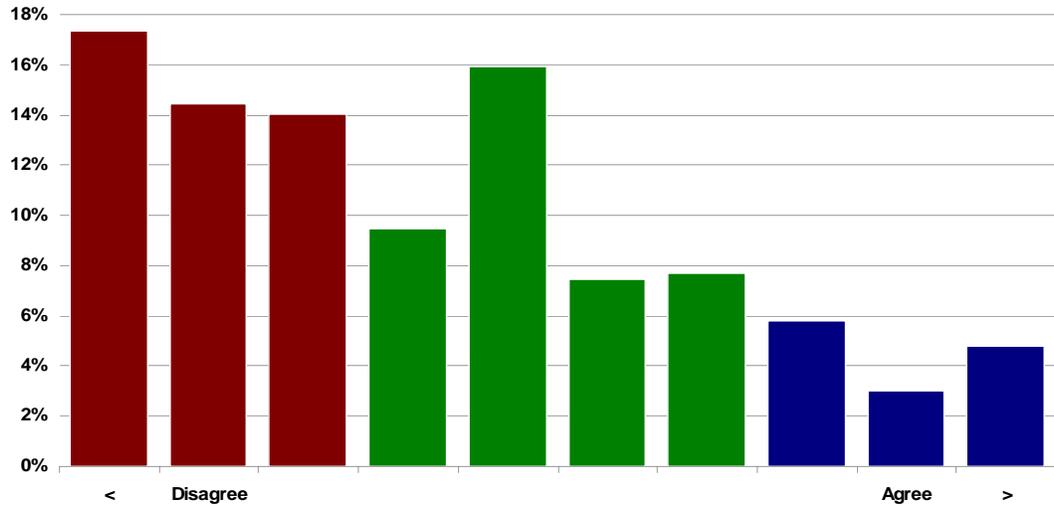
Q15: I prefer to make trips alone because I like time to myself (percent who agree with statement, by age)
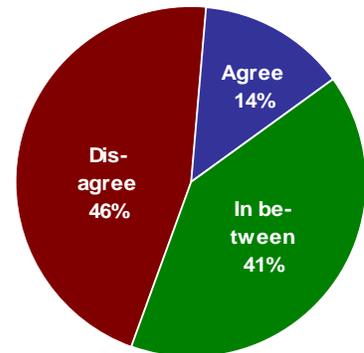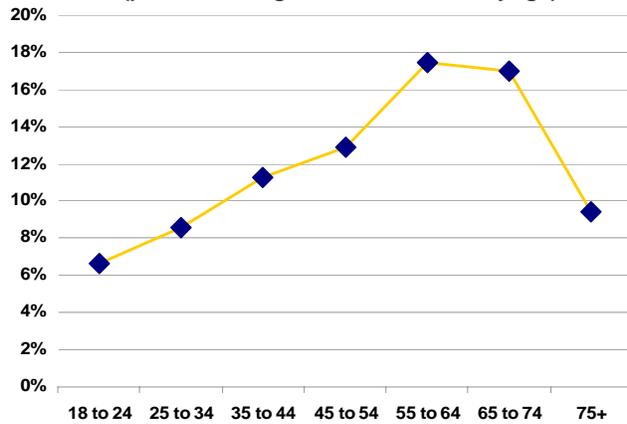
Travel Delays

Need to Know

If there is one thing that is clear from the surveys, it is that people want information about the cause and length of any traffic-related delays. This was a fairly consistent finding among the various subgroups analyzed (age, vehicle ownership, etc.).
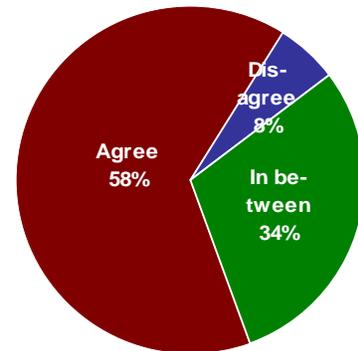
Q8: If my travel option is delayed I want to know the cause and length of the delay
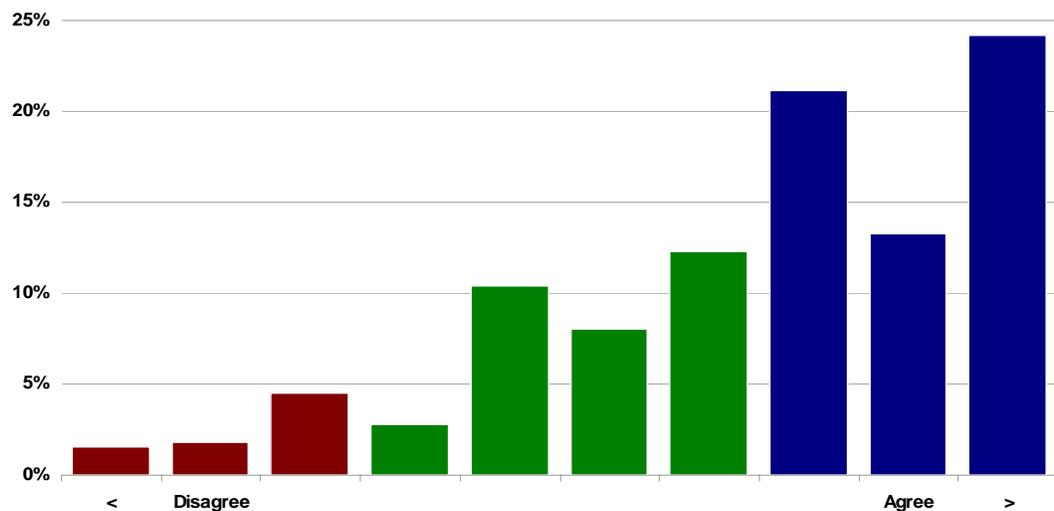
Predictability

The importance of predictability with regard to traffic congestion was studied to learn about individual perceptions and opinions. Overall, 21 percent of the respondents said they would not mind congestion if it were predictable, with remaining respondents either ambivalent about the statement or in disagreement with it. The general conclusion is that most people do not like traffic congestion regardless of its predictability. For about one fifth of the people, knowing when the congestion would occur day-to-day minimized the aggravation. This is most likely the segment that has some control over schedules and could adapt their travel plans accordingly. People who drive rather than take public

transportation report more control over their schedules and are slightly more likely to accept congestion if it is predictable.

Q9: I wouldn't mind the traffic congestion if it was predictable from day to day
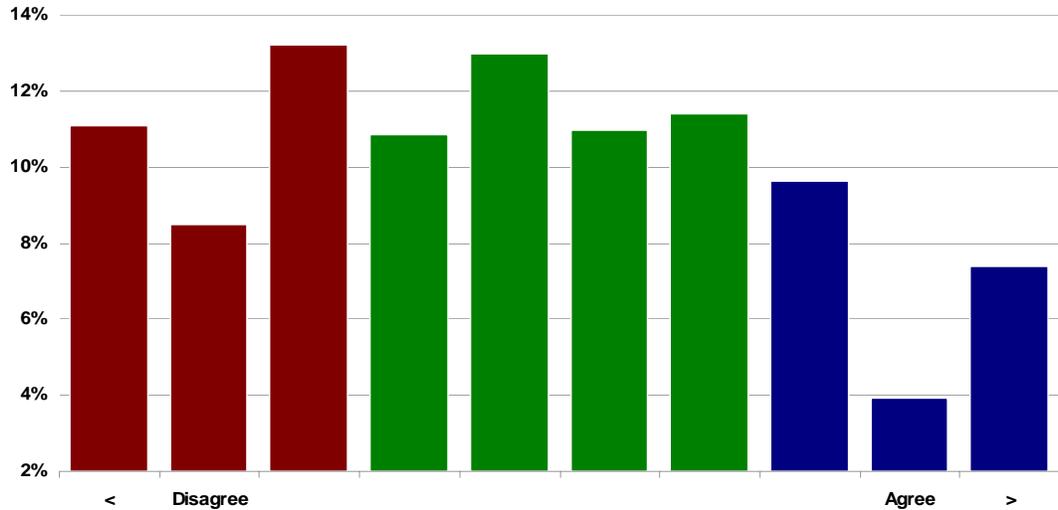
Q9: I wouldn't mind the traffic congestion if it was predictable from day to day (by transit usage)
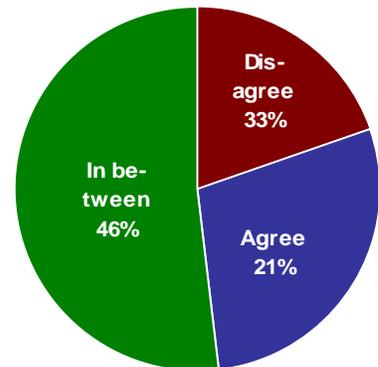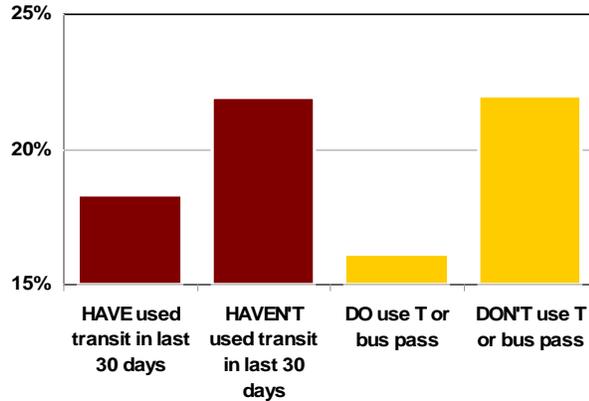
Comfort When Delayed

Survey respondents were asked the extent to which they agreed with the statement, "I don't mind delays as long as I am comfortable." It appears as though there is little enthusiasm for this tradeoff – only 5 percent strongly agreed and 18 percent generally agreed. This finding is similar to the reactions noted above regarding traffic congestion – while it is good to be comfortable or to have information about the problem, this does not really mitigate the discontent. Comfort becomes more of a compensating factor as a person advances in age.

Q21: I don't mind delays as long as I am comfortable

Q21: I don't mind delays as long as I am comfortable (percent who agree with statement, by age)
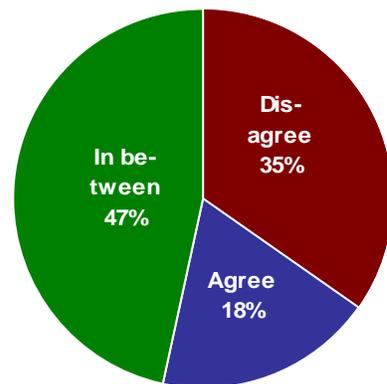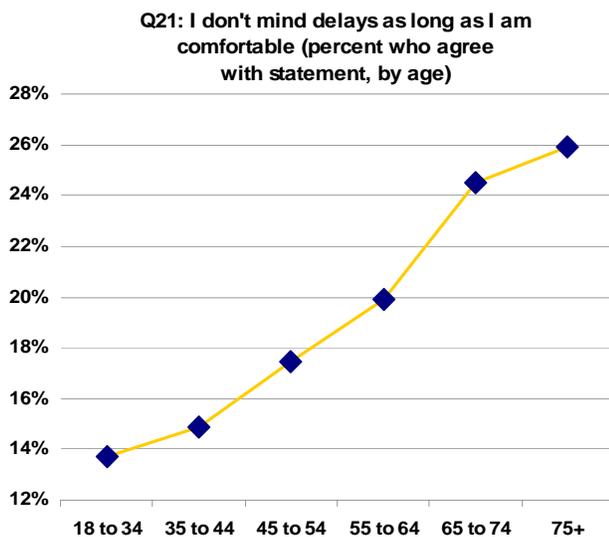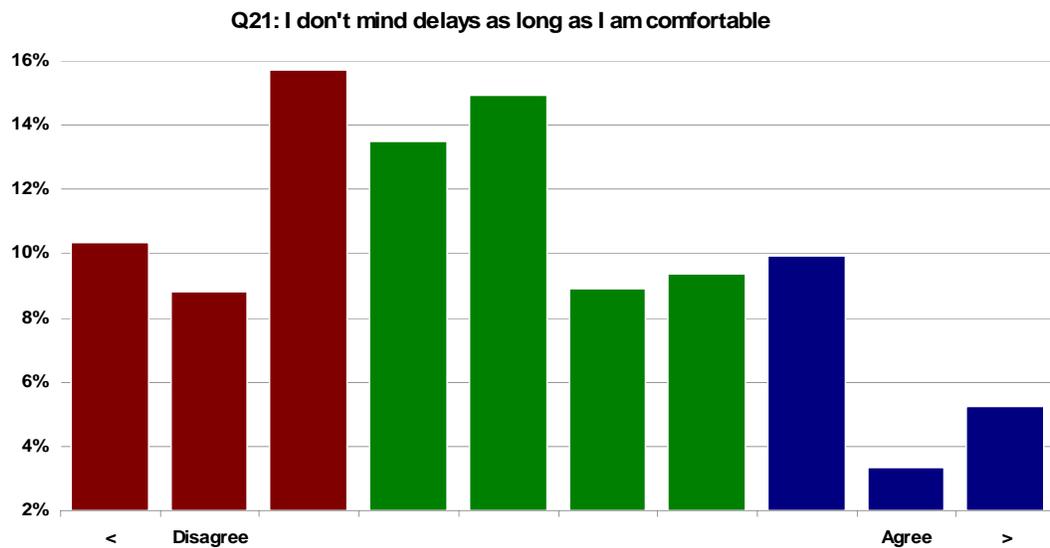
Respondents in the 18 to 34 age range were only half as likely as those 75 or older to not mind traffic delays if they are comfortable. There are no other respondent behaviors (e.g., use public transit) or characteristics (e.g., number of vehicles) that are strongly correlated with the issue of comfort and traffic delays.

Cost Issues

Paying for Convenience

Survey respondents balance a variety of factors when deciding on the form of transportation they will consider using, with convenience and cost generally important in any calculation. In this survey, 45 percent the respondents said that they use the most convenient form of transportation regardless of the cost.[2] The remaining 56 percent were either ambivalent or disagreed. This indicates that while convenience and cost are important considerations, other factors also play a role in this kind of transportation decision.

Q1: I use the most convenient form of transportation regardless of cost

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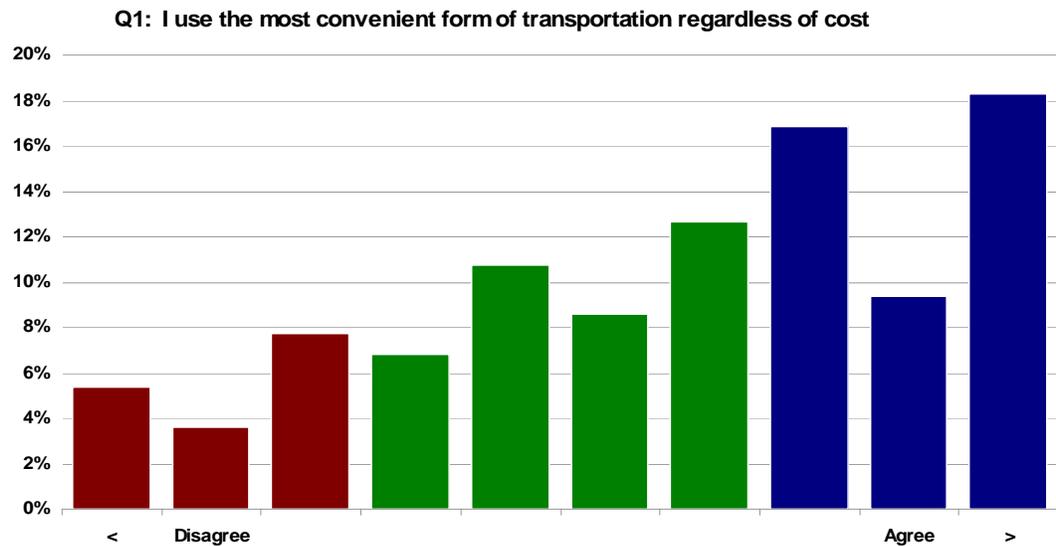
[2] Implicit in this question is the assumption that costs are within the normal range of what a respondent normally encounters. An additional caveat is that studies have shown that people do not consistently understand what the "true" cost of driving is.

Convenience becomes increasingly important as people age, until midlife when it declines somewhat and then levels off. Respondents in the 45 to 54 age range are nearly twice as likely as those in the 18-24 range to agree with the statement that they use the most convenient form of transportation regardless of cost.

Dis-agree 17%

In be-tween 39%

Agree 45%
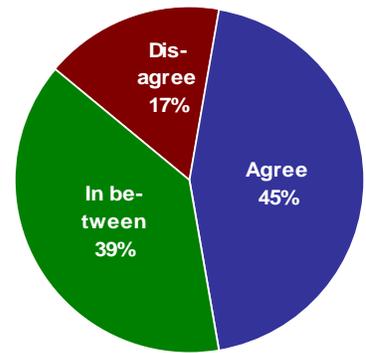
Q1: I use the most convenient form of transportation regardless of cost (percent who agree with statement, by age)
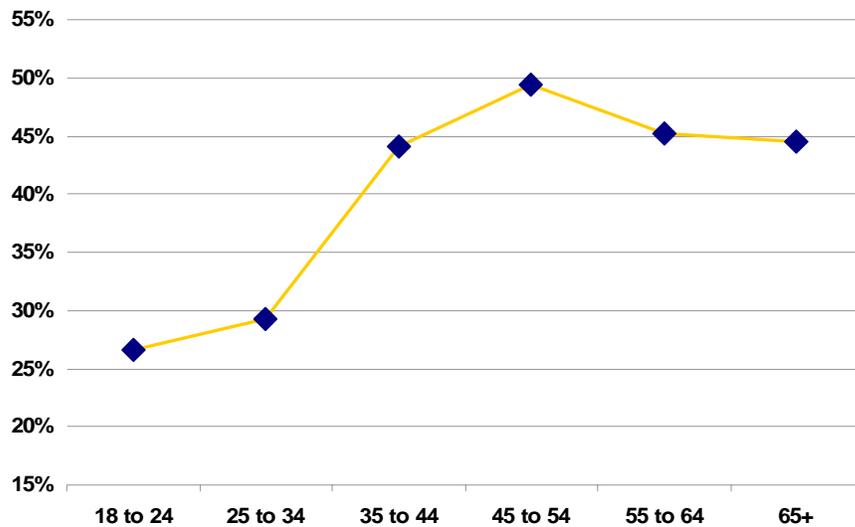
Respondents who do <u>not</u> use a bus pass are far more likely to say that convenience is of more importance than cost to them. In fact, those who do not have a pass are nearly four times as likely to have said that they use the most convenient form of transportation regardless of cost.

Q1: I use the most convenient form of transportation regardless of cost (by ownership of T or bus pass)

Disagree Agree Agree Disagree

Own Pass   Don't Own Pass
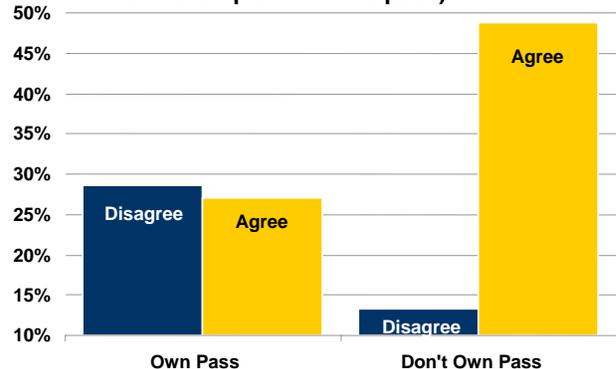
There is a strong correlation between the number of vehicles available to a person and the likelihood of taking the most convenient form of transportation, as shown in the graphic below. Only 12 percent of those with no

vehicles use the most convenient form of transportation, compared to 54 percent of people who have three or more vehicles available. Residents of rural areas, and to a lesser extent suburban, are slightly more inclined to choose the most

convenient form of transportation, perhaps because other forms of transportation are less readily available.

Q1: I use the most convenient form of transportation regardless of cost (by number of vehicles)

A survey question that asked respondents how much they agreed with the statement, "I always take the fastest route to my destination even if I have a cheaper alternative," yielded a full spectrum of responses. Twenty-nine percent of the respondents agreed with this statement (10 percent strongly agreed), 26 percent disagreed and the remaining 46 percent had reactions that fell somewhere in between.

Q14: I always take the fastest route to my destination even if I have a cheaper alternative
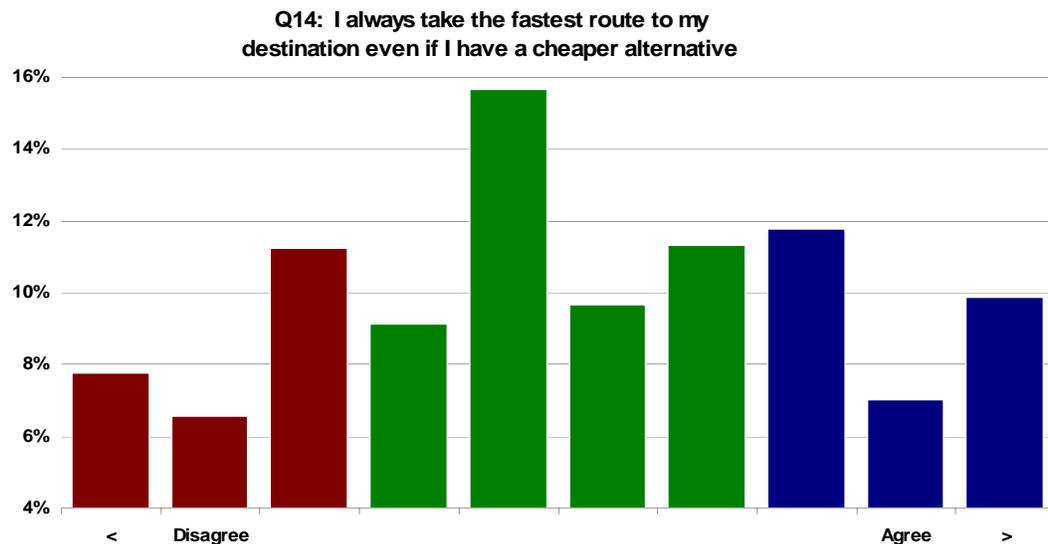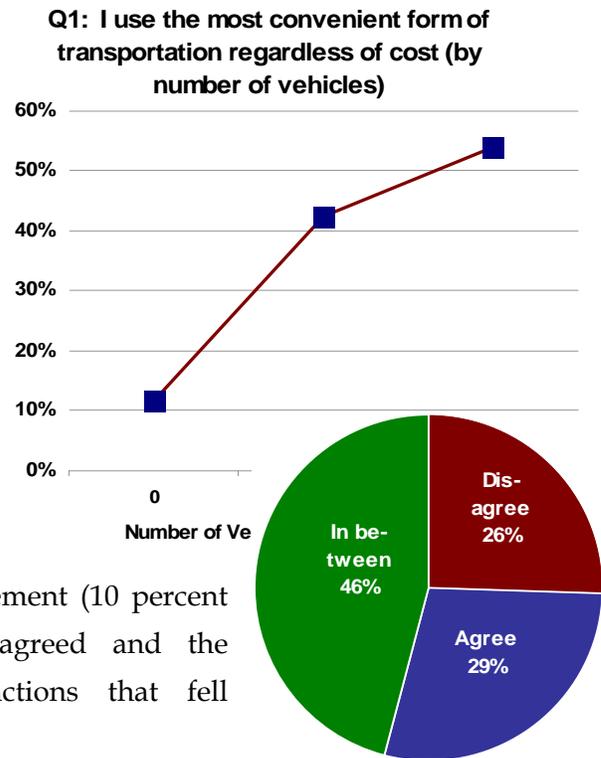
Residents who have <u>not</u> taken transit in the past 30 days and those who do not own a bus pass were somewhat more likely to be concerned with reaching their destinations quickly even when a cheaper alternative is available. Indeed, about

one-third of these respondents said that this was important, compared to less than 20 percent in the group that has recently used public transit.

Q14: I always take the fastest route to my destination even if I have a cheaper alternative (by transit usage)
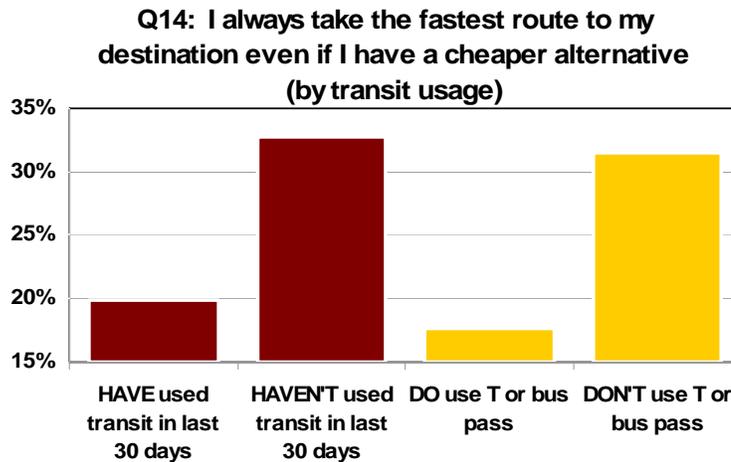
There was a positive correlation between the importance one places on reaching a destination quickly and that individual's access to vehicles. None of the respondents who did not own vehicles claimed to take the fastest route even if a cheaper route were available, perhaps because this was not a realistic proposition. Those with cars

Q14: I always take the fastest route to my destination even if I have a cheaper alternative (by number of vehicles)

Number of Vehicles Available to Household

were much more likely to want to reach destinations fast, even at a higher cost to them.
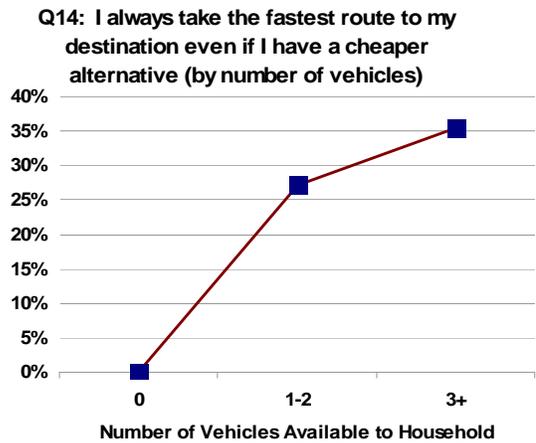
Affordability of Other Transportation Options

The majority of survey respondents are satisfied with their transportation options. Only 14 percent agreed with the statement, "I would use another form of transportation if I could afford it," and within this group only 6 percent agreed strongly. Fully 53 percent disagreed with the statement and the remaining 34 percent held opinions somewhere in between. Responses to this question did not vary meaningfully by any subgroup such as those who ride public transit. This was specifically tested for income and there was no significant difference among different income groups.

Q2: I would use another form of transportation if I could afford it
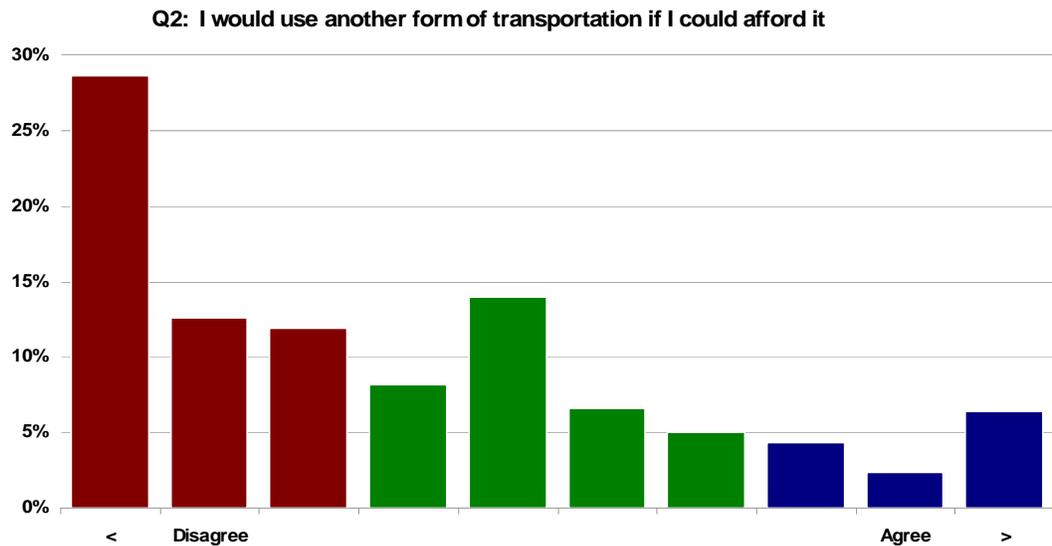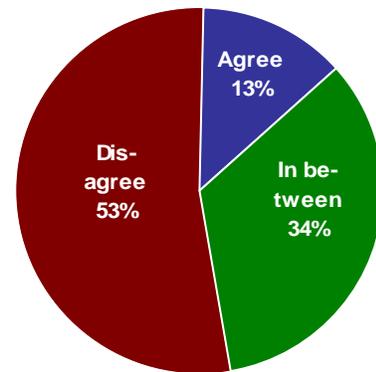
In another survey question, respondents were asked whether they believe that people who drive alone should pay more than others. Less than one quarter of the group sampled agreed, with strongest support among younger people and those without access to a vehicle. (This issue is described in more detail below.)

Environmental Issues

Several questions with an environmental theme were asked of respondents to gauge their understanding of the role transit could play in helping the environment, their willingness to alter their mode of travel, their willingness to pay more to mitigate environmental consequences.

Role of Transit in Helping Environment

Survey respondents were largely in agreement that using transit can help the environment, with 70 percent generally agreeing and 37 percent strongly agreeing. People who have used transit in the last 30 days and those who possess a bus pass were most likely to have the view that public transit helps the environment. Agreement with this statement was

Q25: Use of transit can help improve the environment (by number of vehicles)

found to be inversely related to the number of vehicles an individual has access to.

Q25: Use of transit can help improve the environment
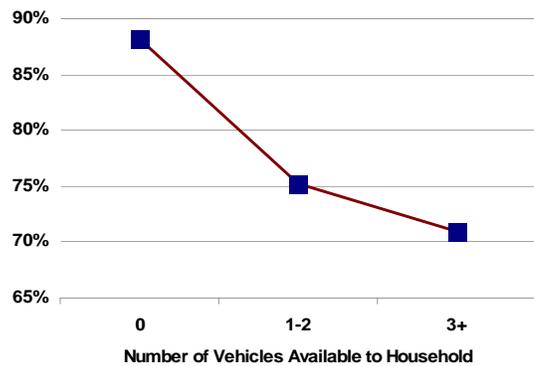
Q25: Use of transit can help improve the environment (by transit usage)
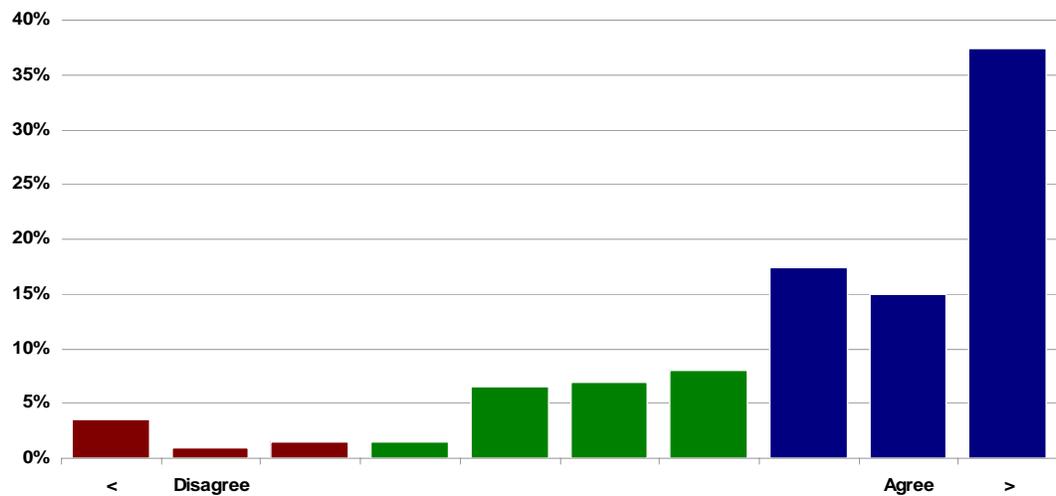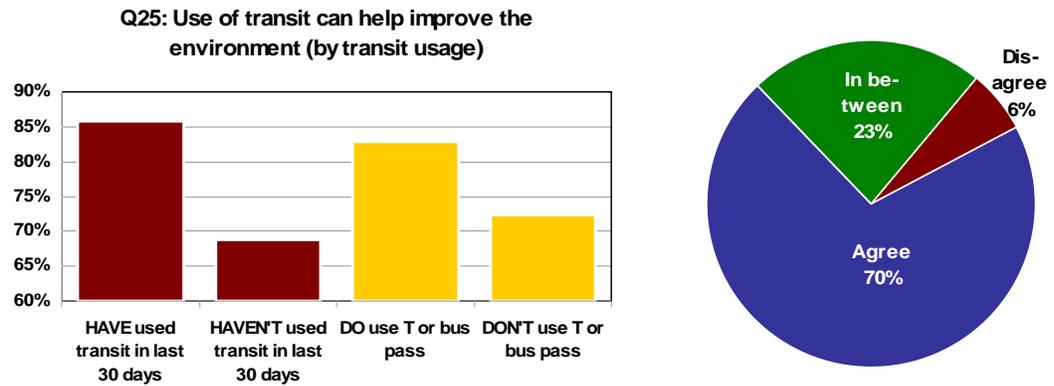
Willingness to Shift Mode of Travel

Although survey respondents generally understand that using public transit helps the environment, only 28 percent said that they would be willing to shift to a different form of transportation to help the environment, and 20 percent are clear that they would not. The majority, 51 percent fall in between the two positions.
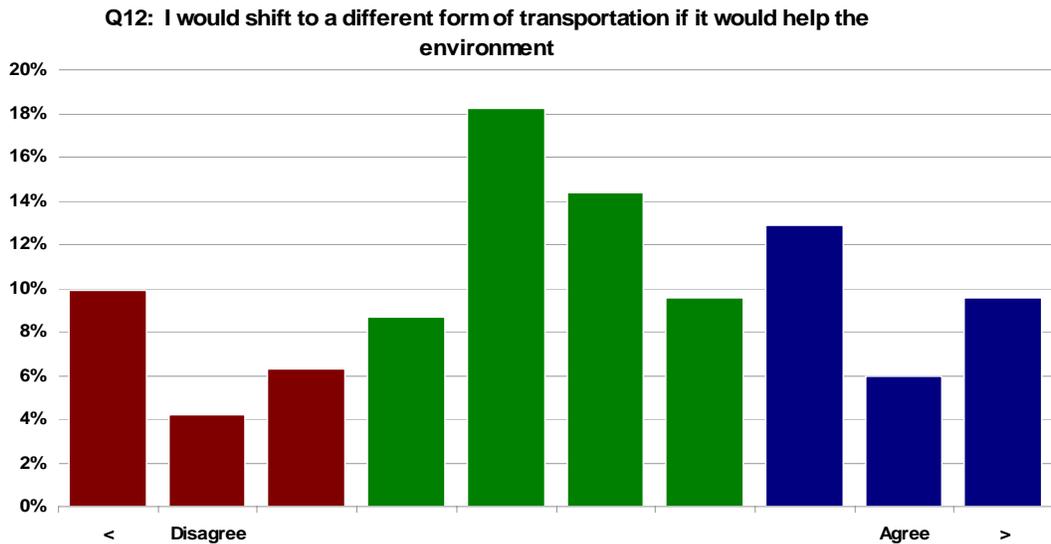
Q12: I would shift to a different form of transportation if it would help the environment

Q12: I would shift to a different form of transportation if it would help the environment (by transit usage)
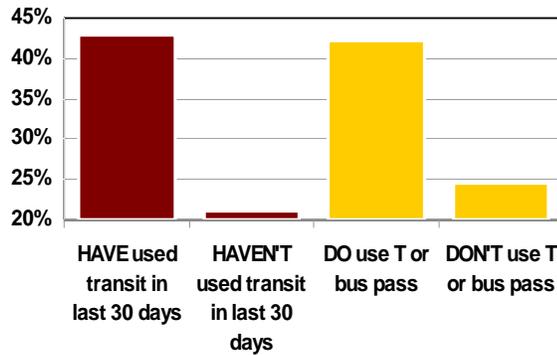
Q12: I would shift to a different form of transportation if it would help the environment (by number of vehicles)
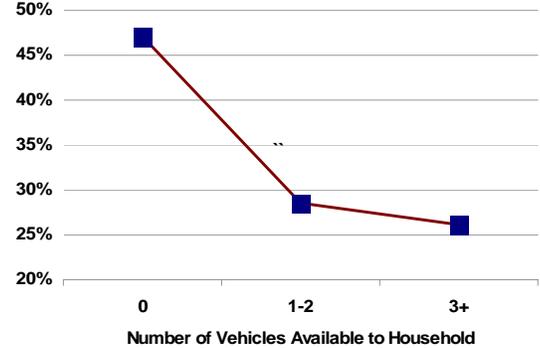
People who use public transportation are twice as likely as those who do not to be willing to shift to another mode of transit to help the environment. Presumably many of the people in the former group have already made such changes. A willingness to shift modes of transportation also is inversely related to the number of vehicles an individual owns. While 47 percent of the respondents who do <u>not</u> have access to a vehicle

would be willing to switch, only 26 percent of those with three or more vehicles would be willing to do so. Presumably many in the latter group are firmly invested in driving, and perhaps many in the former group have already made some kind of adjustments.
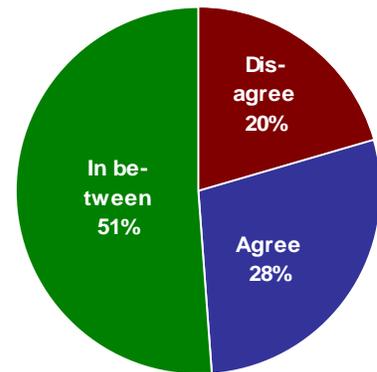
Paying More

Having people who drive alone pay more is one among many potential policy options for reducing highway congestion and environmental impact. There is only lukewarm support for this concept among survey respondents, with 24 percent agreeing with this principal and eight percent strongly agreeing. The remaining 36 percent disagree and 39 percent are somewhere in between.

Q13: People who drive alone should pay more to help the traffic congestion situation

Q13: People who drive alone should pay more to help the traffic congestion situation (by transit usage)
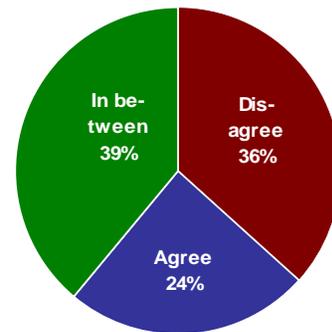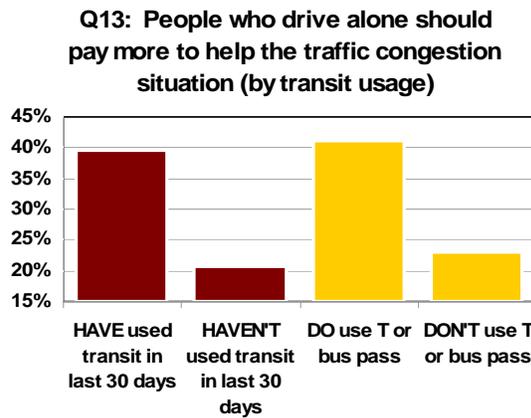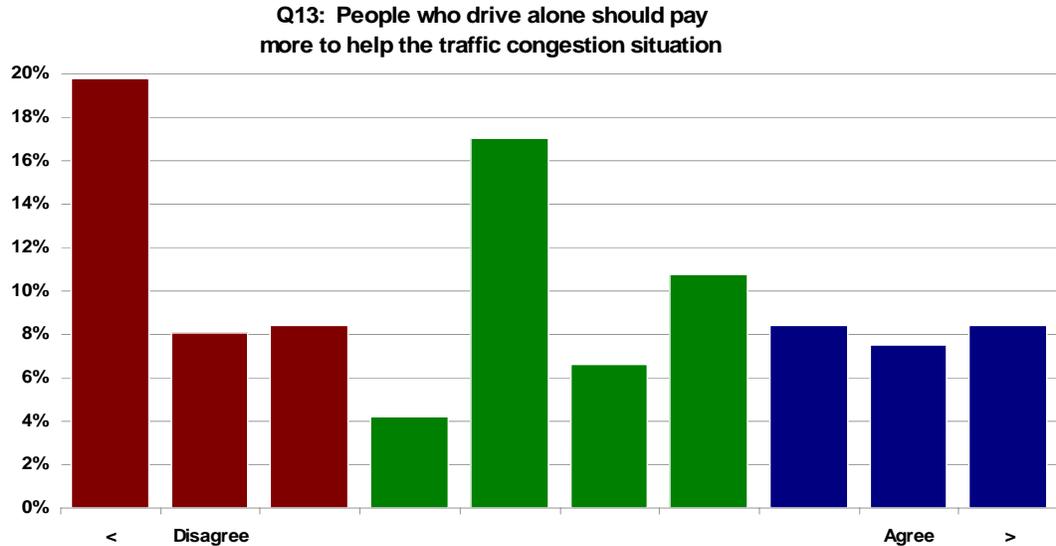
As shown above, respondents who use public transit are about twice as likely as those who have not to believe that people who drive alone should pay more to help alleviate traffic congestion. Younger people are slightly more inclined to think that those who drive alone should pay more, with the view declining in every subsequent age group.

Q13: People who drive alone should pay more to help the traffic congestion situation (percent who agree with statement, by age)
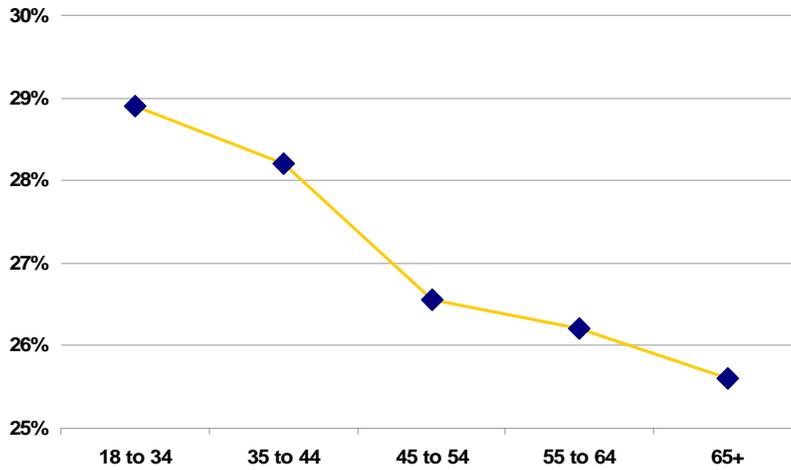
Respondents with access to one or more cars were found to be far less likely to believe that people who drive alone should pay more for doing so, probably in part as a matter of self interest. While 47 percent of those respondents who had no cars agree with this statement, only 25 percent of those with three or more cars were found to agree.

Q13: People who drive alone should pay more to help the traffic congestion situation (by number of vehicles)

Number of Vehicles Available to Household
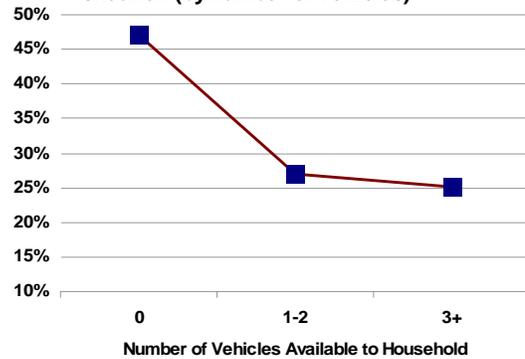
The surveys asked respondents whether they would be willing to pay more when they travel if it would help the environment. This question is similar to some of the other questions described above, and is aimed at further understanding how people's intentions might translate into actual actions or acceptance of policy options. While 70 percent believe that public transit helps the environment, only 31 percent of the respondents said they would be willing to pay more when traveling to help the environment, whereas 18 percent would not and the majority – 51 percent – fell somewhere in between.

Q24: I would be willing to pay more when I travel if it would help the environment
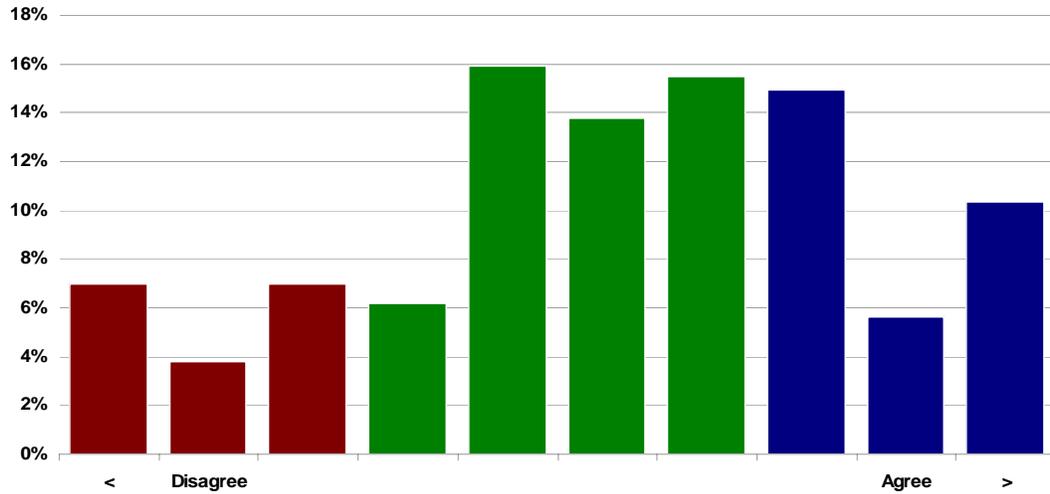
Q24: I would be willing to pay more when I travel if it would help the environment (by transit usage)
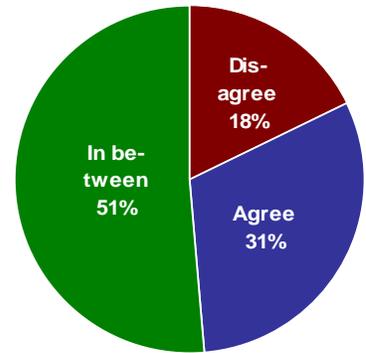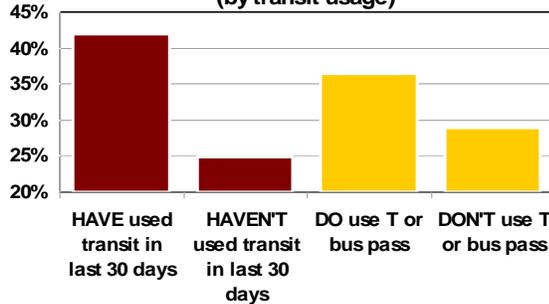
Again, residents who use transit are more likely to say that they would pay more for travel if it would help the environment. Other attributes were not found to be significant at predicting how a respondent answers this question. Responses are, for example, unrelated to vehicle ownership.

3.6 ATTITUDINAL MARKET SEGMENTATION

As noted previously, the stated-preference follow-up survey included 25 attitudinal statements for which respondents were asked to rate their level of agreement on a one-to-ten scale. These attitudinal statements, which were presented to respondents in several different orders and groupings, are listed below, along with their mean ratings, in Table 3.3.

In addition to the descriptive analyses described above, we performed factor analyses of the attitudinal agreement scores. Factor analysis is a method for reducing data items to a smaller number of dimensions, or factors, which capture a more general theme that the individual variables comprise. In factor analysis, we begin with a correlation matrix, and then extract a small number of factors that are regarded as basic variables that account for the combination of attitudinal scores. The common factors are unobservable, hypothetical variables that define the variance of two or more of the basic observed variables.

The equation for the common factor model is

$$y_{ij} = x_{i1}b_{1j} + x_{i2}b_{2j} + ... + x_{iq}b_{qj} + e_{ij}$$

where:

y_{ij} is the value of the ith observation on the jth variable

x_{ik} is the value of the ith observation on the kth common factor

b_{kj} is the regression coefficient of the kth common factor for predicting the jth variable

e_{ij} is the value of the ith observation on the jth unique factor

q is the number of common factors

Several models were run with different numbers of factors. The interpretation of the factor estimates is a subjective process. We evaluated the factor combinations, and chose a six-factor solution based on the distinction between the factors. The factor contribution scores for the 25 variables are shown in Table 3.4.

Table 3.3 Stated-preference Survey Attitudinal Statements

Attitudinal Statements	Mean
Use of transit can help improve the environment	8.33
I wouldn't mind walking a few minutes to get to my destination	8.02
If my travel option is delayed, I want to know the cause and length of the delay	7.47
I am comfortable riding a bus	6.81
I need to have the flexibility to make many trips during the day if necessary	6.79
I would change my form of travel if it would save me some time	6.66
I use the most convenient form of transportation regardless of cost	6.59
I avoid making certain trips at certain times because it is too stressful to make the trip	6.56
I need to make trips to a wide variety of locations each week	6.38
I would be willing to pay more when I travel if it would help the environment	6.04
I would switch to a different form of transportation if it would help the environment	5.88
I need to make trips according to a fixed schedule	5.86
I am usually in a hurry when I make a trip	5.82
I don't mind taking a longer trip if I could make productive use of my time when I travel	5.80
Driving on Puget Sound freeways is stressful for me	5.76
I always take the fastest route to my destination even if I have a cheaper alternative	5.63
I don't like to drive but it is usually the fastest way to get where I need to go	5.60
Having a stress-free trip is more important than reaching my destination quickly	5.53
People who drive alone should pay more to help improve traffic congestion situation	5.20
I wouldn't mind the traffic congestion if it was predictable from day to day	5.08
I don't mind delays as long as I am comfortable	4.84
I don't know how to reach my destination using public transportation	4.62
I prefer to make trips alone because I like time to myself	4.26
I would use another form of transportation if I could afford it	3.87
I am usually anxious and unsettled when traveling	3.23

Table 3.4   Factor Analysis

Question		Envrion-ment Factor 1	Stress Factor 2	Flexi-bility Factor 3	"Not Transit" Factor 4	"Not in a Hurry" Factor 5	Schedule Driven Factor 6
Q1	I use the most convenient form of transportation regardless of cost	-0.12078	-.07063	0.27796	0.38987	0.00141	0.14611
Q2	I would use another form of transportation if I could afford it	0.03777	0.21233	-0.01919	-0.0056	0.22978	0.23524
Q3	I wouldn't mind walking a few minutes to get to my destination	0.32644	-0.0235	-0.04034	-0.23898	0.16435	0.19274
Q4	I don't know how to reach my destination using public transportation	-0.1403	0.09162	0.21812	0.3822	-0.01121	-0.11284
Q5	I need to make trips to a wide variety of locations each week	-0.0418	-.06184	0.63881	0.09418	0.01312	-0.03927
Q6	I need to have the flexibility to make many trips during the day if necessary	-0.1088	-.05233	0.63219	0.15831	0.00829	-0.0053
Q7	I am usually in a hurry when I make a trip	0.06808	0.04768	0.33949	0.19538	-0.25714	0.32307
Q8	If my travel option is delayed, I want to know the cause and length of the delay	0.07195	0.16592	0.21705	0.04924	-0.08088	0.21237
Q9	I wouldn't mind the traffic congestion if it was predictable from day to day	-0.0044	-.11913	0.07719	0.25973	0.32	0.02647
Q10	I am usually anxious and unsettled when traveling	0.03692	0.5506	-0.01471	0.09406	-0.0734	0.10987
Q11	Driving on Puget Sound freeways is stressful for me	0.0558	0.64244	-0.06952	-0.08589	-0.00809	0.12216
Q12	I would switch to a different form of transportation if it would help the environment	0.637	0.15536	-0.07809	-0.10118	0.21929	0.11007
Q13	People who drive alone should pay more to help improve traffic congestion situation	0.48187	0.12353	-0.04967	-0.07238	-0.018	0.10488

Table 3.4 Factor Analysis (continued)

Question	Envrion-ment Factor 1	Stress Factor 2	Flexi-bility Factor 3	"Not Transit" Factor 4	"Not in a Hurry" Factor 5	Schedule Driven Factor 6
Q14	I always take the fastest route to my destination even if I have a cheaper alternative	-0.05852	-.02239	0.23662	0.42569	-0.11035	0.29566
Q15	I prefer to make trips alone because I like time to myself	-0.05278	0.02664	0.00718	0.33784	0.07808	-0.04212
Q16	I am comfortable riding a bus	0.36413	-0.0799	-0.07897	-0.4761	0.2073	0.18438
Q17	I need to make trips according to a fixed schedule	0.049	0.03296	-0.04916	-0.0302	-0.02033	0.34015
Q18	I would change my form of travel if it would save me some time	0.17303	0.07926	0.08084	-0.0533	0.03509	0.59651
Q19	I don't like to drive but it is usually the fastest way to get where I need to go	0.21393	0.3413	0.03224	-0.0411	0.01702	0.23419
Q20	I don't mind taking a longer trip if I could make productive use of my time when I travel	0.24629	0.16136	0.01434	-0.14665	0.44939	0.09662
Q21	I don't mind delays as long as I am comfortable	0.17723	-.04026	-0.06923	0.05333	0.57162	-0.10489
Q22	I avoid making certain trips at certain times because it is too stressful to make the trip	0.12042	0.5099	0.01642	0.06299	0.08525	-0.05486
Q23	Having a stress-free trip is more important than reaching my destination quickly	0.10315	0.4031	-0.0732	-0.03363	0.39209	-0.12011
Q24	I would be willing to pay more when I travel if it would help the environment	0.66505	0.09537	-0.01988	0.00281	0.15791	-0.03338
Q25	Use of transit can help improve the environment	0.53156	0.08484	-0.01695	-0.2257	0.0288	0.11035

The factor contributions range between -1 and 1. The higher the magnitude of the scores, either positive or negative, the greater the contribution the variable has toward the factor. In the table, the highest scores (>0.6 or <-0.6) are highlighted in red. Next, those with scores between 0.5 and 0.6 and between -0.5 and -0.6 are shown in red-orange, followed by orange, light orange, and peach highlighting for other components with larger effects. Un-highlighted cells indicate that the variable contributes little to the particular factor.

Tables 3.5 through 3.10 show the factor scores for each of the individual factors. The factor scores, shown in these tables, indicate distinct themes that the attitudinal ratings support. Factor 1 identified an environmental theme that relates several individual variables. The second factor combines individual variables with a general theme of travel stress. The third factor stresses variables that highly value flexibility in travel. A fourth theme identified by the factor analysis is a rejection of transit. The fifth factor combines variables with a theme of not being in a rush. The final factor combines variables that stress a focus on schedule.

Next, we used these distinct factors to develop attitudinal market segments through the application of cluster analysis techniques. Cluster analysis combines

respondents on the basis of similar characteristics among a set of variables, in this case the six factors. As for the factor analysis, several alternative formulations with different numbers of clusters were tested, and one was selected. The five cluster solution was chosen.

Table 3.5   Factor 1 Ratings – Environmentally Conscious

Question		Factor
Q24	I would be willing to pay more when I travel if it would help the environment	0.66505
Q12	I would switch to a different form of transportation if it would help the environment	0.637
Q25	Use of transit can help improve the environment	0.53156
Q13	People who drive alone should pay more to help improve traffic congestion situation	0.48187
Q16	I am comfortable riding a bus	0.36413
Q3	I wouldn't mind walking a few minutes to get to my destination	0.32644
Q20	I don't mind taking a longer trip if I could make productive use of my time when I travel	0.24629
Q19	I don't like to drive but it is usually the fastest way to get where I need to go	0.21393
Q21	I don't mind delays as long as I am comfortable	0.17723
Q18	I would change my form of travel if it would save me some time	0.17303
Q4	I don't know how to reach my destination using public transportation	-0.1403
Q1	I use the most convenient form of transportation regardless of cost	-0.12078
Q22	I avoid making certain trips at certain times because it is too stressful to make the trip	0.12042
Q6	I need to have the flexibility to make many trips during the day if necessary	-0.1088
Q23	Having a stress-free trip is more important than reaching my destination quickly	0.10315
Q8	If my travel option is delayed, I want to know the cause and length of the delay	0.07195
Q7	I am usually in a hurry when I make a trip	0.06808
Q14	I always take the fastest route to my destination even if I have a cheaper alternative	-0.05852
Q11	Driving on Puget Sound freeways is stressful for me	0.0558
Q15	I prefer to make trips alone because I like time to myself	-0.05278
Q17	I need to make trips according to a fixed schedule	0.049
Q5	I need to make trips to a wide variety of locations each week	-0.0418
Q2	I would use another form of transportation if I could afford it	0.03777
Q10	I am usually anxious and unsettled when traveling	0.03692
Q9	I wouldn't mind the traffic congestion if it was predictable from day to day	-0.0044

Table 3.6   Factor 2 Ratings – "Stress/Anxiety"

Question		Factor
Q11	Driving on Puget Sound freeways is stressful for me	0.64244
Q10	I am usually anxious and unsettled when traveling	0.5506
Q22	I avoid making certain trips at certain times because it is too stressful to make the trip	0.5099
Q23	Having a stress-free trip is more important than reaching my destination quickly	0.4031
Q19	I don't like to drive but it is usually the fastest way to get where I need to go	0.3413
Q2	I would use another form of transportation if I could afford it	0.21233
Q8	If my travel option is delayed, I want to know the cause and length of the delay	0.16592
Q20	I don't mind taking a longer trip if I could make productive use of my time when I travel	0.16136
Q12	I would switch to a different form of transportation if it would help the environment	0.15536
Q13	People who drive alone should pay more to help improve traffic congestion situation	0.12353
Q9	I wouldn't mind the traffic congestion if it was predictable from day to day	-0.11913
Q24	I would be willing to pay more when I travel if it would help the environment	0.09537
Q4	I don't know how to reach my destination using public transportation	0.09162
Q25	Use of transit can help improve the environment	0.08484
Q16	I am comfortable riding a bus	-0.0799
Q18	I would change my form of travel if it would save me some time	0.07926
Q1	I use the most convenient form of transportation regardless of cost	-0.07063
Q5	I need to make trips to a wide variety of locations each week	-0.06184
Q6	I need to have the flexibility to make many trips during the day if necessary	-0.05233
Q7	I am usually in a hurry when I make a trip	0.04768
Q21	I don't mind delays as long as I am comfortable	-0.04026
Q17	I need to make trips according to a fixed schedule	0.03296
Q15	I prefer to make trips alone because I like time to myself	0.02664
Q3	I wouldn't mind walking a few minutes to get to my destination	-0.0235
Q14	I always take the fastest route to my destination even if I have a cheaper alternative	-0.02239

Table 3.7   Factor 3 Ratings – "Flexibility"

Question		Factor
Q5	I need to make trips to a wide variety of locations each week	0.63881
Q6	I need to have the flexibility to make many trips during the day if necessary	0.63219
Q7	I am usually in a hurry when I make a trip	0.33949
Q1	I use the most convenient form of transportation regardless of cost	0.27796
Q14	I always take the fastest route to my destination even if I have a cheaper alternative	0.23662
Q4	I don't know how to reach my destination using public transportation	0.21812
Q8	If my travel option is delayed, I want to know the cause and length of the delay	0.21705
Q18	I would change my form of travel if it would save me some time	0.08084
Q16	I am comfortable riding a bus	-0.07897
Q12	I would switch to a different form of transportation if it would help the environment	-0.07809
Q9	I wouldn't mind the traffic congestion if it was predictable from day to day	0.07719
Q23	Having a stress-free trip is more important than reaching my destination quickly	-0.0732
Q11	Driving on Puget Sound freeways is stressful for me	-0.06952
Q21	I don't mind delays as long as I am comfortable	-0.06923
Q13	People who drive alone should pay more to help improve traffic congestion situation	-0.04967
Q17	I need to make trips according to a fixed schedule	-0.04916
Q3	I wouldn't mind walking a few minutes to get to my destination	-0.04034
Q19	I don't like to drive but it is usually the fastest way to get where I need to go	0.03224
Q24	I would be willing to pay more when I travel if it would help the environment	-0.01988
Q2	I would use another form of transportation if I could afford it	-0.01919
Q25	Use of transit can help improve the environment	-0.01695
Q22	I avoid making certain trips at certain times because it is too stressful to make the trip	0.01642
Q10	I am usually anxious and unsettled when traveling	-0.01471
Q20	I don't mind taking a longer trip if I could make productive use of my time when I travel	0.01434
Q15	I prefer to make trips alone because I like time to myself	0.00718

Table 3.8   Factor 4 Ratings – "Not Transit"

Question		Factor
Q16	I am comfortable riding a bus	-0.4761
Q14	I always take the fastest route to my destination even if I have a cheaper alternative	0.42569
Q1	I use the most convenient form of transportation regardless of cost	0.38987
Q4	I don't know how to reach my destination using public transportation	0.3822
Q15	I prefer to make trips alone because I like time to myself	0.33784
Q9	I wouldn't mind the traffic congestion if it was predictable from day to day	0.25973
Q3	I wouldn't mind walking a few minutes to get to my destination	-0.23898
Q25	Use of transit can help improve the environment	-0.2257
Q7	I am usually in a hurry when I make a trip	0.19538
Q6	I need to have the flexibility to make many trips during the day if necessary	0.15831
Q20	I don't mind taking a longer trip if I could make productive use of my time when I travel	-0.14665
Q12	I would switch to a different form of transportation if it would help the environment	-0.10118
Q5	I need to make trips to a wide variety of locations each week	0.09418
Q10	I am usually anxious and unsettled when traveling	0.09406
Q11	Driving on Puget Sound freeways is stressful for me	-0.08589
Q13	People who drive alone should pay more to help improve traffic congestion situation	-0.07238
Q22	I avoid making certain trips at certain times because it is too stressful to make the trip	0.06299
Q21	I don't mind delays as long as I am comfortable	0.05333
Q18	I would change my form of travel if it would save me some time	-0.0533
Q8	If my travel option is delayed, I want to know the cause and length of the delay	0.04924
Q19	I don't like to drive but it is usually the fastest way to get where I need to go	-0.0411
Q23	Having a stress-free trip is more important than reaching my destination quickly	-0.03363
Q17	I need to make trips according to a fixed schedule	-0.0302
Q2	I would use another form of transportation if I could afford it	-0.0056
Q24	I would be willing to pay more when I travel if it would help the environment	0.00281

Table 3.9   Factor 5 Ratings – "Not in A Hurry"

Question		Factor
Q21	I don't mind delays as long as I am comfortable	0.57162
Q20	I don't mind taking a longer trip if I could make productive use of my time when I travel	0.44939
Q23	Having a stress-free trip is more important than reaching my destination quickly	0.39209
Q9	I wouldn't mind the traffic congestion if it was predictable from day to day	0.32
Q7	I am usually in a hurry when I make a trip	-0.25714
Q2	I would use another form of transportation if I could afford it	0.22978
Q12	I would switch to a different form of transportation if it would help the environment	0.21929
Q16	I am comfortable riding a bus	0.2073
Q3	I wouldn't mind walking a few minutes to get to my destination	0.16435
Q24	I would be willing to pay more when I travel if it would help the environment	0.15791
Q14	I always take the fastest route to my destination even if I have a cheaper alternative	-0.11035
Q22	I avoid making certain trips at certain times because it is too stressful to make the trip	0.08525
Q8	If my travel option is delayed, I want to know the cause and length of the delay	-0.08088
Q15	I prefer to make trips alone because I like time to myself	0.07808
Q10	I am usually anxious and unsettled when traveling	-0.0734
Q18	I would change my form of travel if it would save me some time	0.03509
Q25	Use of transit can help improve the environment	0.0288
Q17	I need to make trips according to a fixed schedule	-0.02033
Q13	People who drive alone should pay more to help improve traffic congestion situation	-0.018
Q19	I don't like to drive but it is usually the fastest way to get where I need to go	0.01702
Q5	I need to make trips to a wide variety of locations each week	0.01312
Q4	I don't know how to reach my destination using public transportation	-0.01121
Q6	I need to have the flexibility to make many trips during the day if necessary	0.00829
Q11	Driving on Puget Sound freeways is stressful for me	-0.00809
Q1	I use the most convenient form of transportation regardless of cost	0.00141

Table 3.10   Factor 6 Ratings – "Schedule Driven"

Question		Factor
Q18	I would change my form of travel if it would save me some time	0.59651
Q17	I need to make trips according to a fixed schedule	0.34015
Q7	I am usually in a hurry when I make a trip	0.32307
Q14	I always take the fastest route to my destination even if I have a cheaper alternative	0.29566
Q2	I would use another form of transportation if I could afford it	0.23524
Q19	I don't like to drive but it is usually the fastest way to get where I need to go	0.23419
Q8	If my travel option is delayed, I want to know the cause and length of the delay	0.21237
Q3	I wouldn't mind walking a few minutes to get to my destination	0.19274
Q16	I am comfortable riding a bus	0.18438
Q1	I use the most convenient form of transportation regardless of cost	0.14611
Q11	Driving on Puget Sound freeways is stressful for me	0.12216
Q23	Having a stress-free trip is more important than reaching my destination quickly	-0.12011
Q4	I don't know how to reach my destination using public transportation	-0.11284
Q25	Use of transit can help improve the environment	0.11035
Q12	I would switch to a different form of transportation if it would help the environment	0.11007
Q10	I am usually anxious and unsettled when traveling	0.10987
Q21	I don't mind delays as long as I am comfortable	-0.10489
Q13	People who drive alone should pay more to help improve traffic congestion situation	0.10488
Q20	I don't mind taking a longer trip if I could make productive use of my time when I travel	0.09662
Q22	I avoid making certain trips at certain times because it is too stressful to make the trip	-0.05486
Q15	I prefer to make trips alone because I like time to myself	-0.04212
Q5	I need to make trips to a wide variety of locations each week	-0.03927
Q24	I would be willing to pay more when I travel if it would help the environment	-0.03338
Q9	I wouldn't mind the traffic congestion if it was predictable from day to day	0.02647
Q6	I need to have the flexibility to make many trips during the day if necessary	-0.0053

Figures 3.2 through 3.6 shows how the members of the five clusters relate to the six different factors. The mean scores indicate how important the factors are for the different clusters. For instance, for cluster 1 members, the "environment/green" and "stressed" factors resonate (i.e the mean score is higher than 0), while these cluster members do not relate to the "flexible" and "no transit" factors (i.e. the mean score is lower than 0). Cluster 2 members have a strong level of agreement with the "no hurry" factor, and a weaker level of agreement with the "environment/green" factor. Cluster 3 members disagree with the "environment" factor. Cluster 4 members agree with the "stressed" and "no transit" factors, and disagree with the "green" and "scheduled" factors. Cluster 5 members hold the "scheduled" factor to be their highest priority and the converse "no hurry" factor to be their lowest priority.

Figure 3.2   Cluster 1 Factor Priorities

Cluster 1 Priorities

	"Green"	"Stressed"	"Flexible"	"No Transit"	"No Hurry"	"Scheduled"
90 Percent	1.659	1.537	0.793	0.416	1.265	1.261
10 Percent	-0.713	-0.559	-1.704	-1.525	-1.018	-1.101
▬ Mean	0.473	0.489	-0.455	-0.555	0.123	0.080
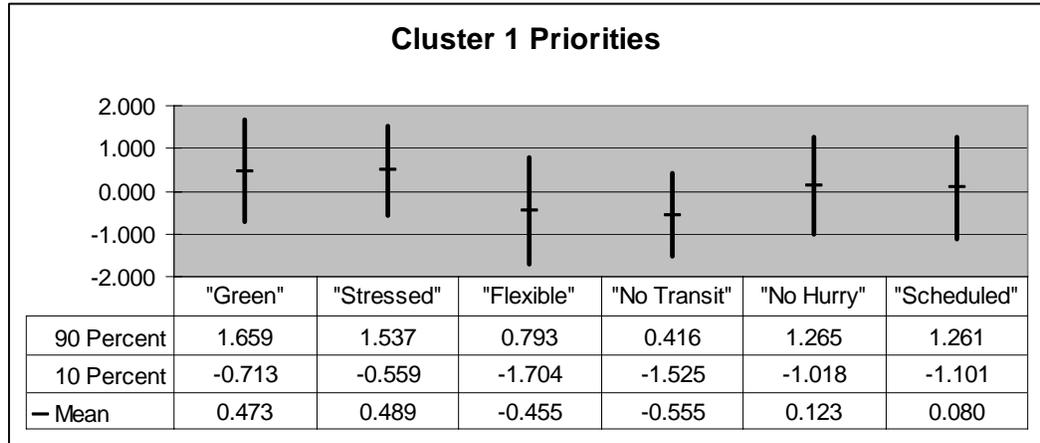
Figure 3.3   Cluster 2 Factor Priorities

Cluster 2 Priorities

	"Green"	"Stressed"	"Flexible"	"Not Transit"	"No Hurry"	"Scheduled"
90 Percent	1.395	0.161	1.279	0.950	1.752	1.166
10 Percent	-0.970	-1.732	-1.365	-1.429	-0.573	-1.589
▬ Mean	0.213	-0.786	-0.043	-0.240	0.589	-0.212
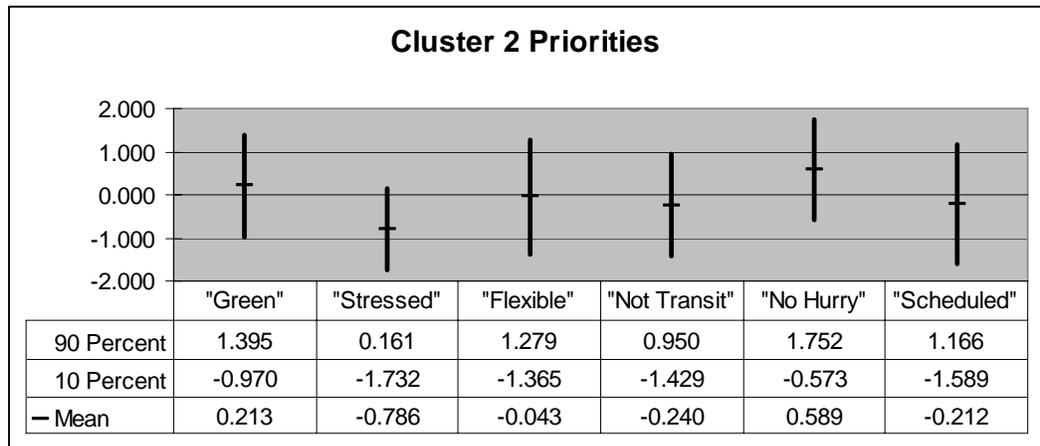
Figure 3.4   Cluster 3 Factor Priorities

Cluster 3 Priorities

	"Green"	"Stressed"	"Flexible"	"Not Transit"	"No Hurry"	"Scheduled"
90 Percent	0.208	1.168	1.402	1.484	0.712	0.836
10 Percent	-2.373	-1.658	-1.832	-1.099	-1.653	-2.010
▬ Mean	-1.083	-0.245	-0.215	0.193	-0.471	-0.587
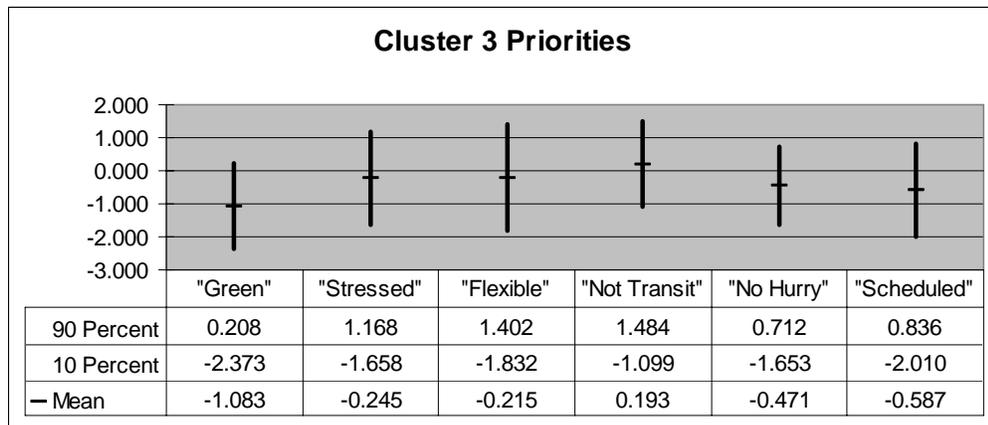
Figure 3.5   Cluster 4 Factor Priorities

Cluster 4 Priorities

	"Green"	"Stressed"	"Flexible"	"Not Transit"	"No Hurry"	"Scheduled"
90 Percent	1.198	1.929	1.544	1.752	1.611	1.249
10 Percent	-1.526	-0.507	-1.013	-0.318	-1.034	-1.354
━ Mean	-0.164	0.711	0.265	0.717	0.289	-0.053
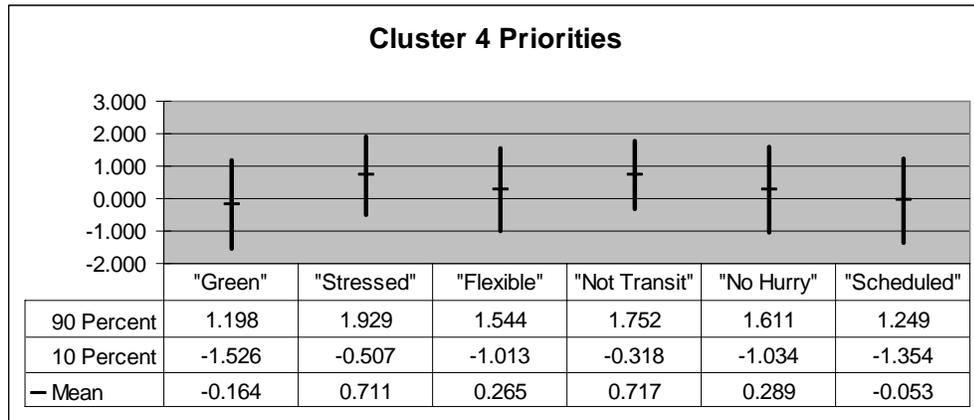
Figure 3.6   Cluster 5 Factor Priorities

Cluster 5 Priorities

	"Green"	"Stressed"	"Flexible"	"Not Transit"	"No Hurry"	"Scheduled"
90 Percent	1.366	0.980	1.682	1.374	0.511	1.590
10 Percent	-1.072	-1.479	-0.639	-1.026	-1.647	-0.480
━ Mean	0.147	-0.250	0.521	0.174	-0.568	0.555
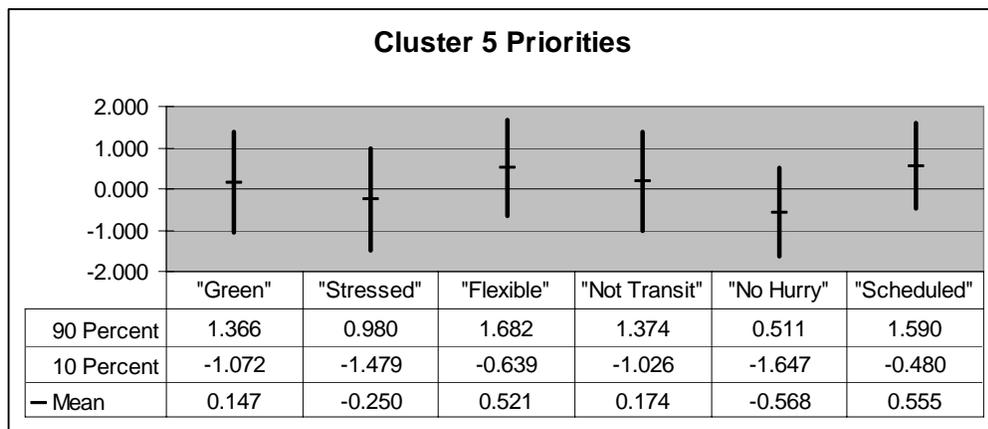
Table 3.11 presents the characteristics of each market segment, derived from the cluster analysis. These are demographic characteristics of the segments after they have been statistically organized into these market segments.

Table 3.11   Characteristics of Each Market Segment (Cluster)

	Cluster 1	Cluster 2	Cluster 3	Cluster 4	Cluster 5
Persons per household		Least likely to have 3+ persons per household	Less likely		Least likely to have one person in their household
Vehicles per household	Least likely to have 3+ vehicles per household				Most likely to have 3+ vehicles per household
Workers per household			Least likely to have 2+ workers per household		Least likely to have no workers in their household
Household income			Most likely less than $50,000	Least likely more than $100,000	Least likely to have household income less than $50,000 Most likely to have household income more than $100,000
Dwelling Unit	More likely to rent home	Most likely to rent home		More likely to live in SF detached	Most likely to live in a detached single family home
Gender		More likely male	Most likely female	Most likely to be male	
Seniors	Least likely 65+ years old	More likely	More likely 75+ years old		Less likely to be 65 years old or more
Education	Least likely to only have gone to high school		Most likely to only have gone to high school	Least likely to have a college degree	
Employment status	Most likely paid full-time		Most likely out of work		More likely to be a paid full-time employee Least likely to be retired
Transit Use	Least likely to have used transit in past 30 days Least likely to have transit pass		Most likely to have used transit in past 30 days	More likely to have used transit in past 30 days Most likely to have transit pass	

3.7 NEXT STEPS

The factor and cluster analysis presented in this section is the beginning of a transit market research study that could address some significant objectives for the Puget Sound Regional Council:

- To better understand its existing and potential transit markets;

- To evaluate changes to existing or new transit services that serve these markets; and

- To provide support for strategic marketing and transit planning activities.

There are four key steps to completing this transit market research, as follows: identify market segments; develop mode choice models; identify travel markets; and develop the service planning tool. These steps are described briefly below.

Identify Market Segments

The purpose of identifying market segments is to understand the significant and critical attitudes of all potential riders toward their options for everyday travel and their choice behavior. The first two components of this effort have been completed in this analysis of the survey data (conducting the factor analysis and segmenting the travel market). The factor analysis develops traveler factors that describe their attitudes based on the survey data. The market segments have been identified based on their underlying demographic and attitudinal characteristics using the survey data.

The final component of this task is to develop Structural Equation Models (SEM). The purpose of the SEM is to jointly estimate statistical models between the attitudinal data collected in the survey and demographic data available from the U.S. Census. This includes estimating the coefficients and statistical measures of the models using the variables and model framework established in the factor analysis and market segmentation process.

Each market segment produced by the structural equations models would be described based on attitudes, demographics, geography, and travel behavior. These descriptions would be used to conduct qualitative assessments of the market segments and the application of this model would produce geographic

representations of the market segments at any level of geography that you have demographics (such as Census blocks or Traffic Analysis Zones).

Develop Market Segment-Specific Mode Choice Models

Market segmentation identifies unique attitudes and preferences between market segments and shows the relative importance of these attitudes between the segments, but it does not provide quantitative measures or predict changes in ridership; mode choice models will do this. This task allows the PSRC to evaluate how changes in specific service characteristics would change ridership. The mode choice models could be applied to pivot off the existing PSRC travel demand models or could be applied directly to produce ridership. The primary reason to pivot off existing mode choice models are for consistency, but the direct application provides changes in ridership that is specific for the market segments developed from the market segmentation models and includes traveler attitude factors from the factor analysis.

The data collected in the choice experiments (described in Section 4.0) could be used to estimate segment-specific mode choice models (where there is sufficient statistical significance to estimate a unique choice model). The segment-specific mode choice models would be used to evaluate the quantitative tradeoffs between transit service characteristics (e.g., wait time, in-vehicle travel time, number of transfers, etc.).

Identify Travel Markets

This task would involve identifying the significant travel markets (i.e., major corridors and origin destination pairs) in the Puget Sound transit service areas and describing the critical characteristics needed in the service planning task. It involves evaluating trip intensity, congestion level, and opportunities for transit priority, parking supply and cost, concentrations of each market segment, land use, and other characteristics to define travel markets by corridor and origin/destination pair. The next step is to describe and rank travel markets to see if there is a potential to provide cost-effective transit service.

Develop Service Planning Tool (SPT)

There is significant benefit to having an easy to use almost real-time estimation tool for small area service alternatives, specifically one that can estimate impacts

of various corridor options. The Service Planning Tool (SPT) can provide reliable ridership estimates that reflect the customer-oriented service changes to be proposed. The tool would allow transportation planners at PSRC (or member agencies) to reconfigure transit service anywhere in the region and estimate the change in ridership. It is sensitive to the geographical concentration of specific market segments.

The SPT provides changes in ridership given changes in the service characteristics (e.g., reliability, wait time, price, etc.), network structure (e.g., exclusive right-of-way, number of transfers, etc.) or customer experience (e.g., real-time arrival information, seat availability, etc.). The SPT generates near instantaneous changes in riders and thus allow users to conduct iterative testing of different service characteristics or more aggressive improvements of a single characteristic.

4.0 Analysis of Stated-Preference Choice Experiments

4.1 ANALYSIS OF TRANSIT CHOICE EXPERIMENTS

The choice sets for the mode choice experiments always included 3 of the following 4 options:

- Bus service A (always included);

- Bus service B (included in some corridors);

- Rail (included instead of Bus B in the other corridors); and

- Auto (always included).

The data was used to estimate nested logit discrete choice models[3]. After many model specifications were tested on the full sample, the one yielding the best results is shown as Model 1: All Trips in Table 4.1. The model is based on 2,151 valid responses, including 4 responses for each of the 552 respondents minus 57 missing responses.

All coefficients and t-statistics are shown in Table 4.1, and some key ratios of coefficients are shown at the bottom. All of the SP design variables show significant effects.. The values discussed below are for Model 1, unless otherwise indicated.

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[3] There are two resources that describe nested logit models using stated preference data: Stated Choice Methods by Jordan J. Louviere, David A. Hensher, and Joffre D. Swait (2000); and Modelling Transport by J. de D. Ortuzar and L. G. Willumsen (1990). Definitions such as logsum and rho-squared are clarified in these references.

Table 4.1   Models With SP Data Only: Segmentation by Actual Mode Used

Sample	Model 1 All Trips		Model 1A Auto trips		Model 1T Transit trips	
Observations	2151		1787		364	
Final log-likelihood	-1811.4		-1506.2		-292.3	
Rho-squared(const)	0.233		0.233		0.269	
Rho-squared(zero)	0.166		0.099		0.199	
Variable	Coeff	T-stat	Coeff	T-stat	Coeff	T-stat
Transit/auto cost ($)	-0.170	-2.4	-0.136	-2.0	-0.198	-1.0
Transit/auto cost/income	-2.796	-2.1	-2.896	-2.3	-0.902	-0.2
Auto in-vehicle time (IVT) (min)	-0.055	-2.5	-0.037	-1.8	-0.207	-2.0
Transit in-vehicle time (IVT) (min)	-0.051	-5.1	-0.041	-4.0	-0.079	-3.2
Transit access time (min)	-0.070	-6.0	-0.065	-4.9	-0.075	-3.1
Transit/auto egress time (min)	-0.053	-3.0	-0.038	-2.2	-0.108	-2.4
Transit first wait time (min)	-0.615	-5.2	-0.550	-4.1	-0.746	-3.2
Transit transfers (#)	-0.102	-6.8	-0.090	-5.3	-0.133	-4.1
Transit transfer time (min)	-0.068	-5.3	-0.061	-4.1	-0.080	-3.3
Transit times standing/20	-0.023	-3.0	-0.010	-1.3	-0.065	-3.5
Transit/auto times late	-0.148	-4.0	-0.136	-3.6	-0.141	-1.6
Bus A constant	0.607	1.8	0.523	1.6	6.677	3.3
Bus B constant	0.493	1.5	0.437	1.4	6.619	3.4
Rail constant	1.091	3.1	1.050	3.1	6.598	3.2
Transit if actual mode=transit	4.853	6.6	0.000	*	0.000	*
Auto constant if HOV trip	-0.228	-1.0	-0.320	-1.6	0.000	*
Option on left side of page	0.124	1.3	0.190	1.9	-0.003	0.0
Option on right side of page	0.294	3.0	0.382	3.9	-0.196	-0.7
Nesting of Bus A w/ Bus B	0.738	7.5	0.807	6.0	0.599	4.1
Nesting of Bus w/ Rail	0.676	7.2	0.757	6.8	0.536	2.5
Coefficient Ratios						
Value of Time (VOT)						
auto in-vehicle ($/hr)	$	15.91	$	12.71	$	59.16
transit in-vehicle ($/hr)	$	14.85	$	13.94	$	22.69
Ratio access time to IVT	1.36		1.59		0.94	
Ratio egress time to IVT	1.03		0.95		1.36	
Ratio wait time to IVT	2.00		2.21		1.67	
Ratio transfers to IVT	12.02		13.56		9.41	
Ratio transfer time to IVT	1.32		1.51		1.01	
Ratio times standing to IVT	0.46		0.26		0.82	
Ratio times late to IVT	2.89		3.35		1.77	

The most logical nesting structure, shown in Figure 4.1, gives the expected results, namely that the nesting logsum parameters are significantly lower than 1.0. As shown in the figure and the table, both logsum parameters are around 0.70. (Note: The "logsum" is the expected combined utility across all choice

alternatives within a nest – the logarithm of the sum of the exponentiated utilities. A logsum parameter less than 1.0 indicates that the alternatives within the nest are closer choice substitutes with each other than they are with the alternatives outside the nest. To maintain the same scale for all modes at the lowest level, single-alternative "nests" are used and constrained to have the same logsum parameters, as shown in italics.)

Figure 4.1   Mode Choice SP Data Nesting Structure
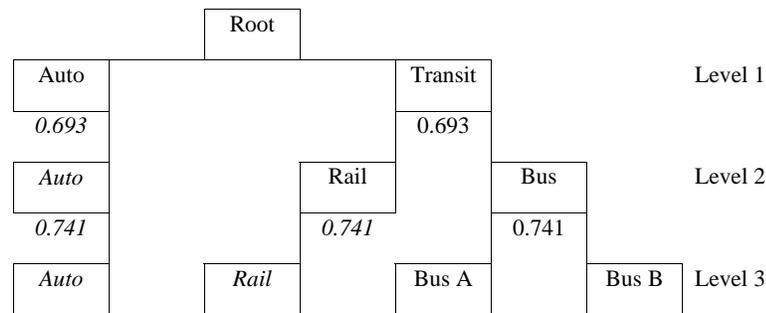
Cost. When estimated separately, transit fare, gas cost, and parking cost all produced similar coefficients near -0.20, so they were grouped together and given a single coefficient.   In addition, a second term with cost divided by income also is significant. This result means that the effect of cost is greater at lower incomes. If the effect of cost was strictly inversely proportional income to income, then the coefficient for the main cost variable would be 0. The fact that both are significant implies that the importance of cost varies with income, but the variation is less than proportional. This is a typical result.

In-vehicle time.   Both auto in-vehicle time and transit in-vehicle time have significant effects, with values of time of about $15/hour, computed at an income of $75K (see calculation below). This result is somewhat higher than is typically found, but the sample also has a higher-than-typical income distribution (Although it is sometimes stated that auto and transit in-vehicle time should have the same coefficients, there is no behavioral reason why this should be the case any more than wait time and in-vehicle time should have the same coefficient).

Walk access and egress times. Walk access time was presented only for transit, while walk egress time was presented for both transit and auto. The ratio of the access time to transit in-vehicle time (IVT) coefficient is 1.36. The ratio of egress

time to IVT is 1.303, which seems lower than usual (In further analysis it may be worth estimating separate egress time coefficients for the car and transit modes).

Service frequency / first wait time. The frequency levels used in the experiment ranged from 5 minutes to 60 minutes. Assuming that first wait time is half the headway does not seem appropriate for very high headways. Although it was not possible to accurately estimate a multi-parameter nonlinear function, the assumed function shown in Figure 4.2 gave superior statistical results versus simply using half the headway. The resulting ratio of wait time to IVT coefficients is 2.000.

Figure 4.2   Assumed Wait Time Function
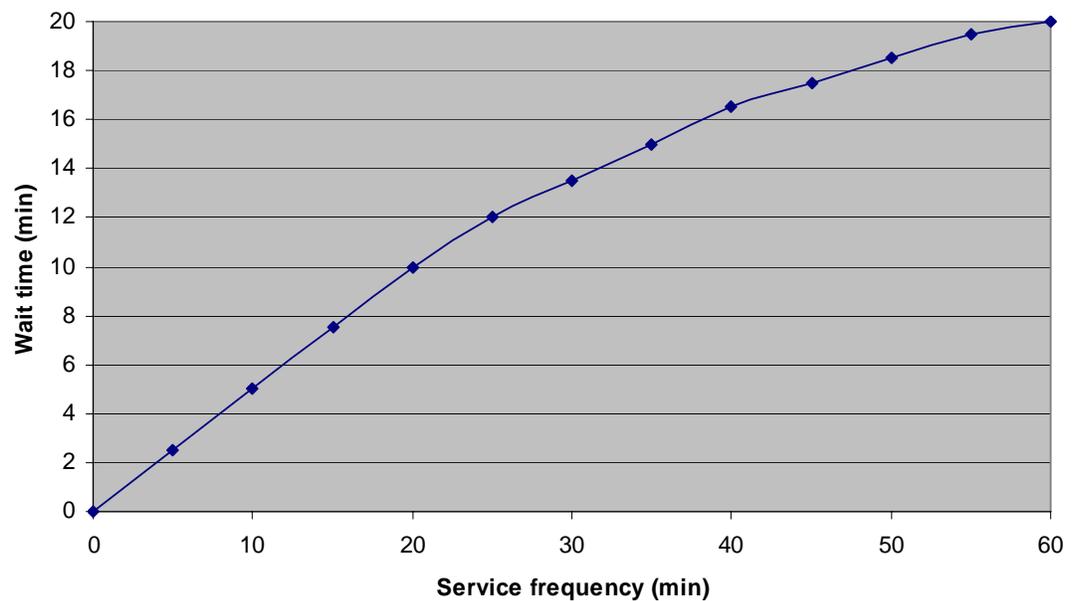
Transfers/transfer time. Both the number of transfers and transfer time gave significant effects, with the effective transfer "penalty" equal to about 12 minutes of IVT, plus about 1.3 minutes of IVT for each minute of extra wait time.

Seat availability. Seat availability was presented as the number of times (1, 2, 4, 12 or 20) per month the person would need to stand (4 was presented as "one time per week," 12 was "three times per week," and 20 was "five times a week"). The probability of having to stand one more time in 20 is equivalent to 0.646 minutes of IVT. If multiplied by 20, this implies that the disutility of having to stand for one trip is equivalent to 9.2 minutes of IVT. Nonlinear forms of this effect were tested, but none performed significantly better than a linear

function (In further analysis, this could be interacted with IVT – it is worse to stand on a longer trip.).

Reliability. For both transit and auto, reliability was presented as the number of times in 20 (1-5 per month) the person would be more than 15 minutes late. The effect is equivalent to about 3 minutes of IVT. If multiplied by 20, this implies that the disutility of being more than 15 minutes late for one trip is equivalent to about 60 minutes of IVT, although even the risk of being late has a disutility for every trip. Nonlinear forms of this effect were tested, but none performed significantly better than a linear function.

Mode-specific constants. Residual constants were estimated for the bus and rail alternatives relative to auto, capturing the effects of any variables that were not explicitly presented (i.e., maintenance costs for auto, safety aspects of both modes). Bus A and Bus B both have somewhat positive constants relative to auto, equivalent to about 10 to 15 minutes of IVT. Rail has a somewhat more positive constant, equivalent to about 20 minutes of IVT. These constants seem to be in a reasonable range. If the person actually traveled by transit, then they have a much higher constant for all of the transit alternatives, as would be expected. This "self-selection" effect could reflect situation constraints such as low auto availability within the household, dislike of driving, etc. The constant for auto is slightly lower if the person actually traveled by shared ride versus SOV, but the difference is not significant.

Order effects. Effects were estimated according to which position on the page each option was situated – to the left or the right, relative to in the middle. Because the ordering of the auto and transit options on the page was randomized across the surveys, it is possible to estimate these effects independently from the mode-specific effects and thus avoid any ordering bias. The estimated effects are small but marginally significant, and most positive for the right hand side of the page, equivalent to about 5 minutes of IVT.

Nesting coefficients. As mentioned above, the nesting of Bus A with Bus B on the lowest level, and the nesting of Bus with Rail on the next highest level, both gave logsum parameter estimates of about 0.7, significantly different from both 0 and 1. (Note: Only two transit options were available for any given respondent, so these two logsum parameters are essentially estimated from two different

subsets of respondents – one comparing bus to bus and the other comparing bus to rail.)

Value of time (VOT). Value of time is calculated as the time coefficient divided by the cost coefficient converted to dollars per hour. This can be calculated for the auto in-vehicle time at an income of $75k as follows:

VOT = -.5055/min / (-.0170 -2.796/75)/$ * 60 min/hr = $15.91/hr

Segmentation by Actual Mode

Models 1A and 1T in Table 4.1 have the same specification as Model 1, but were estimated on two different subsets of the sample, those who actually traveled by car versus those that actually traveled by transit. The t-statistics are generally lower for the transit sub-sample because the sample size is much smaller.

The auto sample has equal effects of auto and transit in-vehicle time, with somewhat lower VOT (about $13/hour). The transit sample, however, has much higher disutility on in-vehicle time, particularly auto in-vehicle time. The transit sample also has much higher disutility on walk egress time and the probability of standing, perhaps being more familiar with these particular aspects of transit use.

The nesting parameters also are further from 1.0 for the transit sample, indicating that they see transit and auto as less similar options than do car users.

Segmentation by Trip Purpose

Table 4.2 shows the results for Model 1 at the left, this time comparing them with Model 1W for trips to or from the workplace and Model 1N for all other non-work trips. The sample sizes for the two segments are roughly equal.

Table 4.2   Models with SP Data Only: Segmentation by Actual Trip Purpose

Sample	Model 1	All Trips	Model 1W Work trips		Model 1N Non-work trips	
Observations	2151		1089		1062	
Final log-likelihood	-1811.4		-885.5		-906.7	
Rho-squared(const)	0.233		0.260		0.223	
Rho-squared(zero)	0.166		0.208		0.127	
Variable	Coeff	T-stat	Coeff	T-stat	Coeff	T-stat
Transit/auto cost ($)	-0.170	-2.4	-0.158	-1.4	-0.145	-1.7
Transit/auto cost/income	-2.796	-2.1	-3.241	-1.3	-2.120	-1.6
Auto in-vehicle time (min)	-0.055	-2.5	-0.095	-2.6	-0.017	-0.7
Transit in-vehicle time (min)	-0.051	-5.1	-0.057	-3.7	-0.044	-3.5
Transit access time (min)	-0.070	-6.0	-0.091	-5.2	-0.048	-3.2
Transit/auto egress time (min)	-0.053	-3.0	-0.056	-2.1	-0.044	-2.1
Transit wait time (min)	-0.615	-5.2	-0.130	-5.7	-0.074	-3.8
Transit transfers (#)	-0.102	-6.8	-0.691	-3.9	-0.522	-3.5
Transit transfer time (min)	-0.068	-5.3	-0.091	-4.8	-0.044	-2.6
Transit times standing/20	-0.023	-3.0	-0.028	-2.4	-0.018	-1.8
Transit/auto times late	-0.148	-4.0	-0.187	-3.3	-0.115	-2.6
Bus A constant	0.607	1.8	0.722	1.3	0.628	1.6
Bus B constant	0.493	1.5	0.637	1.1	0.468	1.3
Rail constant	1.091	3.1	1.645	2.7	0.633	1.6
Transit if actual mode=transit	4.853	6.6	5.597	4.9	3.840	3.9
Auto constant if HOV trip	-0.228	-1.0	0.641	1.0	-0.434	-2.0
Option on left side of page	0.124	1.3	-0.029	-0.2	0.288	2.5
Option on right side of page	0.294	3.0	0.169	1.1	0.414	3.6
Nesting of Bus A w/ Bus B	0.738	7.5	0.773	5.5	0.825	4.6
Nesting of Bus w/ Rail	0.676	7.2	0.534	4.9	0.868	5.2
Coefficient Ratios						
VOT auto in-vehicle ($/hr)	$	15.91	$	28.37	$	5.87
VOT transit in-vehicle ($/hr)	$	14.85	$	17.12	$	15.12
Ratio access time to IVT	1.36		1.59		1.10	
Ratio egress time to IVT	1.03		0.98		1.00	
Ratio wait time to IVT	2.00		2.26		1.70	
Ratio transfers to IVT	12.02		12.06		11.95	
Ratio transfer time to IVT	1.32		1.58		1.00	
Ratio times standing to IVT	0.46		0.48		0.42	
Ratio times late to IVT	2.89		3.26		2.62	

The main difference is that the non-work model has lower rho-squared and lower absolute coefficient values, indicating that, relative to work trips, those on non-work trips made their choices less on the basis of the design variables and more on the basis of other factors such as personal mode preferences and situational constraints. This is a common finding, that mode choice for work trips involves more rational tradeoffs than for non-work trips.

In terms of the relative results, non-work trips show a much lower VOT for auto IVT than do work trips, as well as a somewhat lower sensitivity to transit out-of-vehicle time (OVT) components. Most other results are similar, apart from the fact that the left/middle/right order effects appear to arise mainly from the non-work sample and not from the work trip sample.

Mode Choice Models Based on Revealed-Preference Data

Using the same respondents who provided the SP choices, it was possible to estimate Revealed-preferences (RP) mode choice models to predict the actual mode choice as a function of measured network characteristics. This was done by translating the geocoded origin and destination (OD) XY coordinates to Traffic Analysis Zones (TAZs) in the PSRC 938 zone system, and then attaching year 2000 auto and transit network skim values and zonal parking costs. This model is a binary model with no nesting, with a choice between auto and bus. A few observations were rejected from the analysis for one of three reasons:

- The actual mode was drive + bus or rail, for which there were not enough cases to include those modes in the model (13 cases);

- The actual OD pair did not have valid transit network skims (12 cases); and

- The person was from a household owning no cars (17 cases).

This left 510 valid observations for modeling, including 251 work trips (201 by Car and 50 by Bus) and 259 non-work trips (249 by Car and 10 by Bus). The results are shown in Table 4.3.

In Model 2 estimated on all trips together, the cost and time coefficients are marginally significant, and the imputed VOT for car and transit IVT are reasonable values of about $12/hour, with car slightly higher. The ratios of OVT to IVT coefficients also seem reasonable, with the exception of transfer time, which has the wrong sign. This is a very typical result for RP data, where it is

not possible to estimate separate effects for number of transfers and transfer time because of the high correlation between them.

When the sample is split by trip purpose, in Models 2W and 2N, the results look much worse. For work trips, the VOT for in-vehicle times become unrealistically high (almost $30/hour), and the ratios of OVT to IVT coefficients go below 1.0. Transfer time still has the incorrect sign. These results are presented for each model in Table 4.3.

For the non-work trips, none of the coefficients is significant and several have an incorrect sign. This is due in large part to the small sample size, containing only 10 transit trips. Even in much larger RP samples, however, it is typically not possible to obtain reasonable RP mode choice models for non-work trips without constraining coefficients. Overall, these RP results help show the value of SP data to provide behavioral information.

Table 4.3   Models with RP Data Only: Segmentation by Actual Trip Purpose

Sample	Model 2 All Trips		Model 2W Work Trips		Model 2N Non-Work Trips	
Observations	510		251		259	
Final log-likelihood	-138.8		-94.4		-34.9	
Rho-squared(const)	0.607		0.457		0.805	
Rho-squared(zero)	0.248		0.247		0.175	
Variable	Coeff	T-stat	Coeff	T-stat	Coeff	T-stat
Transit/auto cost ($)	-0.310	-4.8	-0.191	-2.5	-0.357	-1.3
Transit/auto cost/income	-0.798	-0.5	-0.941	-0.5	1.650	0.2
Auto in-vehicle time (min)	-0.068	-1.5	-0.103	-1.9	0.021	0.2
Transit in-vehicle time (min)	-0.057	-1.7	-0.097	-2.4	0.065	0.9
Transit access/egress time (min)	-0.056	-2.3	-0.083	-2.7	-0.022	-0.4
Transit wait time (min)	-0.093	-1.4	-0.080	-1.0	-0.177	-1.1
Transit transfers (#)	-1.744	-2.8	-1.979	-2.9	-0.290	-0.2
Transit transfer time (min)	0.159	1.9	0.216	2.4	-0.360	-1.0
Bus constant	0.357	0.4	1.803	1.5	-2.335	-1.0
Coefficient Ratios						
VOT auto in-vehicle ($/hr)	$ 12.51		$ 29.51		$ -3.90	
VOT transit in-vehicle ($/hr)	$ 10.47		$ 27.58		$ -12.02	
Ratio access to IVT	0.99		0.86		-0.34	
Ratio wait time to IVT	1.64		0.83		-2.73	
Ratio transfers to IVT	30.67		20.50		-4.46	
Ratio transfer time to IVT	-2.79		-2.23		-5.54	

Mode Choice Models Based on Both SP and RP Data

Table 4.4 shows the results of analogous Models 3, 3W, and 3N that use both the SP and RP observations from the previous models simultaneously. The two data sets are treated identically and both contribute to all parameters, with the following differences:

- The RP car option is placed in the Auto "nest" and the RP bus option is placed in the RP Bus A nest. Because the RP choice is binary, the RP data do not contribute to the estimation of nesting parameters.

- The RP data does not contain values for seat availability or reliability, so those coefficients are based only on the SP data.

- The RP data does not have transit walk access and egress times separated out, so both are constrained to have the same coefficient for the RP choices.

- Only the BusRP constant is estimated from the RP data. All other constants, including the ordering effects, are estimated from the SP data.

- An additional "scale parameter" is estimated for the SP data to allow for the fact that it may have a different residual error variance relative to the RP data. By including this parameter, both data sets contribute to coefficients of the same absolute magnitude.

Overall, the results in Table 4.4 are quite similar to the SP-only results in Table 4.2, but with somewhat lower and more typical values of time, and fewer "outlying" results. Also, the bus RP constant versus auto becomes (slightly) negative, which is more typical of forecasting models. The scale of the SP data relative to RP is equal to about 0.5 in all cases. The meaning of this parameter is not straightforward to interpret, as it tends to vary with many different characteristics of the data sets. In any case, it is not used in forecasting, but just as an adjustment parameter to allow the two data sets to be combined in a statistically suitable manner.

Table 4.4   Models With Both RP and SP Data: Segmentation by Trip Purpose

Sample	Model 3	All Trips	Model 3W Work trips		Model 3N Non-work trips	
Observations	2661		1340		1321	
Final log-likelihood	-1955.6		-986.4		-945.2	
Rho-squared(const)	0.280		0.280		0.298	
Rho-squared(zero)	0.170		0.207		0.126	
Variable	Coeff	T-stat	Coeff	T-stat	Coeff	T-stat
Auto in-vehicle time (min)	-0.116	-2.3	-0.159	-2.1	-0.033	-0.7
Transit in-vehicle time (min)	-0.110	-3.6	-0.118	-2.7	-0.069	-1.9
Transit access time (min)	-0.145	-4.1	-0.174	-3.3	-0.079	-1.9
Transit/auto egress time (min)	-0.100	-2.6	-0.100	-1.9	-0.070	-1.7
Transit wait time (min)	-0.216	-4.2	-0.250	-3.3	-0.123	-1.9
Transit transfers (#)	-1.343	-3.9	-1.478	-3.0	-0.839	-2.0
Transit transfer time (min)	-0.136	-3.8	-0.162	-3.1	-0.073	-1.7
Transit times standing/20	-0.050	-2.6	-0.054	-2.1	-0.030	-1.4
Transit/auto times late	-0.313	-3.2	-0.362	-2.5	-0.190	-1.7
Transit/auto cost ($)	-0.516	-3.9	-0.443	-2.6	-0.276	-1.7
Transit/auto cost/income	-4.113	-1.8	-3.456	-1.1	-3.481	-1.3
Bus RP constant	-0.734	-0.8	-0.145	-0.1	-1.149	-0.9
Bus A constant	0.823	1.2	1.617	1.5	0.782	1.2
Bus B constant	0.550	0.8	1.421	1.4	0.523	0.9
Rail constant	1.824	2.4	3.365	2.5	0.799	1.2
Transit if actual mode=transit	10.590	3.8	11.120	2.8	6.322	1.9
Auto constant if HOV trip	-0.503	-1.0	1.145	0.9	-0.700	-1.5
Option on left side of page	0.264	1.2	-0.062	-0.2	0.472	1.7
Option on right side of page	0.619	2.6	0.314	1.0	0.685	1.9
SP scale factor versus RP	0.479	5.7	0.521	4.2	0.612	2.4
Nesting of Bus A w/ Bus B	0.730	7.5	0.759	5.6	0.818	4.6
Nesting of Bus w/ Rail	0.655	7.2	0.524	5.0	0.867	5.2
Coefficient Ratios						
VOT auto in-vehicle ($/hr)	$	12.19	$	19.49	$	6.18
VOT transit in-vehicle ($/hr)	$	11.54	$	14.50	$	12.77
Ratio access time to IVT	1.32		1.47		1.15	
Ratio egress time to IVT	0.91		0.85		1.02	
Ratio wait time to IVT	1.96		2.12		1.79	
Ratio transfers to IVT	12.23		12.51		12.23	
Ratio transfer time to IVT	1.23		1.37		1.07	
Ratio times standing to IVT	0.45		0.46		0.44	
Ratio times late to IVT	2.85		3.07		2.76	

After providing the SP responses, respondents were asked to answer an open-ended question about the most important factor or factors in making their mode choices.   The responses were classified by MORPACE, and are tabulated in Table 4.5 below. On average, each respondent provided 1.286 responses, so the

right-hand column adds to 128.6 percent. Travel time and convenience (no transfer) are the most popular, each mentioned by about 25 percent of respondents. Service frequency/reliability and cost were each mentioned by 20 percent or so of respondents. About eight percent mentioned needing the car because of disability, baggage, or errands. Very few people (one percent) explicitly mentioned disliking buses.

Table 4.5   Self-Reported Most Important Mode Choice Factor(s)

Response Category	Number	Percent of responses	Percent of respondents
Length of time/Time/Time is important	147	20.7%	26.6%
Convenience/Easiest/No transfer	140	19.7%	25.4%
Service frequency/Reliability/ Availability	108	15.2%	19.6%
Cheaper/Price/Parking fee	93	13.1%	16.8%
Faster/Quicker/Time saving	45	6.3%	8.2%
Car is necessary/Disabled/Too many things to carry	45	6.3%	8.2%
Flexibility	18	2.5%	3.3%
Standing is inconvenient/Have to stand	13	1.8%	2.4%
Walking time	11	1.5%	2.0%
Dislike waiting	10	1.4%	1.8%
Comfort/Relaxing	10	1.4%	1.8%
Difficulty walking	6	0.8%	1.1%
Distance/Close proximity	6	0.8%	1.1%
Dislike buses/Transits/Crowded/ Unsafe	5	0.7%	0.9%
I want to help the environment	4	0.6%	0.7%
Weather	3	0.4%	0.5%
Like walking	3	0.4%	0.5%
Other miscellaneous responses	43	6.1%	7.8%
Total across all respondents (n=552)	710	100.0%	128.6%

4.2 TOLL CHOICE EXPERIMENTS

The choice sets for the mode choice experiments always contained the following 4 options:

- Travel on a free route during the peak-period (6:00 a.m. to 9:00 a.m. or 3:00 p.m. to 7:00 p.m.);

- Travel on a tolled route during the peak-period;

- Travel on a free route outside the peak-periods; and

- Travel on a tolled route outside the peak-periods.

The data was used to estimate nested logit discrete choice models. Two main nesting structures were tested – toll/non-toll choice within time periods, or else time-of-day choice within toll/non-toll option. The former gave the best results, as reported in Model 4: All Trips in Table 4.1. The model is based on 2,862 valid responses, including 4 responses for each of the 752 respondents minus 146 missing responses. The nesting structure is shown in Figure 4.3, with a nesting logsum parameter of about 0.4, significantly lower than 1.0.

Figure 4.3   Toll Choice SP Data Nesting Structure
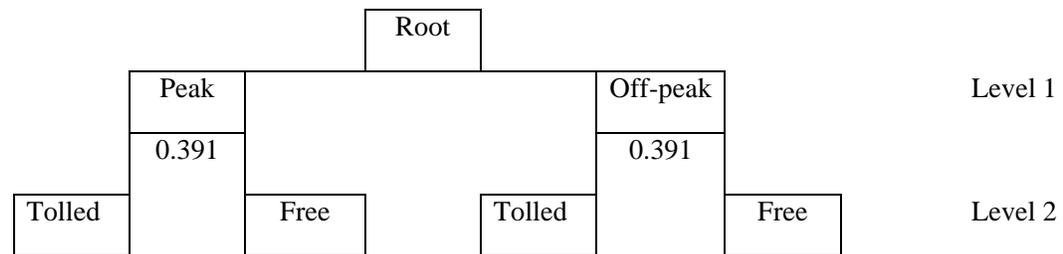
The variables in the toll SP models are defined as follows:

- **Toll cost ($)** – Base toll coefficient, without additive effects of income and occupancy;

- **Toll cost/income ($/K$)** – Toll cost divided by income – effect of toll decreases with income;

- **Toll cost * # passengers ($)** – Toll cost times number of extra passengers – effect of toll decreases with occupancy;

- **Travel time (min)** – Base time coefficient, without additive effects of occupancy and current time;

- **Travel time * # passengers (min)** – Travel time times number of passengers – effect of time increases with occupancy;

- **Travel time/actual travel time** – Travel time as fraction of current actual time – a minute saved is worth more on shorter trips;

- **Travel distance (miles)** – Base (and only) distance coefficient;

- **Fraction of times late** – Base reliability coefficient;

- **Fraction of times late squared –** Non-linear effect – marginal effect of increased risk of delay is less at high levels of risk;

- **Off-peak * actual minutes after 6:00 a.m. –** Disutility of shifting out of the AM peak, as a function of the shift that would be required to go earlier;

- **Off-peak * actual minutes before 9:00 a.m. –** Disutility of shifting out of the AM peak, as a function of the shift that would be required to go later;

- **Off-peak * actual minutes after 3:00 p.m. –** Disutility of shifting out of the PM peak, as a function of the shift that would be required to go earlier;

- **Off-peak * actual minutes before 7:00 p.m. –** Disutility of shifting out of the PM peak, as a function of the shift that would be required to go later; and

- **Off-peak * actual off-peak –** Preference of the off-peak over the peak period for those already traveling outside the peak periods.

In Model 4, the coefficients for all four design variables – toll cost, travel time, travel distance, and fraction of times late are significant with the expected negative sign. These results are presented in Table 4.6. The effect of toll cost is a combination of a linear effect and an effect of toll divided by income. This is the same effect that was found in the transit SP models, but here the income-related effect is larger. There also is an offsetting effect related to the number of additional passengers in the vehicle, but it is quite small, with each passenger only reducing the cost coefficient by about five percent (0.026/-0.535).

The coefficient for travel time also is significant, and the imputed value of time is $9.69/hour when evaluated at an income of $75,000/year and no additional passengers. The range of values as a function of income is plotted in Figure 4.4. The function shows a large drop in value of time at lower income levels, larger than a plot of the VOT for the transit SP would show. This result is consistent with the observation that paying a toll to use a faster adjacent route is more of a discretionary expenditure and may thus be more related to income than other types of daily transportation expenditures (In further analysis, it may be interesting to also try a third variable that would test for an upturn in the curve at very high income levels.).

Table 4.6 Toll/Non-Toll Models with SP Data: Segmentation by Actual Trip Purpose

Sample	Model 4 All Trips		Model 4W Work trips		Model 4N Non-work trips	
Observations	2,862		1,355		1,507	
Final log-likelihood	-3,040		-1,403.1		-1,562.9	
Rho-squared(const)	0.234		0.253		0.252	
Rho-squared(zero)	0.214		0.19		0.19	
Variable	Coeff	T-stat	Coeff	T-stat	Coeff	T-stat
Toll cost ($)	-0.535	-9.0	-0.558	-8.2	-0.579	-5.4
Toll cost/income ($/K$)	-6.940	-3.0	-4.749	-2.1	-10.600	-2.6
Toll cost * # passengers ($)	0.026	0.6	0.172	2.3	-0.024	-0.4
Travel time (min)	-0.101	-7.2	-0.112	-6.4	-0.066	-2.5
Travel time * # passengers (min)	-0.019	-1.4	0.006	0.3	-0.021	-1.2
Travel time/actual travel time	-0.376	-1.7	-0.146	-0.5	-0.785	-2.4
Travel distance (miles)	-0.093	-3.5	-0.048	-1.4	-0.131	-3.2
Fraction of times late	-8.024	-7.9	-7.870	-5.4	-8.370	-5.9
Fraction of times late squared	6.160	3.5	6.851	2.7	5.939	2.5
Off-peak * actual minutes after 6 a.m.	-0.015	-4.6	-0.022	-3.8	-0.006	-1.4
Off-peak * actual minutes before 9 a.m.	-0.036	-6.7	-0.034	-4.3	-0.033	-3.7
Off-peak * actual minutes after 3 p.m.	-0.008	-4.3	-0.025	-3.6	-0.005	-2.5
Off-peak * actual minutes before 7 p.m.	-0.006	-3.2	-0.013	-3.1	0.000	0.2
Off-peak * actual off-peak	3.071	6.3	1.672	3.1	3.497	5.5
Toll route constant	-1.056	-11.5	-0.789	-6.0	-1.152	-8.6
Toll/nontoll nest within period	0.391	7.3	0.378	4.3	0.436	6.1
Coefficient Ratios						
Value of travel time ($/hour)	$ 9.69		$ 10.80		$ 5.51	
Increase in VOT per additional passenger	21%		31%		28%	
Ratio of distance to IVT (min/mile)	0.92		0.43		1.98	
Ratio of fraction late to IVT (min/time late)	79.13		70.33		126.51	
Ratio of earlier a.m. departure to IVT (min/min)	0.15		0.19		0.09	
Ratio of later a.m. departure to IVT (min/min)	0.35		0.31		0.50	
Ratio of earlier p.m. departure to IVT (min/min)	0.08		0.22		0.07	
Ratio of later p.m. departure to IVT (min/min)	0.06		0.11		(0.01)	
Ratio of toll route constant to IVT (min)	10.41		7.05		17.41	

Figure 4.4   Imputed Value of Time Savings as a Function of Income
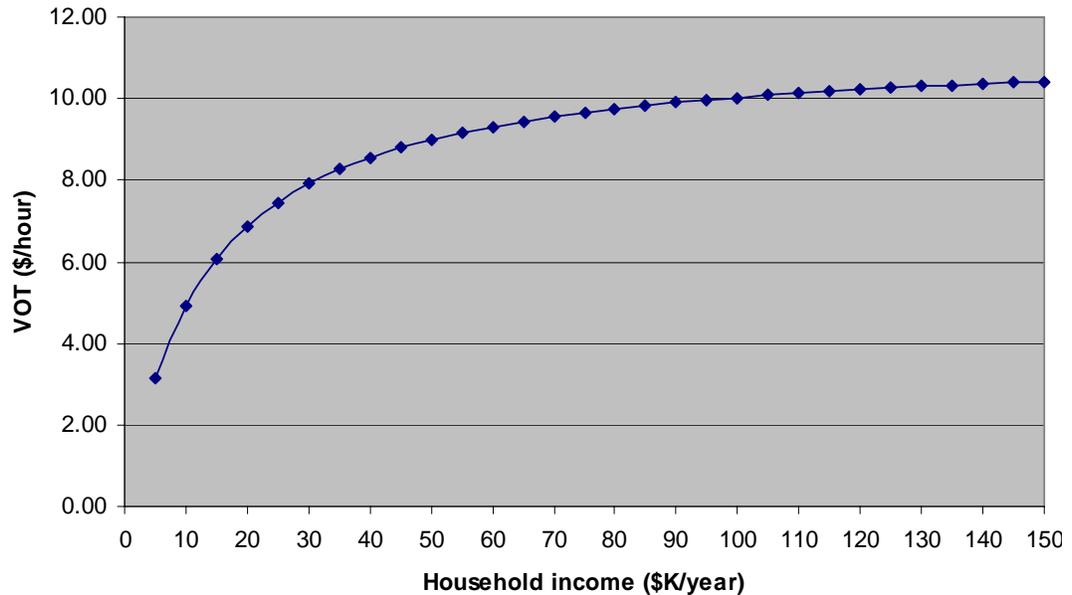
There is an additional coefficient for travel time related to the number of additional passengers in the car. In Model 4, the travel time coefficient is raised by about 20 percent (-0.019/-0.101) for each additional passenger. Combined with the cost effect per additional passenger, this gives an increase in the imputed VOT of about 21 percent per additional passenger, as shown in the table.

A third time coefficient applies to the travel time difference divided by the respondent's actual travel time for the reported trip. This is a negative coefficient, meaning that time changes are valued as more important as they are a larger fraction of the total travel time. This effect is not very large or significant, however.

The next variable is the distance traveled. This has a significant effect equivalent to almost one minute of IVT per mile. In other words, this is the same disutility that would occur in travel time if that extra mile was driven at 60 miles per hour. Looked at another way, this implies that someone would be willing to drive an extra mile out of their way for each minute of travel time saved. Since the fuel cost for a vehicle (not included explicitly in the experiment) is likely to be about 15 cents per mile, and a minute of travel time is valued at about 16 cents ($9.60/hour), this comparison seems reasonable.

Fraction of times arrived more than 15 minutes late is valued quite highly, with a disutility equivalent to 79 minutes of IVT for each time late. This result is comparable to the result obtained for the transit SP experiment of about 60 minutes. In the toll experiment in Model 4, it was possible to estimate a quadratic function of delay, with an offsetting effect at high levels of delay. The resulting function is shown in Figure 4.5. At five percent chance of being late, the value is about 4 minutes, which would translate to 80 minutes at 100 percent if the effect were linear. However, people appear to become less sensitive to each additional percent chance as reliability gets continuously worse. At 25 percent, the value is about 16 minutes, which would translate to 64 minutes per actual time late. At 50 percent, the value is 24 minutes, which would translate to 48 minutes per time late.

Figure 4.5   Effect of Reliability
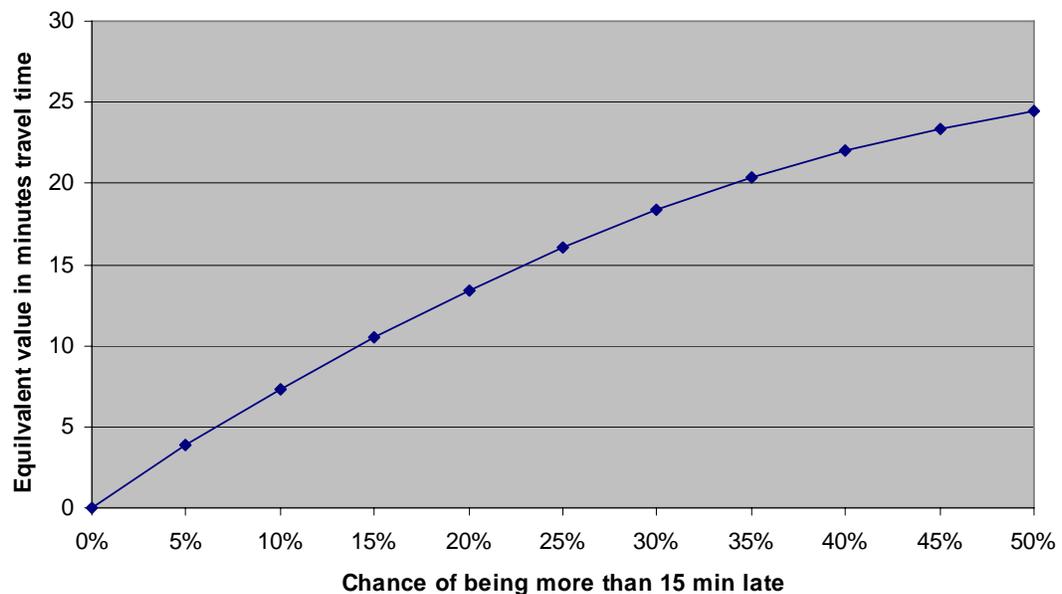
This type of function shows that what people are actually valuing is the change in the risk of being late, not just the actual times being late. As travel becomes less reliable, people must build in some slack time for being late, but once they have already done that, the risk of being delayed more often is not so onerous because the person has already accommodated being "late" into their schedule to a large extent. Of course, in actual situations it also is the length of delays and not just the frequency that is important. A more complex SP study focusing on

just reliability would be necessary to measure both frequency and duration effects at the same time.

The next variables in Table 4.6 measure the resistance for peak-period travelers to choose one of the off-peak options, estimated as a function of the time between their actual departure time and both the beginning and the end of the peak-period. In all cases, shifting departure time a minute is less onerous than adding a minute of in-vehicle time. The largest effect is for a.m. peak travelers shifting until after nine a.m., where the disutility is equal to 0.35 minutes IVT. These effects are plotted in Figure 4.6, which shows both a.m. peak functions to be steeper than the p.m. peak functions. This is presumably because the arrival time at work is very much constrained for many travelers, and getting up very much earlier in the morning is not very attractive either.

Figure 4.6   Resistance to Shifting Out of the Peak
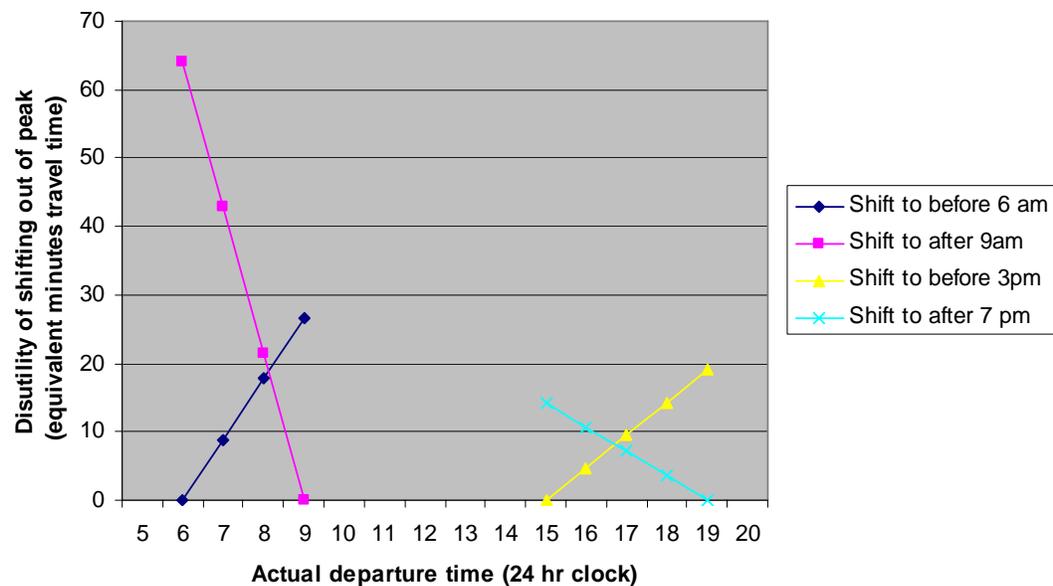
For people who actually traveled in the off-peak, a single variable was estimated for the resistance to shift into the peak, and it is equivalent to about 30 minutes of IVT. In theory, the same type of per-minute sloped functions could be estimated for shifting into the peak as were estimated for shifting out of it, but such a choice was not made very often in the data.

The final variable in Model 4, other than the nesting parameter described earlier, is the residual constant term for the toll route, measuring any residual preference

for or against the tolled options after accounting for any differences in cost, time, distance, and reliability. In most actual cases, there are not any significant differences between tolled lanes and general lanes except for these variables, other than the physical method of entering the tolled facility (separate ramps versus common ramps, etc.) and paying the toll (subscription-based transponders, per-use toll booths, etc.). None of those factors were mentioned explicitly in the experiment. In Model 4, the tolled routes have a negative constant equivalent to about 10 minutes of travel time. This is a typical result for SP-based toll choice models, and most likely represents a strategic policy bias against tolls. In other words, some respondents may reject the tolled options "on principle" regardless of the toll level. When SP-based toll models are used in forecasting, it is common practice to ignore this type of assumed response bias and assume a residual constant of 0.

Segmentation by Trip Purpose

Table 4.6 also shows results for Model 4W for trips to or from the workplace and Model 4N for all other non-work trips. Otherwise, these models have the same specification as Model 4, and the sample sizes for the two segments are roughly equal.

Relative to work trips, non-work trips show a lower average VOT ($5.50/hour versus $10.80/hour), as well as a higher effect of income on toll sensitivity. Both purposes show an increase in VOT of about 30 percent for each additional passenger, although it appears that for work trips it is mainly due to lower cost sensitivity (cost-sharing for carpools), and for non-work trips it is mainly due to greater time sensitivity (aggravation of driving with children?). The resistance to increase distance by finding a more circuitous route is much higher for non-work trips. In real situations, this might be due to less familiarity with alternative free routes, although it is not obvious that such a difference would translate to an SP exercise. The effect of delay is higher for non-work trips when comparing the ratio to IVT, but similar when comparing the actual coefficients.

In general, the resistance to shifting out of the peak-periods is much lower for non-work trips than for work trips, as one would expect. The exception is for shifting later in the a.m. peak, which is the highest for both purposes. The resistance for shifting **into** the peak is higher for non-work trips, however. The

negative strategic bias against the tolled options is stronger for the non-work trips. Perhaps commuters would expect to receive more frequent benefits from toll lanes, and so are more in favor of them in general.

Addition of the "Non-Car" Option

Following each of the 4 toll SP choice questions, the respondents were asked whether they would go by car at all if these were the only 4 options, without making explicit what other option they would choose instead (go by bus, go somewhere else, stay home, etc.). This fifth "non-car" option was included in Model 4X using the nesting structure shown in Figure 4.7. The new option is in a separate nest, with "dummy" nests below it shown in italics. The logsum parameter is very low, at 0.135, indicating that the 4 car options are much more similar to each other than they are to the non-car option.

Figure 4.7   Toll Choice SP Data Nesting Structure 2
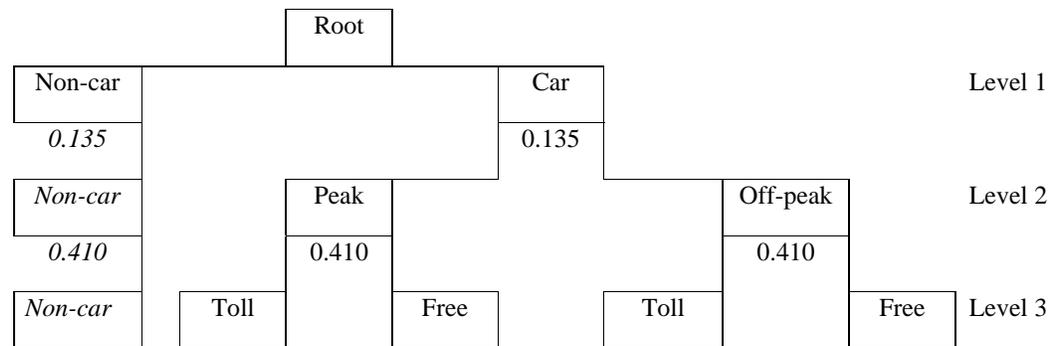
The estimation results for Models 4 and 4X are compared in Table 4.7. Most of the coefficients and ratios remain very similar to those in Model 4. The main result difference is that many of the t-statistics become somewhat lower. The disutility of not going by car at all is measured to be equivalent to about 2 hours IVT, or $20. One would expect a high value here, although it is difficult to say how high is reasonable. Overall, adding this additional option does not appear to add much statistical or explanatory power to the model.

Table 4.7   Toll/non-toll Models with SP Data: Adding the "non-car" option

Sample	All Trips Model 4		All Trips Model 4X	
Observations	2,862		2,862	
Final log-likelihood	-3,040		-3,831.5	
Rho-squared(const)	0.234		0.168	
Rho-squared(zero)	0.214		0.122	
Variable	Coeff	T-stat	Coeff	T-stat
Toll cost ($)	-0.535	-9.0	-0.534	-7.3
Toll cost/income ($/K$)	-6.940	-3.0	-8.146	-2.8
Toll cost * # passengers ($)	0.026	0.6	0.056	1.2
Travel time (min)	-0.101	-7.2	-0.107	-6.0
Travel time/actual travel time	-0.376	-1.7	-0.432	-1.6
Travel time * # passengers (min)	-0.019	-1.4	-0.006	-0.3
Travel distance (miles)	-0.093	-3.5	-0.107	-3.4
Fraction of times late	-8.024	-7.9	-7.125	-5.8
Fraction of times late squared	6.160	3.5	5.173	2.4
Off-peak * actual off-peak	3.071	6.3	3.048	5.2
Off-peak * actual minutes after 6 a.m.	-0.015	-4.6	-0.016	-3.9
Off-peak * actual minutes before 9 a.m.	-0.036	-6.7	-0.033	-5.5
Off-peak * actual minutes after 3 p.m.	-0.008	-4.3	-0.004	-2.0
Off-peak * actual minutes before 7 p.m.	-0.006	-3.2	-0.006	-2.9
Toll route constant	-1.056	-11.5	-1.004	-9.0
Not go by car constant			-13.420	-3.1
Toll/nontoll nest within period	0.391	7.3	0.410	6.1
Nest across all car options			0.135	2.9
Coefficient Ratios				
Value of travel time ($/hour)	$ 9.69		$ 9.99	
Ratio of time*passengers to IVT (min/min)	0.19		0.05	
Ration of distance to IVT (min/mile)	0.92			
Ratio of fraction late to IVT (min/time late)	79.13		66.59	
Ratio of earlier a.m. departure to IVT (min/min)	0.15		0.15	
Ratio of later a.m. departure to IVT (min/min)	0.35		0.31	
Ratio of earlier p.m. departure to IVT (min/min)	0.08		0.04	
Ratio of later p.m. departure to IVT (min/min)	0.06		0.06	
Ratio of toll route constant to IVT (min)	10.41		9.38	
Ratio of not go by car constant to IVT (min)	-		125.42	

Following the toll SP questions, respondents were asked to complete an open-ended question stating the most important factor or factors in making their route choices. The responses were classified by MORPACE, and are tabulated in Table 4.8 below. On average, each respondent provided 1.547 responses, so the right-hand column adds to 154.7 percent.

Table 4.8   Self-Reported Most Important Toll Choice Factor(S)

Response Category	Number	Percent of responses	Percent of respondents
Cost/Free	353	30.4%	46.9%
Travel time/Quickest/Time saved	314	27.0%	41.8%
Reliability of arrival/Frequency of being late	198	17.0%	26.3%
Short travel distance/Distance	49	4.2%	6.5%
Ease of movement/Traffic avoidance/Delays	44	3.8%	5.9%
Time-of-day for travel	41	3.5%	5.5%
Convenience/Availability	33	2.8%	4.4%
Avoid toll roads	27	2.3%	3.6%
Does not apply, no toll roads	15	1.3%	2.0%
Flexibility	6	0.5%	0.8%
Only option	4	0.3%	0.5%
Other miscellaneous responses	79	6.8%	10.5%
Total across all respondents (n=752)	1,163	100.0%	154.7%

As one might expect, cost and time are the two most popular, both mentioned by over 40 percent. In fact, further analysis showed that about 21 percent of respondents mentioned **both** of them. Reliability also was common, mentioned by 26 percent. Distance, delays, and time-of-day were mentioned by about six percent each. It is reassuring that few people mentioned any other factors besides the four that were included in the choice experiment.

5.0 Analysis of the Vehicle-Based GPS Data to Investigate Diary Non-Response

This chapter describes the method and results for using the data from the vehicle-based GPS survey and the corresponding activity/travel diary to investigate the frequency and characteristics of missing vehicle trips in the diary data. This includes a discussion of survey non-response issues and correction, a descriptive analysis of the data, results of a binary logit model of diary vehicle trip response rate, and a description of how the logit model is then used to calculate trip-specific correction factors for use with the diary trip data.

5.1 DISCUSSION OF DIARY NON-RESPONSE AND CORRECTION FACTORS

There are several possible types of non-response error and bias that can occur for household travel surveys:

1. Certain types of households are more difficult to contact than others;

2. Certain types of households are more likely to refuse to participate;

3. Certain types of households are less likely to complete the survey after agreeing to participate; and

4. Certain types of persons/households are less likely to answer certain (types of) questions.

The first three types of bias above influence the overall household response rate, and they have already been corrected to the extent possible using iterative proportional fitting to match a number of census-based population targets for the region (see X).

The last type of non-response – often called "item non-response" – can be more problematic. Item non-response is most typically encountered for sensitive information such as household income. In such cases, there are often ways of

imputing values such that the data can still be used in analysis. (Note that in this survey, income data is missing for only about 5 percent of households, which is a lower percentage than typically found in household survey data.)

The most problematic type of item non-response in household travel diary data is that of missing trips. People may neglect to report trips that they have made for any number of reasons. Some reasons that are often suspected include:

- The person made a very short trip, and did not think it was important enough to report.

- The trip left home and returned back home without stopping at any destination for more than a minute or two.

- The person neglected to report a short stop that was made as part of a longer tour – e.g., a stop on the way to work to buy a cup of coffee.

- The person got tired of filling in the diary and/or reporting the trips, so did not report some trips later in the day, and reported fewer trips on the second diary day than on the first.

- A person's trips were reported by proxy by another household member who did not know about certain trips.

In typical household surveys, there is no straightforward way of correcting for such missing data because we do not have data regarding the trips that are missing. The best that can typically done is to estimate trip frequency models, apply them, and compare the generated auto and transit trip volumes to those observed in screenline counts and on-board surveys. This is a very approximate method of correction, however, because inaccuracies in the trip distribution model, the mode choice model, or in the observed count data also can cause mismatches between predicted and observed trip volumes.

For the PSRC survey, GPS units were placed in all household vehicles for a sub-sample of approximately 220 car-owning households, tracking time and space coordinates for the same days that the household members completed the travel diaries. This means that, in addition to the other uses of GPS data to monitor traffic speeds and route choice decisions, we also can use it identify auto trips that were made by household vehicles during the diary days but not reported in the travel diaries. Several such analyses have been done in the past, and the

percentage of GPS vehicle trips that could not be matched in the diary data has ranged from a high of about 40 percent to a low of about 10 percent, with typical values around 20 percent. Since we only put GPS units in vehicles, we cannot match up any trips not made by vehicles (like transit or walk or bike trips).

If we know the percent of missing auto trips, we have an estimate of what adjustment factor is needed to get a more accurate representation of the number of actual trips. For example, if it is found that only 80 percent of the GPS auto trips are present in the diary data, then weighting each auto trip by 1 / 0.8 = 1.25 would be appropriate. We also know, however, that certain types of trips are more likely to be under-reported, and certain types of households are more likely to under-report trips. So, a more accurate adjustment approach also takes into account household characteristics and trip characteristics in deriving an adjustment factor for each auto trip. The analysis reported in the next three sections is designed to provide the most accurate adjustment procedure possible.

5.2　DESCRIPTIVE ANALYSIS

In this section, we provide some descriptive results of the match between the auto trips in the GPS data base and the auto trips reported by the same households in the travel diaries. First, some summary statistics are provided in Table 5.1.　GPS data was collected from 225 households.　Some of those households did not provide complete diary data, however.　When those households are excluded, there are 179 households remaining with both acceptably complete diary data for all household members and complete GPS data for all household vehicles. Each of the 179 households had 1, 2, or 3 vehicles outfitted with GPS units, and there were 269 vehicles in those households, an average of 1.50 vehicles per household. There are 485 vehicle-days in the GPS data with 1 or more trips, an average of 1.8 days per vehicle. The maximum number would be 2.0 days per vehicle – both diary days, meaning that the GPS-equipped vehicles were used for at least one trip on 90 percent of the possible days.

Table 5.1 Summary Statistics

Households with complete GPS data	225	
Households with both complete GPS and diary data	179	
Vehicles in those households with complete GPS data	269	1.50 vehicles/household
Vehicle-days with 1+ GPS trips	485	1.80 days/vehicle
GPS trips for those vehicle-days in total	2,357	4.86 trips/vehicle-day
GPS trips for those vehicle days with matching diary trips	1,938	4.00 trips/vehicle-day
Imputed missing diary vehicle trips	419	17.8% of GPS trips

The methodology used to form trips from the GPS data and to match those trips with diary trips from the corresponding households is described in a technical memo by EcoNorthwest, provided in Appendix G. The method used was fairly sophisticated, and allowed multiple GPS trips to be matched to a single diary trip and vice-versa. Trips were matched both algorithmically and manually, and a visual double-check of the unmatched trip records indicated that there was no obvious way to improve the match rate. The results of the matching show that out of 2,357 GPS trips (4.86 trips per vehicle-day), matching diary trips were found for 1,938 (4.00 trips per vehicle day). This implies that 419 of the GPS trips are missing in the diary data, an item non-response rate of 17.8 percent. This rate is fairly typical compared to past studies. Because matching GPS and diary trips is an inexact science/art with no standard rules, it is not possible to say whether the different match rates found across studies is due more to differences in data quality or in the methods for matching the trips.

Table 5.2 orders the households by the number of GPS trips in their vehicles in the rows, and the number of those trips that are missing in the diary data in the columns. There are two important things to observe in the table. First, about 44 percent of households (79 out of 179) have a perfect match between diary and GPS trips for all HH vehicles across the two diary days. Only about 22 percent (41 out of 179) are missing 4 or more trips in the diary data. As one would expect, the number of missing trips is higher as the number of vehicle trips the household makes increases.

When analyzing and correcting for missing trips in diary data using GPS data, it is important to first consider what information is available in both data sets. A summary is provided in Table 5.3. GPS trip records are very accurate, but

contain only a few types of data; namely household ID, vehicle ID, trip start and end location coordinates, and trip start and end times, to the nearest second. (More detailed GPS traces also can indicate the route used, speed, and acceleration, but that type of data was not used for this analysis.) Two important items that are **not** available in the GPS data are the identity of the occupants of the vehicle and the activity purposes at trip ends. The trip diary data, on the other hand, has all of the items in Table 5.3, but the time and location data are liable to be less accurate than in the GPS data. This is particularly true for trip departure and arrival times, where rounding errors of 10 or 15 minutes are common, meaning that the standard error in self-reported travel times is likely to be as large as or larger than the mean. The most reliable use for self-reported departure and arrival times is to determine the general time of day in which a trip takes place. Otherwise, the geocoded coordinates are likely to be a more accurate indicator of trip length in the diary data.

Table 5.2 Number of Missing Diary Trips by Number of HH GPS Trips

HH GPS trips	None missing	1 missing	2 missing	3 missing	4+ missing	Total
2	3					3
3	4					4
4	6	1				7
5	5	2	1		2	10
6	7	3	1		2	13
7	6	3		1	1	11
8	2	2	1			5
9	8	3			2	13
10	6	2	1		3	12
11	4	1	2	1	3	11
12	4			1	2	7
13	2	3		3		8
14	3	2		2	2	9
15	1	1	2	1	2	7
16	3		1	1		5
17	3		1	1	3	8
18	4		2	2		8
19	1					1
20	4	1	2			7
21	2		1		4	7
22				1	1	2
23			1		1	2
24	1	1			3	5
25				1		1
26			1			1
27					2	2
28			1		2	3
29				1	2	3
34					3	3
35					1	1
Total	79	25	18	16	41	179

Table 5.3   Information Available in GPS and Diary Trip Data

Data Item	GPS Data	Diary Data
Household ID and Characteristics	Yes	Yes
Vehicle ID and characteristics	Yes	Yes
Trip end location coordinates	Yes	Yes, to geocoding accuracy
Trip end times	Yes	Yes, but large rounding errors
Person ID and characteristics	No	Yes
Vehicle occupants	No	Yes
Activity purposes	No	Yes

So, the information available in both data sets to analyze and adjust non-response rates includes:

- Household characteristics;

- Vehicle characteristics;

- Trip distance (based on XY coordinates);

- Trip end proximity to home (based on XY coordinates); and

- Trip departure time of day (to the nearest hour or so).

Figure 5.1 indicates that there is virtually no difference in the percent of GPS trips matched in the diaries across car ownership levels. Thus, auto ownership is not likely to be an important variable to explain non-response rates.

Figure 5.1   Percent of GPS Trips in Diaries by HH Car Ownership
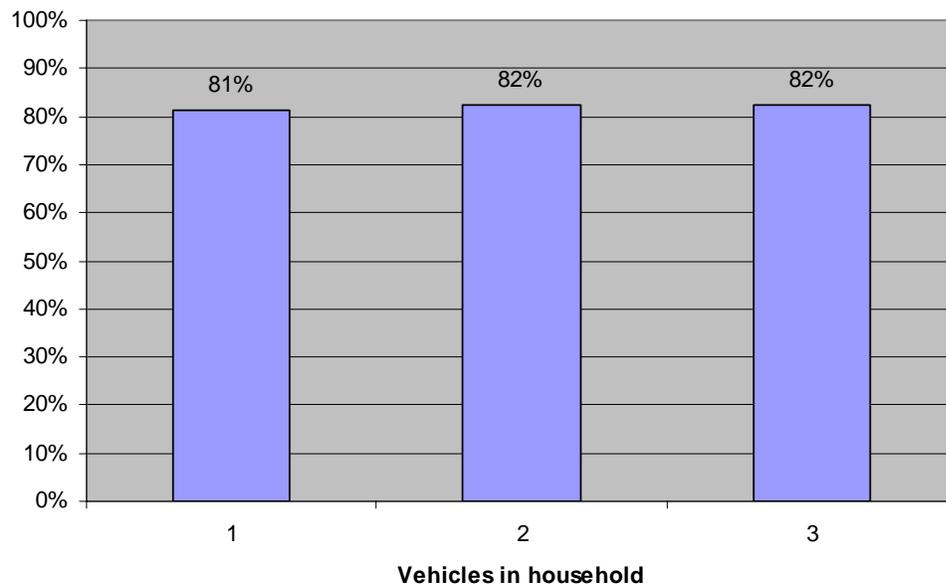
Figure 5.2 does show some variation in match rate by household size, with two person households showing a significantly lower rate than other size classes.

Figure 5.2   Percent of GPS Trips in Diaries by HH Size
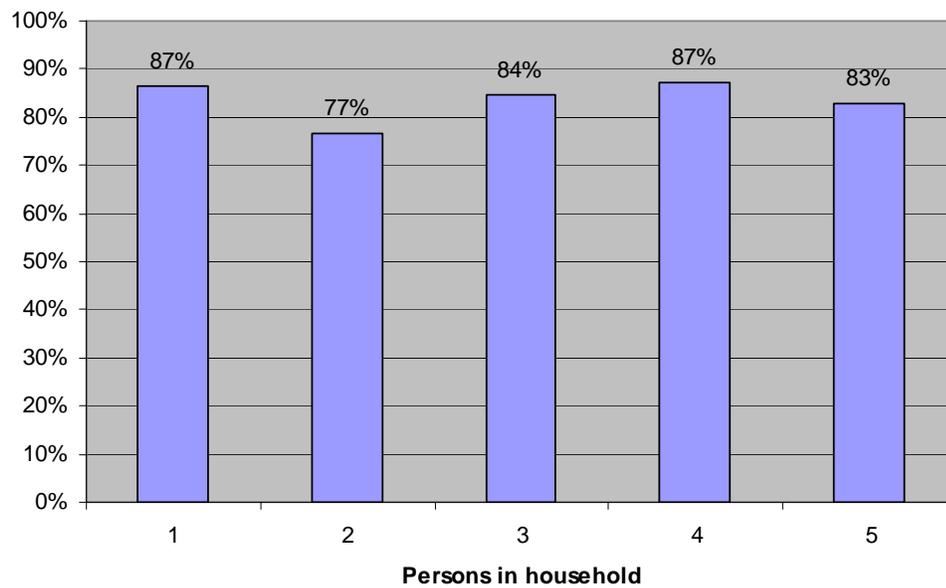
Possible reasons for the difference by household size may be explained by looking at different household lifecycle groups.   In Figure 5.3, we see that households with children tend to have higher match rates. One possible reason for this is that those households are more likely to have shared ride vehicle trips

as opposed to drive alone trips, and the more household members' diaries that should contain a given auto trip, the less chance that the trip will be missing from all of those diaries. Single adults under age 35 have a low match rate, but there are only one or two such households in the GPS sample. Two-plus adult households with no children have the lowest match rates, particularly older households. This may be due somewhat to the greater likelihood of proxy reporting for a second adult.

Figure 5.3   Percent of GPS Trips in Diaries by HH Lifecycle
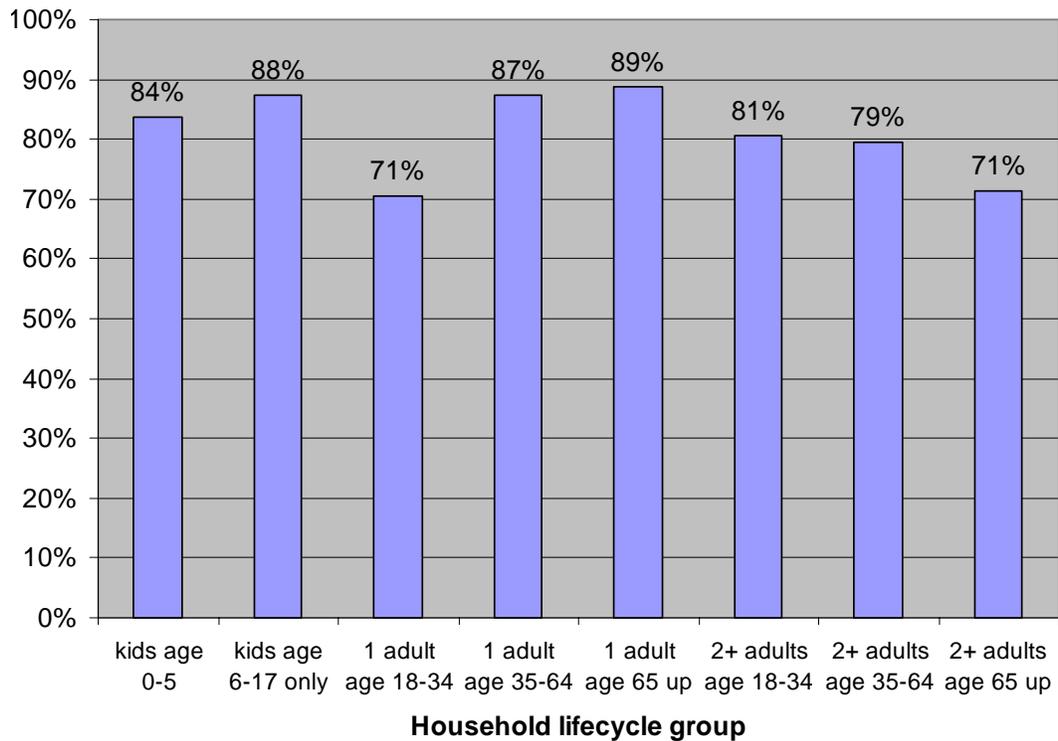
Figure 5.4 does not show a smooth trend in match rates by household income group, although in general those groups with incomes less than $40,000 tend to have the lowest match rates, and those with incomes above $80,000 tend to have somewhat higher rates.

Figure 5.4   Percent of GPS Trips in Diaries by HH Income
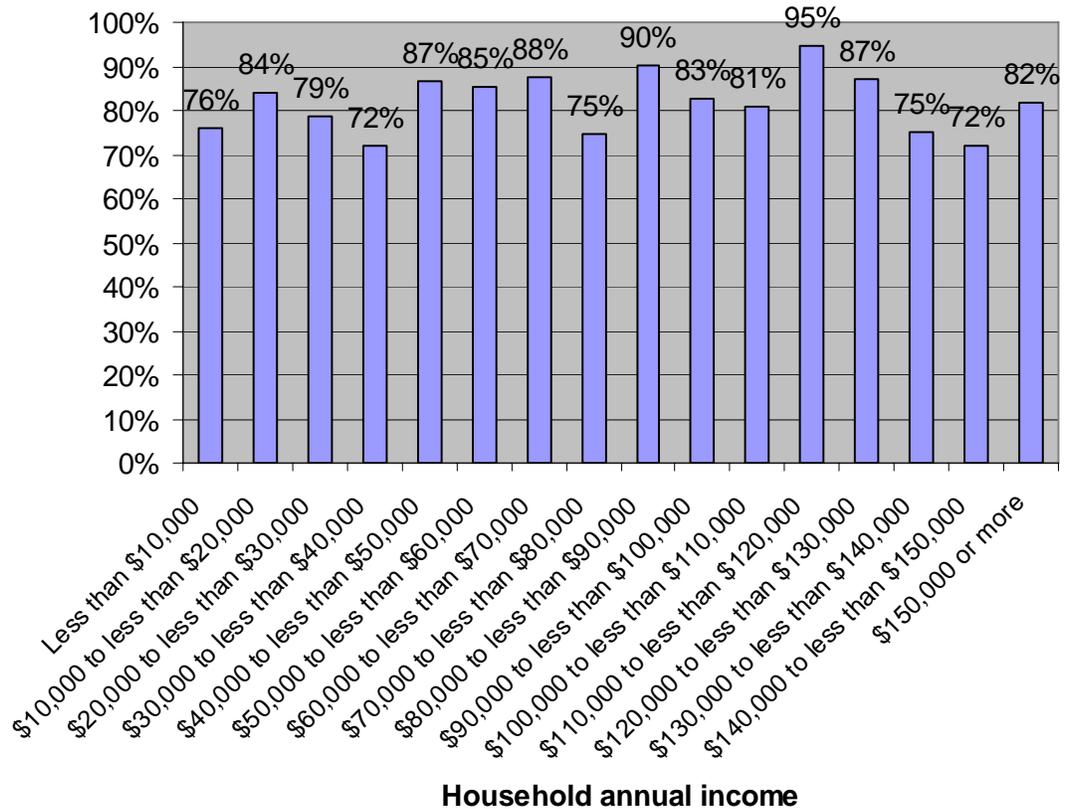
Figure 5.5 shows some differences in match rates according to the area of residence, with City of Seattle and Pierce County residents having the highest ones. The reasons for such differences are not obvious, though it could be the case that those in more urban areas have more mode options and thus realize that even short trips are important for planning, while more suburban residents may think that only longer trips that use the main roads are important.

Figure 5.5   Percent of GPS Trips in Diaries by Area of Residence
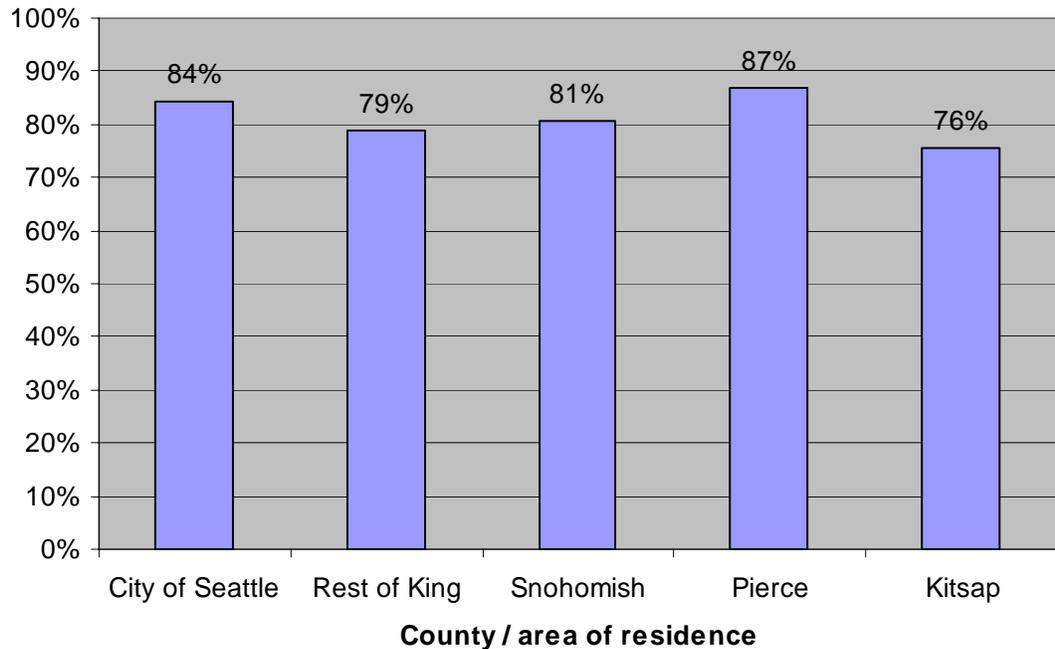
The method of data retrieval also may be important. Because we do not know the exact person in the car for the GPS trips, Figure 5.6 splits the household in terms of whether or not one or more adults in the household have proxy diary responses over the phone, and whether or not most or all of the household's diaries were returned by mail. (It is not possible to tell if any diaries returned by mail also were filled in by proxy.) Households where one or more adults' trips were reported over the phone by proxy have significantly lower match rates than phone retrieval households with no proxies. Most GPS households returned their diaries by mail, compared to non-GPS households who used the mail option much less often. (Perhaps they tended to send their diaries back with the GPS unit.) Mail retrieval shows a lower match rate than phone retrieval with no proxy reporting, but higher than phone retrieval with proxies.

Figure 5.6   Percent of GPS Trips in Diaries by Data Retrieval Type
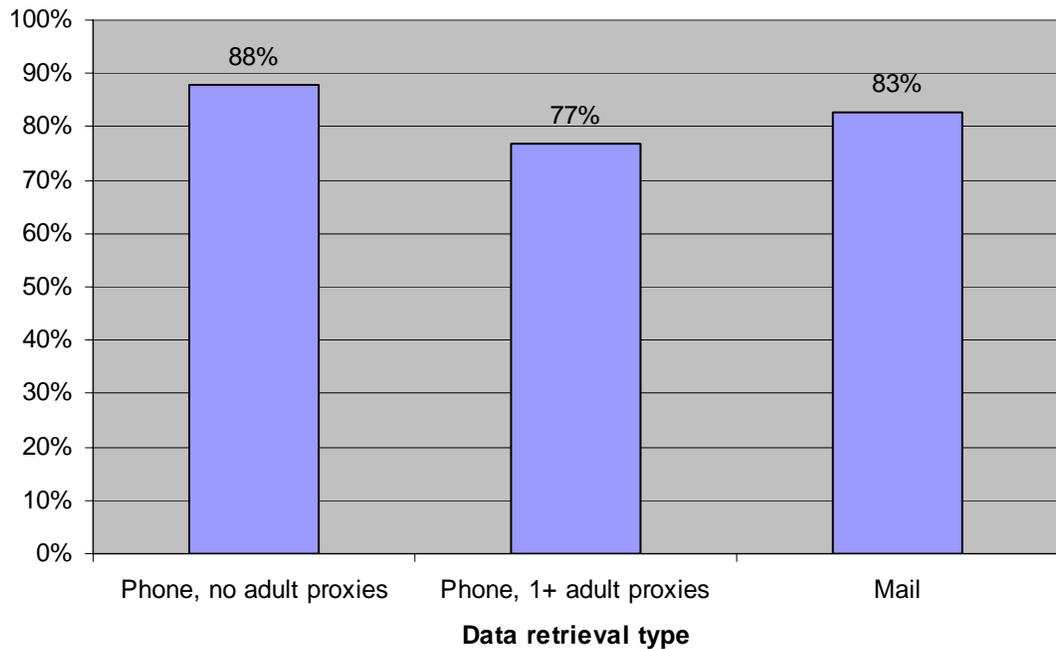
Figure 5.7 clearly shows a fatigue effect, with fewer of the GPS trips reported in the diaries on the second travel day relative to the first travel day.

Figure 5.7   Percent of GPS Trips in Diaries by Diary Day
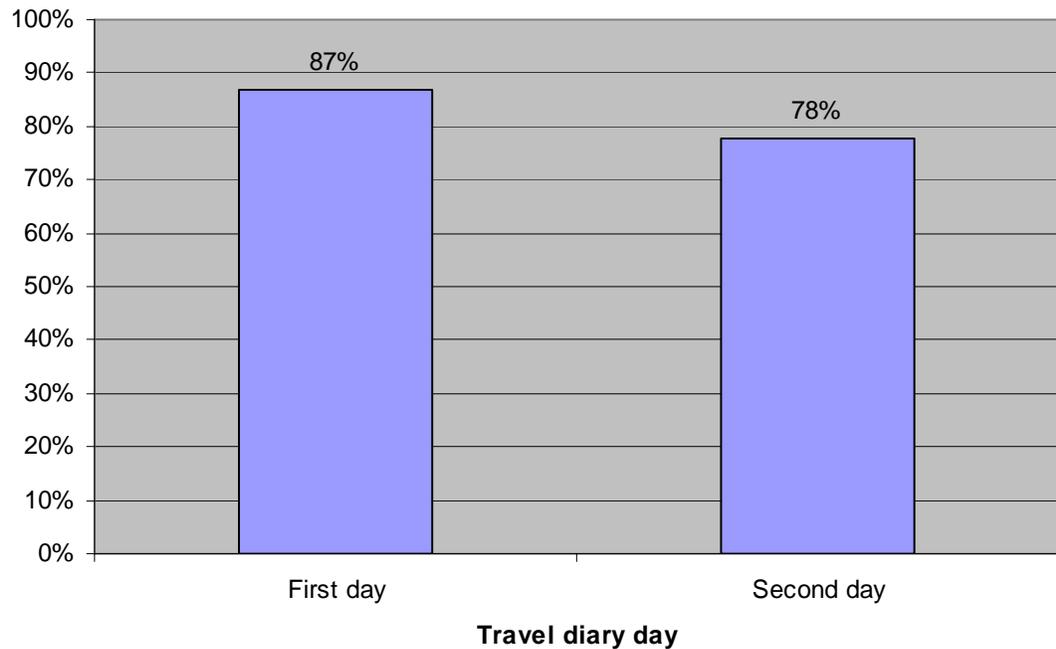
In Figure 5.8, a fatigue effect also appears to occur during the day, with a continuous drop in match rate for GPS trips after 19:00 (seven p.m.). There also are some low rates during the mid morning, but that effect does not seem as consistent as during the evening.

Figure 5.8   Percent of GPS Trips in Diaries by Hour of the Day

Departure hour (24 hour clock)
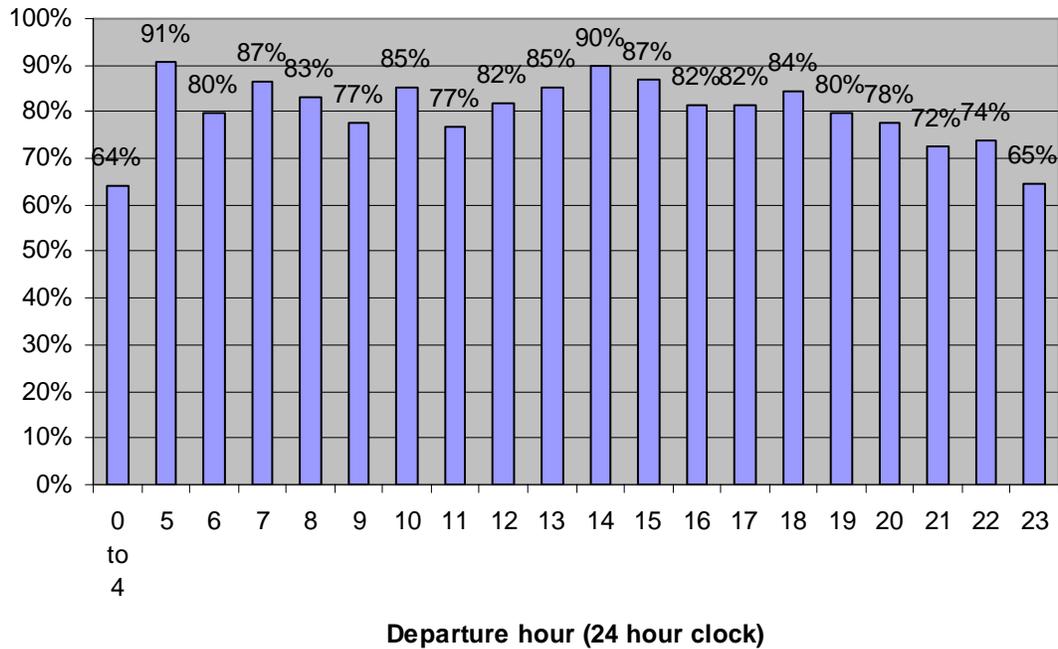
It was possible in both the GPS and diary data sets to locate trip end coordinates near home, as presented in Figure 5.9. Since a vehicle can be parked in a street or parking lot near home, a tolerance of 300 feet was used around the home XY coordinates. Non-home-based trips have a lower match rate than trips that begin and end at home. Also, there are a small number of trips that both begin and end near home, such as someone moving the car to a different parking space, or just driving around with stopping anywhere for enough length of time to qualify as a trip end. Only about half of those home-home trips were reported in the travel diaries.

Figure 5.9   Percent of GPS Trips in Diaries by Trip End Type
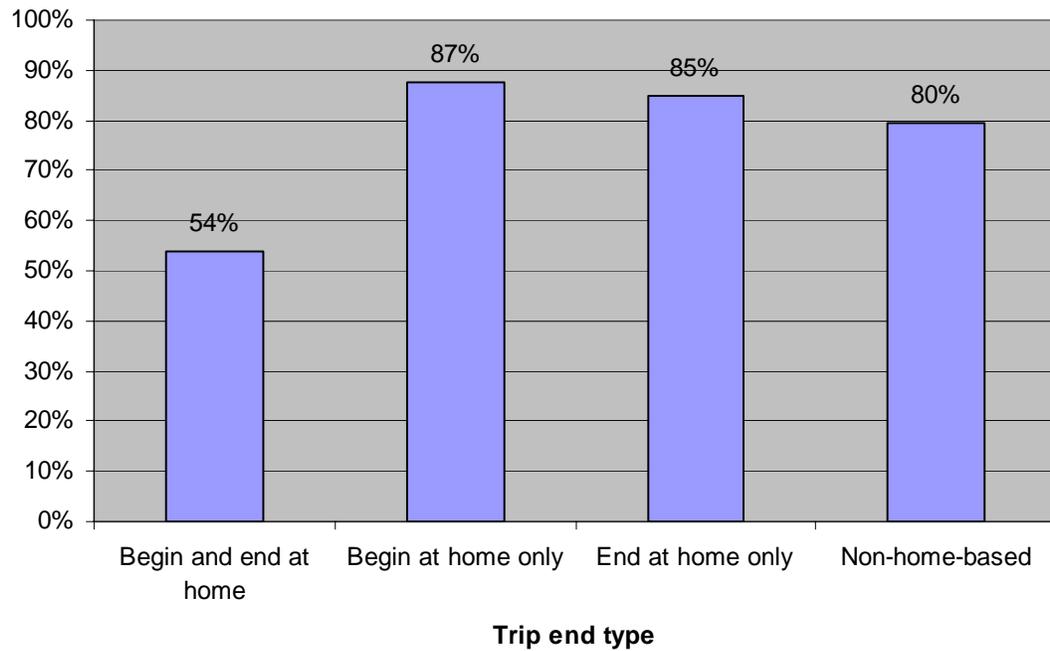
Figure 5.10 shows match rates by trip distance class. The distance was calculated as the crow-fly distance between the trip ends, based on the GPS XY coordinates. Short trips of less than one-half mile have the lowest match rate by far. Over one mile, the match rate increases slightly with distance.

Figure 5.10 Percent of GPS Trips in Diaries by Trip Distance Class
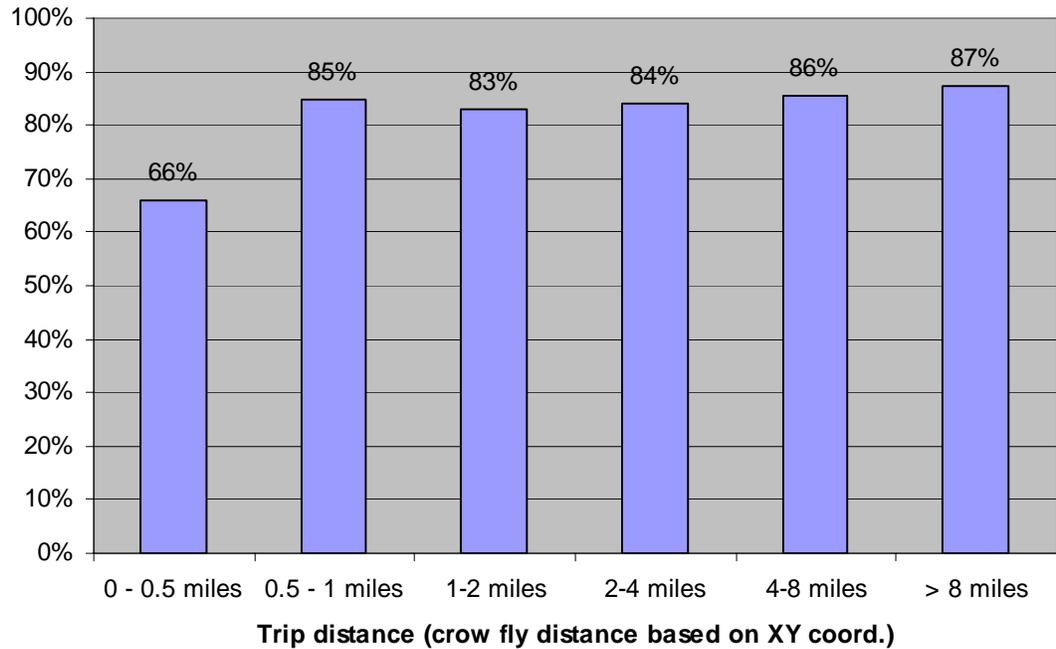
Figure 5.11 shows the same data in a different format, this time comparing the distance distribution of the matched versus the unmatched GPS trips. Only about 10 percent of the matched GPS trips are very short ones (less than ½ mile), while over 25 percent of the unmatched trips are very short. This further confirms that very short trips are the most likely to be underreported in the diaries.

Figure 5.11 Distance Distribution for Matched and Unmatched GPS Trips
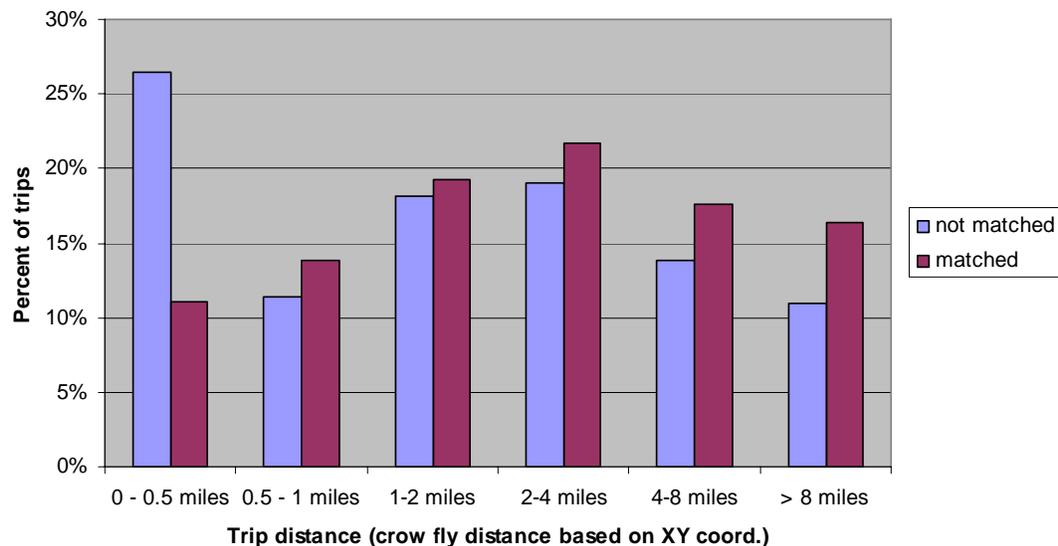
5.3 BINARY LOGIT ANALYSIS

In this section, we shift the analysis from looking at one variable at a time to a multivariate approach. A binary logit model was estimated, where the probability of finding a match for a GPS trip is represented as:

$P = \exp(U) / [1 + \exp(U)]$, where U is a linear utility function   (1)

After various specification tests, the best model that was obtained is that shown in Table 5.4. All the variables in the model are statistically significant with t-statistics greater than two. All of the variables are 0/1 dummy variables with the exceptions of the proxy and mail back response variables, which are specified as the fraction of household adults age 16+ responding in those respective manners, and the distance variable, which is specified as the natural logarithm of the GPS crow fly distance in miles – with any distance less than 0.01 miles set to 0.01 to avoid extreme values. The third column in Table 5.4 shows the average value of each variable in the estimation sample. For example, an average of 0.14 for the "1 person household" dummy variable indicates that 14 percent of the GPS trips are from one person households. The last column to the right shows the effect on the predicted matching probability of changing the value of the variable from 0 to 1, with all other variables held constant at their sample average values.

Overall, there are no surprises in the model, and all of the individual categories that showed higher or lower match rates in Figures 5.1 through 5.10 are included in the model. It also was tested whether the fatigue affects are interactive (i.e., whether the lower match rate in the evenings is even more pronounced on diary day 2). No such effect was found, meaning the fatigue effects by diary day and time of day are additive.

Table 5.4   Logit Model Results of the Probability of Matching GPS Trips

Variable	Coefficient	T-statistic	Sample average	Effect on prob-ability
Constant – trip matched	2.039	-6.68	1.00	
One person household	0.943	-4.68	0.14	8.5%
Children per vehicle in household	0.744	-5.59	0.42	8.3%
Household income $0-30K	-0.808	3.87	0.11	-11.6%
Household income $30-50K	-0.573	3.49	0.18	-7.5%
Household income $50-80K	-0.348	2.38	0.25	-4.3%
Resident of City of Seattle	0.526	-3.86	0.31	5.6%
Resident of Pierce County	0.637	-3.77	0.21	6.4%
Fraction of HH adults w/ proxy response	-2.008	3.67	0.20	-14.4%
Fraction of HH adults w/ mail back response	-0.787	2.92	0.38	-8.0%
Trip is on diary day 2	-0.727	6.15	0.50	-8.4%
Trip begins between 7 p.m. and 9 p.m.	-0.508	2.61	0.09	-6.8%
Trip begins between 9 p.m. and midnight	-0.791	3.21	0.05	-11.7%
Trip begins at home	0.608	-4.05	0.31	6.5%
Trip ends at home	0.558	-3.74	0.31	6.0%
Trip both begins and ends at home	-1.317	3.76	0.04	-22.5%
LN(maximum of crow fly distance,.01 miles)	0.268	-6.33	0.66	12.2%

5.4 CALCULATION OF TRIP ADJUSTMENT WEIGHTS

One use of the model in Section 4 is to calculate correction weights for the vehicle trips in the diary data. This was done as follows:

- Calculate all of the variables used in the binary logit model for each vehicle trip in the diary data.

- Apply the binary logit model to calculate the utility U and probability P for each trip, as shown in Equation (1)

- Calculate the adjustment weight for the trip, which is the inverse of the match probability P, or [1 + exp(U)] / exp(U). (Note: Using this procedure, the adjustment weight was capped at 5.0 to avoid extreme values. This cap only affected a handful of trips.)

The resulting weight can then be multiplied by the household-specific expansion weight in order to get a vehicle-trip-specific expansion weight. The tables below show some results of applying such a weight.

In Table 5.5, we can see that the expanded vehicle trips before adjustment are biased towards diary day 1, with 10.5 million trips on the first day and 9.4 million on the second. After adjustment, there are about 12.6 million trips on

both days. The adjustment gives a 20 percent increase in Day 1 vehicle-trips, and a 35 percent increase in Day 2 vehicle-trips, for a 27 percent increase overall. Using the crow-fly straight line distance as an indicator of trip length, the adjustment increases the overall vehicle-miles by 20 percent, from 99.7 million to 119.5 million. The increase in distance is less than the increase in trips because shorter trips are more likely to be underreported, and thus the adjustment factors are larger for short trips. The average trip distance goes down by six percent, from 5.03 miles to 4.74 miles. (Note that the average distances would be longer if network distances were used instead of straight line distances, but the trend would still be in the same direction)

Table 5.5   Summary of Adjusted and Unadjusted Expanded Vehicle Trips

	Unadjusted Trips	Unadjusted Percent	Adjusted Trips	Adjusted Percent	Ratio of adjusted to unadjusted Trips
Day 1 vehicle-trips	10,463,943	52.7	12,605,394	50.0	1.20
Day 2 vehicle-trips	9,380,970	47.3	12,628,778	50.0	1.35
Total vehicle-trips	19,844,913	100.0	25,234,171	100.0	1.27
Total vehicle-miles	99,736,962		119,539,439		1.20
Average crow-fly distance (miles)	5.03		4.74		0.94

The adjustment also tends to increase evening trips more than trips in the other periods. Table 5.6 shows an increase of 40 percent to 50 percent for most of the evening periods after 7 p.m., while the increase is less than 25 percent for most other periods.

Table 5.6   Adjusted and Unadjusted Expanded Vehicle Trips by
             Departure Hour

Departure Hour	Unadjusted Trips	Unadjusted Percent	Adjusted Trips	Adjusted Percent	Ratio of adjusted to unadjusted Trips
0-1	60,404	0.3	74,440	0.3	1.23
1-2	17,555	0.1	21,097	0.1	1.20
2-3	22,241	0.1	29,290	0.1	1.32
3-4	33,315	0.2	40,289	0.2	1.21
4-5	96,276	0.5	115,326	0.5	1.20
5-6	336,465	1.7	391,479	1.6	1.16
6-7	806,358	4.1	974,131	3.9	1.21
7-8	1,449,006	7.3	1,771,967	7.0	1.22
8-9	1,357,662	6.8	1,654,679	6.6	1.22
9-10	954,580	4.8	1,181,199	4.7	1.24
10-11	960,326	4.8	1,204,179	4.8	1.25
11-12	1,098,177	5.5	1,391,575	5.5	1.27
12-13	1,138,145	5.7	1,444,532	5.7	1.27
13-14	1,057,999	5.3	1,373,006	5.4	1.30
14-15	1,343,159	6.8	1,703,051	6.7	1.27
15-16	1,697,561	8.6	2,125,266	8.4	1.25
16-17	1,696,395	8.5	2,112,449	8.4	1.25
17-18	1,822,697	9.2	2,259,696	9.0	1.24
18-19	1,376,759	6.9	1,696,165	6.7	1.23
19-20	966,188	4.9	1,413,479	5.6	1.46
20-21	757,620	3.8	1,056,863	4.2	1.39
21-22	467,441	2.4	702,745	2.8	1.50
22-23	231,026	1.2	355,279	1.4	1.54
23-24	97,559	0.5	141,990	0.6	1.46
Total	19,844,913	100.0	25,234,171	100.0	1.27

Table 5.7 shows that non-home-based trips are increased more than home-based trips, with an increase of 37 percent versus about 20 percent for home-based trips. "Loop trips" that both begin and end at home are increased by 200 percent, but still make up less than 1 percent of all trips.

Table 5.7   Adjusted and Unadjusted Expanded Vehicle Trips by Trip End
             Type

	Unadjusted Trips	Unadjusted Percent	Adjusted Trips	Adjusted Percent	Ratio of Adjusted to Unadjusted Trips
Begin at home	6,968,274	35.1	8,358,969	33.1	1.20
End at home	6,854,672	34.5	8,503,789	33.7	1.24
Begin and end at home	70,186	0.4	213,034	0.8	3.04
Non-home-based	5,951,780	30.0	8,158,380	32.3	1.37

Table 5.8 shows the same trips as in Table 5.7, but this time in terms of miles (straight line distance). Although the number of non-home-based and loop trips increases the most, these also tend to be shorter trips. Thus, the average length for non-home-based trips goes down by eight percent versus four percent for home-based trips. The "loop trips" tend to be very short, with average trip distance going down even further from 0.15 miles to 0.10 miles. It is not clear how good a substitute walking or biking might be for most of these very short trips. It may be worth finding some such GPS trips that **are** matched in the diaries, and examining their characteristics in terms of activities and persons participating.

Table 5.8   Adjusted and Unadjusted Expanded Vehicle Miles by Trip End
             Type

	Unadjusted Miles	Unadjusted Miles/Trip	Adjusted Miles	Adjusted Miles/ Trip	Ratio of Adjusted to Unadjusted Average Distance
Begin at home	37,072,298	5.32	42,872,665	5.13	0.96
End at home	35,106,129	5.12	41,876,186	4.92	0.96
Begin and end at home	10,596	0.15	21,107	0.10	0.66
Non-home-based	27,547,939	4.63	34,769,481	4.26	0.92

Use of the Adjustment Factors

Some possible uses of the adjustment factors are:

- To provide adjusted trip-specific expansion factors for descriptive analyses;

- To provide adjusted trip rates for trip-based trip generation models;

- To provide adjusted trip rates and distance distributions for trip-based distribution models; and

- To provide more accurate calibration targets for both trip-based and tour-based/activity-based models.

Finally, a few caveats on the use of these factors:

- We cannot derive corresponding factors for the underreporting of walk trips and transit trips. Thus, it is not advisable to use the auto trip factors directly in mode choice model estimation, though there may be ways to use them in calibration.

- The adjustment factors are trip-based, so they cannot be used directly in estimating tour-based and full day activity pattern-based models. Nevertheless, the factors may be of use in deriving more accurate calibration targets for adjustment of activity-based models.

Possible Further Research

One type of analysis that was not carried out is to look in detail at the cases where a single GPS trip was found to match a series of two or more diary trips or vice-versa. Such an analysis could give further insight into the types of intermediate stops on tours that tend to be underreported. In a case where two or more adjoining GPS trips are matched by a single, longer diary trip, there are two main possibilities:

- The person did not report an actual intermediate stop in the diary; and

- What was interpreted to be a trip end in the GPS data was not an actual activity stop, but was, for example, a long stop at a traffic signal or delay.

If the first possibility is true, the adjusted diary data may still give an accurate estimate of VMT, but may be lacking behavioral information about stops made along the route. If the data is to be used for activity-based modeling, some further investigation along these lines may be worthwhile.

A. Survey Methods

APPENDIX A

SURVEY METHODS

Background

Travel surveys conducted in the 1950's and 1960's were very large and expensive projects, perhaps involving five percent of all households, and probably using a home interview to collect the information on daily travel. These large samples were used to prepare zone-to-zone trip tables. In the 1980's the trend was toward smaller samples, usually less than 1 percent of all households, and using either a mail-out/mail-back, or mail-out/telephone-back method for data collection. The goal became to collect travel data to calibrate trip generation, trip distribution, and mode choice, rather than attempting to establish accurate zone-to-zone trip tables

The Puget Sound Regional Council (PSRC) followed that trend, and used Michael E. Smith's approach for "Small-Sample Home Interview Travel Surveys," in designing the first of six surveys. The survey in Kitsap County would assist in two ways: (l) it would be the first time a household travel survey had been conducted in Kitsap County, and (2) it would serve as a test for the household travel surveys to be conducted in the remaining three counties.

Approximately 4,500 households or about .5 percent of all households in the Puget Sound region were surveyed between 1985 and 1988. Six separate surveys were conducted, three in King County conducted jointly with the Municipality of Metropolitan Seattle (Metro), and one each in Kitsap, Pierce and Snohomish counties.

The 2006 PSRC Household Activity and Travel Survey was undertaken to obtain information on region wide household activities and the travel these activities generate. PSRC will use the data to update, develop, and calibrate statewide and urban travel demand models. The primary use of the models is to estimate future travel demand and travel patterns. Other uses include air quality conformity, alternatives analysis, and detour analysis.

In the design of the 2006, basic demographics, activities, and tour and travel characteristics were collected for every member (including children) of 4,746 households during a consecutive 48-hour travel period. Vehicle GPS data were collected from a subsample of 220 of these households, with completed activity/travel diaries also collected for each household member. (Up to three-vehicles per household were equipped with GPS units).

Finally, a follow-up attitude perception and stated preference (SP) survey was conducted with a subsample of 916 respondents whose revealed trips fit criteria of interest for possible public transit and highway toll alternatives. A <u>customized preference/choice survey instrument</u> was generated using actual origin-destination data taken from trips reported in the household activity survey.

Sample Design and Selection

The minimum sample size for the base household activity survey was set at 4,600 households. This was divided between a main sample and transit rider and transit access oversamples. A two-day activity/travel diary was collected for all members of sampled households. The sample size for the SP survey was set at a minimum of 800 individuals sampled from the 4,600 households who completed the household survey. See Sampling Technical Document Attachment A1.

Rationale for Using Multiple Sample Frames
Ideally, a household travel/activity survey would be conducted using a single, geographically stratified RDD (random-digit-dial) sampling frame. One problem with this approach is the number of transit riders sampled is usually too small for analysis. Transit riders would fall into the RDD sample according to their incidence in the overall population. For example, if transit ridership in the PSRC area is 5% or less, the number of transit riders coming from the household survey (n=4,600) would be 230 or fewer. Moreover, using a region-wide RDD frame to oversample transit riders, particularly if they represent less than 10% of the total area households, is not very efficient.

Another strategy for increasing the number of transit riders in a sample was needed.   The sampling design, thus, provided for oversampling of households within defined 4-plus zip codes where transit options (access) are currently available. Within this transit access oversample, small oversamples of households whose member(s) use ferry service or park & ride lots were included.

Sampling Targets and Results
The sample size for the main RDD household activity survey was set at 3,600 households; for transit access households, the sample target was 1,000. Regardless of survey activity, a two-day activity/travel diary was collected for all members of sampled households. By definition, a completed household was a household where two-day travel inventories and related information was retrieved from every member. The sample for the SP survey was set at 800 individuals

sampled from the 4,600 households who completed the household survey. Table A1 on the following page shows the recommended and completed sample sizes by survey activity.

Table A1. Recommended and Completed Sample Sizes by Survey Activity

Survey Activity	Sample Size	Completed No. of Households
Household Survey – Main Sample (Random-Digit-Dial)	3,600	3,937
Household Survey – Transit Rider & Transit Access Oversamples	1,000	809
Stated Preference Survey	800	916

While the completed transit rider and transit access oversample was somewhat less than the target, an additional 742 households of the completed RDD sample (18.8%) reported at least one trip by public train or bus during their 48-hour assigned travel period, and 196 RDD households (5%) reported at least one trip by ferry. Thus, overall the number of transit rider and transit access households completed will be sufficient for robust transit rider activity and travel analysis.

For the main RDD survey, the region was divided into five geographic sampling areas. Each sampling area was defined by counties, or within King County, by the City of Seattle and those areas within King but outside Seattle. For the most part, the types of travel patterns and behaviors generated by households within each of these areas are similar. The five sampling areas were the following:

1. King County outside Seattle
2. the City of Seattle
3. Kitsap County
4. Pierce County
5. Snohomish County

To ensure both representation by household density across the region, and adequate statistical validity within less populated counties, the RDD sample required the completion of 48-hour activity/travel diaries in each sampling area from the number of households as shown below:

Table A2: Recommended and Completed RDD Sample Sizes by Geographic Area

Counties	Sample Size	Completed # of Households
King Without Seattle	900	1,054
City of Seattle	900	982
Kitsap County	400	589
Pierce County	750	624
Snohomish County	650	688
TOTAL	3,600	3,937

Again, while Pierce County response rates were somewhat low, the completed sample size is sufficient for robust statistical analysis. Regional RDD results will be weighted by geographic area household density, proportional to the 2004 American Community Survey[1] Census data shown below.

Table A3: 2004 American Community Survey Data for Number of Households by Sampling Area

Counties	Number of Households	Percent of Households
King Without Seattle	469,354	34.8%
City of Seattle	266,569	19.8%
Kitsap County	89,978[2]	6.7%
Pierce County	281,307	20.9%
Snohomish County	240,563	17.8%
TOTAL	1,347,771	100.0%

Variables of household size, number of vehicles available to a household, and the number of workers per have been found to be highly correlated with travel behavior and travel patterns. Therefore, a final modeling concern for the RDD sample design was the degree to which, for completed sample size within the region, the number of autos available to a household matched household size, again as documented by the 2004 American Community Survey. Independently, the number of workers per household was also to be representative of Census data for the region.

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[1] Source: U.S. Census Bureau, 2004 American Community Survey

[2] 2004 American Community Survey data not available for Kitsap County. PSRC 2004 estimate is cited

The stratification of households by household size and autos available identified 16 potential cells for sample monitoring. (Autos by 0 autos, 1 auto, 2 autos, and 3+ autos; household size by 1-person, 2-persons, 3-persons, and 4+-persons; 4 x 4). Upon inspection, improbable cells were removed from the tables where the number of autos was greater than household size.

A comparison of the sample design to the completed number of households as stratified by number of autos and household size is shown in Table A3.

Table A3. Recommended and Completed Number of RDD Households by Number of Autos and Household Size

	No Vehicles	1 Vehicle	2 Vehicles	3+ Vehicles	Totals
1-person HH	*184/***130**	*718/***875**	*113/***162**	*41/***57**	*1,056/***1,224**
2-person HH	*75/***26**	*312/***236**	*621/***826**	*244/***361**	*1,224/***1,443**
3-person HH		*98/***73**	*260/***233**	*202/***208**	*577/***518**
4+ person HH		*66/***47**	*352/***398**	*316/***305**	*743/***752**
Totals	*259/***156**	*1,193/***1,231**	*1,346/***1,619**	*802/***931**	*3,600/***3,937**

*Key: Recommended Sample Size/***Completed # of Households**

The completed sample size was very representative by household size and by number of vehicles, with the exception that the number of zero-vehicle households completed was only 60% of recommended RDD sample size. However, zero-vehicle completes will total 220 when 64 zero-vehicle households collected as a part of the oversample of transit rider and transit access sample are added.

Likewise, the completed RDD sample is representative region-wide by the number of workers per household as shown in Table A4.

Table A4. Recommended and Completed RDD Households by Number of Workers

	No Workers	1 Worker	2 Workers	3+ Workers	Totals
Region Sample Model	24.2%	43.6%	26.8%	5.5%	100.0%
RDD Completed Sample	25.9%	40.6%	29.2%	4.3%	100.0%

Response Rates

In terms of overall 2006 PSRC Household Activity/Travel Survey response rates, based on the American Association for Public Opinion Research's (AAPOR) Response Rate 3 (RR3) calculation method, the overall recruitment response rate (including oversamples) was 36.7%. The participation rate (fully completed household retrievals/recruitments) overall was 54.1%.

Transit Access and Transit Rider Oversample

This frame consisted of directory-listed sample from targeted geographic areas. Areas were selected based on their geographic proximity to specific transit-supported corridors. Households were randomly sampled from this frame. PSRC staff identified the transit access geography according to the following procedure.

1. "Transit density" from PSRC's modeling network was mapped using percent workers by block group.

2. Zip+2 geographic coverage was purchased from a private vendor.

3. "Transit density" was then overlaid onto the Zip+2 maps and a subset of Zip+2 areas were selected. (See map of transit access areas on the following page.)

Various criteria were used to select the Zip+2 areas including different "density" levels and the amount of overlap between the "density" geography and the Zip+2 geography. A total of 1,724 Zip+2 areas were selected. The distribution of the targeted Zip+2 geography across the region is presented in Table A5.

Table A5. Distribution of Transit Access Targeted Zip+2 Areas

County	Total ZIP+2 Areas in a County	Zip+2 Areas In Targeted Transit Access Area	Percent of County	Percent of Total Targeted Zip+2 Areas
King	4,381	1,382	31.55%	80.2%
Kitsap	905	10	1.10%	0.6%
Pierce	2,882	183	6.35%	10.6%
Snohomish	2,218	149	6.72%	8.6%
Total	10,386	1,724		100.0%

Geographic Stratification for Transit Access Areas

Park-and-Ride Transit Rider Intercept Oversample

Park-and-Ride transit users represent a unique subgroup from a sampling perspective. Their incidence is too low to expect enough for analysis purposes from the RDD or transit access frames.

Therefore, an intercept process at selected park-and-ride lots was used to supplement this frame. Interviewers were placed at these lots to solicit names, phone numbers, and addresses from commuters waiting to board transit buses. Those who agree to participate were contacted at a later time by telephone when the standard recruitment interview was administered. While sampling design called for 150 households completed by this method, actual completes were only 92. However, for analysis this oversample of park and ride user households can be supplemented by 205 RDD or other transit access/ferry user households who had at least one member reporting use of a park and ride lot during their 48-hour travel period

Frame 4: Ferry Rider Intercept Oversample

Like Park-and-Ride transit users, ferry riders also represent a unique subgroup from a sampling perspective.

Therefore, an intercept process at selected ferry debarking locations was used to supplement this frame. Interviewers were placed at these locations to solicit names, phone numbers, and addresses from commuters waiting to board ferries. Those who agree to participate were contacted at a later time by telephone when the standard recruitment interview was administered. While sampling design called for 50 ferry user households to be completed by this method, actual completes were only 18. For analysis this small oversample of ferry user households can be supplemented by 185 RDD or other transit access/park and ride user households who had at least one member reporting use of a ferry during their 48-hour travel period.

GPS Tracking

GPS tracking was designed as a subcomponent of the Household Activity/ Travel Survey. The objective was to compare data results from GPS tracking of a sample of household vehicle(s) trips with the diary trips reported by household members. The research assumption is that respondents frequently underreport trips, and that GPS tracking of a subsample of household vehicles can help identify the types of trips that are most frequently underreported in diaries, as well as profile the respondents most likely to underreport trips. GPS tracking is not deployed with the entire sample since the cost would be prohibitive. For the 2006 survey, 220 households completed both 48-hour diaries for each of their household members, and GPS tracking for up to three of their household vehicles. These households were recruited randomly from the RDD household Activity/Travel Survey sample.

Attitude and Stated Preference Survey

The attitude and stated preference survey was conducted as a follow-up to the 2006 Household Activity/Travel Survey. 1,400 respondents were selected, based on their revealed trips, which met criteria for length of trip and location of origin and destination points, within defined geographic corridors of transit access and/or potential toll alternatives. Approximately one-third of the sample was provided with transit alternatives choice experiments, one-third received choice experiments related to toll usage, and the final third received choice exercises related to both. Overall, completed interviews were obtained from 916 respondents for a response rate of 65.4%.

Survey Methods Background

In the 1950's and 1960's, a home-interview survey was not uncommon. The costs of conducting such a survey now, effectively prohibits this method, except in very small samples, or very large budgets. The only recently conducted home-interview survey was conducted by the North Central Texas COG (1984).

The more common methods used today are:

- telephone screen/mail-out of forms/phone-back
- telephone screen/mail-out of forms/mail-back

For the 2006 Household Activity/Travel Survey respondents were recruited by phone and assigned a 48-hour travel recording period, mailed diaries and instructions for each household member (and if applicable, GPS units for their vehicles). Each household received a reminder call the evening before their 1st travel day and they were recalled the evening after their 2nd travel day to collect person and diary information over the phone. If a household or any member did not want to proceed with the data collection phone interview, they were asked to mail back their completed diaries.

Proxy interviewing was discouraged except for those under 16, but if a member could not be reached otherwise, their diary reporting was accepted by phone from another adult in the household. For 20% of persons 18 or older, activity/travel was reported by proxy; 25% of persons (including children) reported their activity/travel by mail.

The transit rider and transit access oversample was collected using the same methodology as for the Random-Digit-Dial (RDD) sample, with the exception of a small oversample of ferry riders (19 households) and park & ride lot users (92 households). These oversample households were recruited by intercept surveying at, respectively, the ferry docks and representative park & ride lots within the region. This small oversample of interest supplemented the RDD sample of 180 completed households with at least one member who took a ferry trip during their travel days; and 281 RDD completed households with a member who used a park & ride lot during their assigned recording period.

The preference survey was conducted primarily as a mail-back option. Households selected (based on their revealed trips of interest) were phoned to inform them of their selection for the follow-up. Attitudinal questions and four choice experiments, customized to the respondent's revealed trip of interest were mailed. Those not responding by mail were encouraged to respond by phone.

2006 Survey Methodology

There were nine program components to the 2006 Household Activity/Travel Survey: These are:

1. sample design and monitoring
2. designing materials and instruments
3. the pilot
4. data collection and monitoring
5. GPS tracking for a subsample
6. geocoding or all origin and destination points
7. data checking and quality control.
8. design and conduct of the attitudinal and stated preference survey.
9. analysis and reporting

For quality control, interim datasets and reports were scheduled after the completion of 30 (the pilot) 1,500 and 4,600 households. The delivery schedule was adhered to throughout the data collection period with travel days starting the first of April 2006 and ending in mid-June 2006.

In addition to a detailed Work Plan, a Sampling Technical Plan Document, Quality Control Manual, and a Geocoding Procedures Manual were developed. These protocols defined criteria for determining whether a completed household would be accepted.   All documents were approved prior to use in the main survey by PSRC.

Design and Implementation of Survey Materials and Instruments

The months of February and March 2006 were devoted to development of data collection materials and instruments, and to a pilot survey. There was a minimum of two iterations and reviews of each item before final drafts were approved.

The following materials and instruments, which provide the program flow, can be found in the Appendices as cited below:

*   Pre-Recruitment Letter   Appendix B
*   Recruitment Script   Appendix B
*   Diary Cover Letter and Diary Format   Appendix B
*   Retrieval CATI Script   Appendix B
*   Reminder Call Script   Appendix B
*   Preference Survey Instrument   Appendix C
*   Preference Survey Retrieval Script   Appendix C

A description of these program materials follows.

Pre-Recruitment Letter

A pre-recruitment informational letter was developed and released to replicates (randomly selected portions) of the sample on a scheduled basis. This was done so that respondents did not receive the letter too far in advance of the recruitment phone call.

The households that received pre-recruitment letters were flagged in the data file. All undeliverable mailing was monitored and flagged in the data file. An attempt was made to correct the address through the United States Postal Service (USPS) website. A log was also kept of phone calls to the 1-800 number, to Internet help, and of any mail responses. Any non-routine responses were referred to PSRC. Undeliverable mailings were monitored, logged, and flagged in the data file.

Recruit Script

The telephone recruit script introduced the purpose of the study and secured the agreement of the household to participate. Demographics including the number of persons in the household, number, make, model, and year of vehicles, number of workers, and income were collected. Two-consecutive travel days were randomly assigned to a household by the CATI system, which kept travel day assignments even by eligible days over the interviewing period

In addition, to enhance activity and land-use modeling capabilities, households were asked in the recruit for additional information about their current and previous residence (if they had moved within the last ten years). Questions asked for both current and previous address were: rent or own, type and age of structure, length of residency, and street address, city, county, state. The contact person for the household was also asked for the reasons they chose their current residence.

The CATI screens displayed counts of recruited and retrieved households by data cells within sample areas and by socioeconomic attributes, which were then compared with the Sampling Plan Technical Document on a daily basis. Initial recruitment to retrieval ratios were low for certain populations such as 4+-person and zero-vehicles households. To compensate, PSRC and its partners began implemented five responsive interviewing design strategies[3] over the

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[3] [1] Steven Heeringa and Robert Groves, *"Responsive Design for Household Surveys"* in the 2004 Proceedings of the American Statistical Association, Survey Research Methods.

course of the data collection period. Each of these strategies used a series of different or successive recruitment and response techniques. These modifications included:

- Adjusting recruitment sample targets based on the varying actual retrieval rates for different data cells.
- Introducing portions of low-income targeted Random-Digit-Dial (RDD) samples into the traditional RDD sampling frames.
- Introducing differential incentives ($20-$30--not paid for by PSRC) for zero-vehicle and 4+-person households, if all members of the household completed the activity/travel inventories.
- Introducing RDD listed sample targeted by income and household size.
- Conducting refusal conversion interviews for all households recruited in rare population data cells that did not initially complete the travel inventories (retrievals).

Diary Cover Letter and Diary Format

To reduce respondent burden, particular attention was paid to the diary format to ensure that all modeling data requirements were met and that the flow and construction of questions and instructions were clear.

This design captured only two types of activities within the home: (1) home-not working and (2) home–working. Primary and secondary activities at each location were collected; however, the timing of these activities at any one location was collected as a block without differentiating among activities. Activities were collected via closed-ended categories. Thus respondents were required to self-code their activities into pre-set categories using the list and examples in the diary. The diary questions were designed to flow in conjunction with the Computerized Assisted Telephone Interviewing (CATI) customized program, taking the respondents through their activities/locations and travel in chronological order.

Included with the diary was a person information sheet for each member of the household. This information was not included in the recruit since data requested for each member about work and school were extensive. The diary, cover letter, instructions, and person information sheet were thoroughly tested in the pilot, which was conducted in March of 2006. Final copies of the diary cover letter and the diary can be found in Appendix 4.

The activity-travel diary (retrieval interview) format consisted of eight parts:
1. Collecting any changes in or missing data, in regard to number of persons in the household, number and type of vehicles, and number of workers.

2. Collecting person attributes including age, gender, relationship to contact person, driver's license status, education level, use of transit during the last 30 days, transit pass and rate information, disability status, use of Internet and frequency of watching DVDs (activities which substitute for travel)..

3. Collecting person attributes in regard to school and/or work activities

4. Information about work characteristics including shifts worked, hours per week, flexibility, and availability of compressed work week.

5. Usual mode of getting to work and times of travel

6. Information on previous job location (if changed job location within the past 10 years) including reasons for change in location or job.

7. Activity-travel diary in including up to five modes used for each trip, parking information for car, routes, transfers, and fare for public transit and taxi/shuttle modes, and information about which household member(s) traveled with you and (if traveling by car) what household vehicle was used.

8. A series of attitudinal questions were asked of the first person interviewed within a household. These questions included:

    - transit options to work or school
    - importance of delays
    - road and bridge maintenance
    - importance of transportation system
    - levels of state and local funding
    - population expansion and land use
    - freight movement and the economy
    - city or neighborhood composition
    - paying for tolls
    - truck traffic
    - importance of predictably travel
    - affordable transportation costs
    - comfort while traveling
    - privacy while traveling
    - importance of flexibility
    - importance of quickest travel time
    - effect of travel delays

The extent of questions asked for modeling and transit option alternatives resulted in a retrieval interview that averaged 17 minutes in length. Nevertheless sampling completion targets were met.

Personal labels were applied to diaries with the name, ID #, and the travel days for each respondent. A business reply envelope was included with the household packet. A full mailing log was electronically maintained in the database. In total, diary packets were sent to 8, 816 recruited households. Any undeliverable mailings were fully explored and the household was re-contacted by phone for corrected information. The data file was continually edited with these changes by an assigned assistant programmer.

Reminder Call Script

The evening before the first assigned household travel day, the recruited household was called to remind household respondents to start recording their locations and travel at 3:00 a.m. (and to install the GPS units in their vehicles before traveling). Any questions regarding the process or the diaries were answered. Re-mailings and rescheduling of travel dates were edited into the data file on a daily basis by the assistant programmer. Hard refusals at this point were recorded and reviewed by a supervisor for possible refusal conversion.

Retrieval CATI Script

The CATI retrieval script followed the flow of the diary. Respondents did not have to provide a previously reported address and trips taken jointly were recorded and then confirmed in each relevant household member's activity/trip file. Household retrieval phone interviews were scheduled by the Computer Assisted Telephone Interviewing (CATI) system for the evening following the assigned travel days. Retrieval interviews continued to be scheduled for the following five days until the CATI recorded that all members had completed the travel inventory. Phone messages were left with persons or on answering machines. Respondents were asked for the most convenient time to call them back. Attempts were also made during the day and on weekends.

Respondents who were reluctant to complete the person information sheet and activity/travel inventories by phone were asked if they would do so by mail. If mail was indicated, the household was reminded that a postage-paid envelope was provided with the diary package for the return of all completed materials. Difficult to reach respondents were asked to call the toll-free number provided. The CATI system provided all of the real-time tallies specified for the recruit, by person and household as appropriate. The data file was edited daily with any corrected information that was received from respondents. Finally, callbacks were made for home or work

address information when an address was found to be non-geocodable. All corrected information was entered into or edited into the CATI data file.

Preference Survey Instrument

The preference survey instrument was designed by PSRC in consultation with the project's modeling subconsultants, Cambridge Systematics and Mark Bradley. The survey instrument consisted of a series of rotated attitudinal questions and four choice exercises. On third of the sample was provided with transit option choices and one third were provided with toll choices. The final third received both choice set exercises. A document describing the preference survey design is included as Appendix 8.

Weighting of Data for This Report

Figures provided in this report for each of the sample types have not been weighted. However, the RDD sample is largely representative by county and for the region.   Regional figures presented in this report are weighted using estimated household totals for each county and the city of Seattle as documented in the 2004 American Community Survey.

B. Main Survey Forms

- *Pre-Recruitment Letter*

- *Recruitment Script*

- *Retrieval Script*

- *Diary Cover Letter*

- *Activity Diary*

Puget Sound Regional Council
PSRC

Dear Puget Sound Area Resident:

The Washington State Department of Transportation and the Puget Sound Regional Council (PSRC) are conducting a survey of daily travel, in order to better understand travel behavior within the Puget Sound Region. This survey is important because the results will be used to improve and set priorities for transportation investments within the region. The more people who complete the survey, the more accurate our results will be.

Your household has been randomly selected to take part in the survey of daily trip-making activity. A trained interviewer from MORPACE International, a firm with over 50 years of experience, will be calling on behalf of the State and PSRC within the next week to ask some statistical questions regarding your household. The call will take less than ten minutes. All information is confidential as required by law and your participation is voluntary, yet vital. Please be counted. We understand your time is valuable and we will make every effort to make your participation in the **Puget Sound Household Travel Survey** as convenient as possible.

If you have any questions about the Survey, please contact MORPACE toll-free at 1-800-294-9668, or call the Puget Sound Regional Council at 206-464-7964. Information is also available at *www*.psrc.org. Thank you in advance for helping to move the Puget Sound Region forward.

Sincerely,

Kevin Murphy
Director, Data Systems & Analysis
Puget Sound Regional Council

Puget Sound Household Travel Survey 2006
Recruit Interview

LETTER_I. *If pre-notification letter was sent, show:*
"Pre-notification letter sent"
Else, show:
"Pre-notification letter was NOT sent"

INTRO1. Hello, my name is **<INSERT INTERVIEWER'S FIRST NAME>** from MORPACE calling on behalf of the Washington State Department of Transportation and the Puget Sound Regional Council. The two agencies are jointly conducting a transportation study to better understand the daily travel patterns of area residents. Are you a member of this household and at least 18 years old?

(CONTINUE WITH HOUSEHOLD MEMBER AT LEAST 18 YEARS OF AGE)
This is an official Puget Sound Regional Council study. The information that is collected will be treated as private and confidential. This is not a sales call and no sales calls will result from this interview. It is an attempt to gather travel information from area residents that will influence the future development of the Puget Sound-area's transportation infrastructure. Would you like to help with this effort? For quality control purposes, this call may be monitored.

1	Yes	
2	Not ready/Adult unavailable	**(SCHEDULE CALLBACK)**
3	Unwilling – terminate	**(GO TO TERM_INT)**
8	Don't Know	**(GO TO ADULT_C)**
9	Refused	**(GO TO ADULT_C)**

(ASK IF INTRO>3)
ADULT_C. I'm only allowed to interview individuals that are at least 18 years of age. Are you at least 18?
(INTERVIEWER: IF UNWILLING TO CONFIRM ELIGIBILITY, READ:
"Thank you for your time."
Then enter "2", which will terminate the interview.)

1	Yes	
2	Unwilling to confirm eligibility	**(TERMINATE)**

(ASK IF INTRO=3)
TERM_INT. Thank you for considering our request.
(TERMINATE)

(ASK IF INTRO=1 OR ADULT_C=1)
PHONE_CK. To be sure I dialed correctly, can you confirm that your phone number is **<INSERT SAMPLE PHONE NUMBER>**?

1	Yes – correct phone number	
2	No – incorrect phone number	**(GO TO PHONE_CB)**

(ASK IF PHONE_CK=2)
PHONE_CB.   I apologize. I must have dialed incorrectly. Because the phone numbers for this project were randomly selected, I am not able to replace your household for the household that was selected. Thank you for your time.
(SCHEDULE IMMEDIATE CALLBACK TO CALL CORRECT NUMBER)

We first want to confirm that you live in the survey area. (or "that you meet our eligibility requirements")

AREA_ST.   And you live in Washington?

        01   Yes
        02   No   (GO TO AREA_TM)

AREA_CTY1.   What COUNTY do you live in?

        01   King   **(GO TO AREA_CTY2)**
        02   Kitsap
        03   Pierce
        04   Snohomish
        996   Other   **(GO TO AREA_TM)**

        998   Don't Know   **(GO TO AREA_TM)**
        999   Refused   **(GO TO AREA_TM)**

(ASK IF AREA_CTY1=1)
AREA_CTY2.   Do you live inside the city limits of Seattle?

        01   Yes
        02   No

DELETE Q AREA_CTW

(IF AREA_CTY2=1 THEN SKIP)
AREA_CTW.   What is the name of the CITY or area where you live?
              (IF NEEDED: "We need to know where the physical location of your residence is.")
              (RECORD NUMBER FOR APPROPRIATE LOCATION FROM CITY/AREA LIST)
              (RECORD 996 FOR "OTHER")

        996   Other (Specify _____)

        998   Don't Know   **(GO TO AREA_TM)**
        999   Refused   **(GO TO AREA_TM)**

AREA_TM.   Unfortunately, your household is not eligible for this project. Thank you for your time.
              (TERMINATE)

INFO.   The results of your participation in this study will be used to help develop the future transportation improvements in the Puget Sound area. Members of your household will each receive a diary to easily record travel information for a 48-hour period. The diary will ask you what locations you visit and how you travel from one location to the next. After the two-day travel period, an interviewer will call back to collect the information over the phone.

ALL members of your household, regardless of age, must complete the interview for your household to count. Can we count on your support for this important Puget Sound area project?

01   Yes – Continue   **(GO TO HHNUMVEH)**
02   No – Will Not Participate   **(INFORMED TERMINATE)**

IF INFO=01, ASK:)
APTPO.   Do you live in an apartment building, or do you have a Post Office (PO) Box address? (CHECK ALL THAT APPLY)

1   Apartment Building
2   PO Box Address
3   Neither

FedEx.   Can you accept a Fed Ex delivery addressed to your home or street address during regular business hours?

1   Yes
2   No (SKIP GPS Questions)

This call will take about ten minutes.

HHNUMVEH.   For sampling purposes I need to obtain some background information about your household. First, how many vehicles are available to your household?   Please count all working, owned and leased cars, vans, trucks, and motorcycles, as well as vehicles available for REGULAR USE to your household, such as company vehicles. Include RVs and mopeds only if they are used for local trips. Do NOT include bicycles, golf carts, boats, or snowmobiles.

How many working vehicles are available to your household?

(INTERVIEWER: Verify if more than 6 vehicles.)
(RECORD NUMBER OF HOUSEHOLD VEHICLES)

__ __   (PROGRAMMER: Allow 0 to 10 vehicles.)

97   Zero/None   **(GO TO HHNUMPPL)**
98   Don't Know   **(GO TO HHNUMPPL)**
99   Refused   **(GO TO HHNUMPPL)**

(ASK IF HHNUMVEH>0 and <97)
HHVEHTYPE_1 What is the make and model of the first vehicle in your household?
HHVEHTYPE_# What is the make and model of the next vehicle in your household?
      (SEARCH QUESTION)

_____

      9999   REFUSED

HHVEHYEAR_# What is the year of this vehicle?

      __ __ __ __   (PROGRAMMER NOTE: MUST BE BETWEEN 1900 AND 2006)

      9999   REFUSED

HHNUMPPL.   We will send a travel diary for EACH person that lives in your household. INCLUDING yourself, all other adults, and children of all ages, how many people currently live in your household?
(INTERVIEWER: Include roommates and housemates. Do NOT include children living away from home.)

      (RECORD TOTAL NUMBER OF HOUSEHOLD MEMBERS)

      __ __   (PROGRAMMER: Allow 1 to 15.)

(ASK IF HHNUMPPL>9)
GROUPCK.   Are any of these people related to each other?
      01   Yes
      02   No

(ASK IF HHNUMPPL=1)
WRKRS1.   Are you currently employed?

      01   Yes
      02   No

      99   Refused

(ASK IF HHNUMPPL>1)
WRKRS2.   Including yourself, how many of the people, 16 years of age or older, living in your household are currently employed?

      __ __   (PROGRAMMER: Allow 0 to HHNUMPPL.)
                 (PROGRAMMER: IF WRKRS1=1, CODE WRKRS2=1, ELSE WRKRS2=0/97)

      97   Zero/None
      98   Don't Know
      99   Refused

(ASK IF HHNUMPPL>1)
PERS_INT.   Now I'd like to ask a few questions about each of the household members so we can
               prepare individual diaries. Again, I want to assure you that this information is for
               research purposes only. The information that is collected will be treated as private and
               confidential. Let's start with you.

NAME_1.   Please tell me your first name.
NAME_#.   Now please tell me the next person's first name.
               (INTERVIEWER: If respondent refuses, ask for initials or other identifying information.)
               (RECORD FIRST NAME)

               _____

SEX_1.   (RECORD GENDER - BY OBSERVATION)
SEX_#.   Is **<INSERT NAME_#>** male or female?

               01   Male
               02   Female

               99   Refused

SAGE_1.   What is your age?
SAGE_#.   What is **<INSERT NAME_#>**'s age?
               (RECORD AGE)

               __ __ __   (PROGRAMMER: Allow 18 to 115 for SAGE_1.)
                               (PROGRAMMER: Allow 0 to 115 for SAGE_2:15.)

               998   Don't Know
               999   Refused

(ASK IF SAGE_#=998 OR 999)
AGE_1.   Which of the following categories best describes your age?
AGE_#.   Which of the following categories best describes **<INSERT NAME_#>**'s age?

               01   Under 5   **(DO NOT SHOW FOR PERSON 1)**
               02   5 to 15   **(DO NOT SHOW FOR PERSON 1)**
               03   16 to 17   **(DO NOT SHOW FOR PERSON 1)**
               04   18 to 24
               05   25 to 34
               06   35 to 44
               07   45 to 54
               08   55 to 64
               09   65 to 74
               10   75 to 84
               11   85 and over

               998   Don't Know
               999   Refused

(ASK IF AGE_#998 OR 999)
AGE18_1.   (INTERVIEWER: HIT "1" TO CONTINUE)
                (PROGRAMMER: Only allow answer 1.)
AGE18_#.   Is **<INSERT NAME_#>** 18 years of age or older?

          01   Yes (18 or older)
          02   No (under 18)

          98   Don't Know
          99   Refused

 (ASK IF NOT FIRST PERSON)
RELAT_#.   What is **<INSERT NAME_#>**'s relationship to you?
                (DO NOT READ LIST. PROMPT, IF NEEDED.)

          001   Husband/Wife/Unmarried Partner
          002   Son/Daughter/In-Law
          003   Brother/Sister/In-Law
          004   Mother/Father/In-Law
          005   Other Relative
          006   Roommate/Friend
          007   Household Help
          996   Other (Specify _____)

          998   Don't Know
          999   Refused

(ASK IF [(SAGE_#>15 AND SAGE_#<116) OR (AGE_#>2)
LDRV_1.   Do you have a valid driver license??
LDRV_#.   Does **<INSERT NAME_#>** have a valid driver license?

          01   Yes
          02   No

          98   Don't Know
          99   Refused

(ASK IF [(SAGE_#>17 AND SAGE_#<116) OR (AGE_#>3)
EDU_1.   What is the highest level of school you have completed?
EDU_#.   What is the highest level of school **<INSERT NAME_#>** has completed?
                (DO NOT READ LIST. PROMPT, IF NEEDED.)

          01   Less than high school
          02   High school graduate
          03   Some college
          04   Vocational/Technical training
          05   Associates degree
          06   Bachelors degree
          07   Graduate/Post-graduate degree

          98   Don't Know
          99   Refused

(ASK IF [(SAGE_#>15 AND SAGE_#<116) OR (AGE_#>2)
WRKR_1.   Are you a…?
WRKR_#.   Is **<INSERT NAME_#>** a…?
                 (INTERVIEWER NOTE: Answers 1 and 2 refer to PAID work. Answer 3 can be full-time
                 OR part-time.)
                 (READ LIST) (ALLOW MULTIPLE MENTIONS)

                 01   A PAID Full-time worker
                 02   A PAID Part-time worker
                 03   AN UNPAID worker or volunteer
                 04   Retired
                 05   Not working

                 98   Don't Know
                 99   Refused

(ASK IF WRKR_#=05)
NOWK_1.   Are you looking for PAID-work?
NOWK_#.   Is **<INSERT NAME_#>** looking for work?

                 01   Yes
                 02   No

                 98   Don't Know
                 99   Refused

TRANSIT_#   Have (you/NAME) used any form of public transit within the Puget Sound region within
                 the last 30 days?

                 01   Yes
                 02   No

                 98   Don't Know
                 99   Refused

PROGRAMMER: REPEAT NAME_# TO NOWK_# FOR EACH HOUSEHOLD MEMBER, UP TO 15.

PROGRAMMER: COMPARE WRKRS2 ANSWER TO TOTAL OF WRKR_#=1 OR 2 IF EQUAL, CONTINUE WITH INTERVIEW BY PROCEEDING TO DATE. IF NOT EQUAL, GO TO WRKVER.

(ASK IF WRKRS2<>TOTAL OF WRKR_#=1 OR 2)
WRKVER.   In the beginning of the interview, I heard that **<INSERT WRKRS>** member(s) of your
                 household work(s). Now I have <INSERT TOTAL # OF WORKERS>. Which number is
                 correct?

                 01   Beginning of the interview was incorrect
                         Need to change the beginning number
                 02   Beginning of the interview was correct
                         Need to change an individual's employment answer

(ASK IF WRKVER=1)
WRKCH1.   So, to confirm, there is/are **<TOTAL OF WRKR_#=1 OR 2>** worker(s) in your household.
               (IF RESPONDENT AGREES, ENTER ABOVE NUMBER)
               (IF NOT, BACKUP AND CHANGE PREVIOUS ANSWER)

               __ __   (PROGRAMMER: Allow TOTAL OF WRKR_#1 OR 2 ONLY!!)

(ASK IF WRKVER=2)
WRKCH2.   Let's now review which household members are employed.

               (PROGRAMMER: Cycle back through all WRKR_# questions.)

GPS_1.   (INTERVIEWER KEY IN A "1" TO CONTINUE.
               IF TERMINATES, F3 BACK TO KEY IN A "2".)

               01   OFFER GPS
               02   DO NOT OFFER GPS – QUOTA FILLED – (GO TO DATE)

GPS_DATE.   We would like to send [PROGRAMMER: If HHNUMPPL=1 SHOW: "you", ELSE SHOW:
               "each member of your household"] a diary to keep track of your travel for a 48-hour
               period, **<INSERT DAYS OF WEEK AND DATE OF TRAVEL DAYS>**.

               01   Continue – willing to participate
               02   Unsure about participation **(GO TO GPS_ASSURE)**

GPSDATECHK.   Will **<INSERT DAYS OF WEEK AND DATE OF TRAVEL DAYS>** be typical travel days
               for your household, or will your typical travel be altered due to vacation, spring break, or
               some other circumstance?
               INTERVIEWER: PLEASE TRY TO FILL THE TRAVEL DATE THAT IS LISTED FIRST.

               01   Typical travel days
               02   Non-typical travel days **(GO TO GPS_NDATE)**

GPS_NDATE.   How about **<INSERT DAY OF WEEK AND DATE plus 7 OF TRAVEL DAYS>?**

               01   Typical travel days (GO TO GPS)
               02   Non-typical travel days **(GO TO DATECHK TO SCHEDULE NON-GPS DAY)**

(ASK IF GPS_DATE=02)
GPS_ASSURE.   Your household will represent many others in the Puget Sound area, and no one else can
               be substituted for you. Your input will help the Washington State Department of
               Transportation and the Puget Sound Regional Council better plan for future
               transportation improvements in the region. Will you help us out with this important
               project?

               01   Yes – willing to participate (GO TO GPSDATECHK)
               02   No – not willing to participate **(TERMINATE)**

DATE.   We would like to send [PROGRAMMER: If HHNUMPPL=1 SHOW: "you", ELSE SHOW: "each member of your household"] a diary to keep track of your travel for a 48-hour period, **<INSERT DAYS OF WEEK AND DATE OF TRAVEL DAYS>**.
INTERVIEWER: PLEASE TRY TO FILL THE TRAVEL DATE THAT IS LISTED FIRST.

        01   Continue – willing to participate
        02   Unsure about participation   **(GO TO ASSURE)**

DATECHK.   Will **<INSERT DAYS OF WEEK AND DATE OF TRAVEL DAYS>** be typical travel days for your household, or will your typical travel be altered due to vacation, spring break, or some other circumstance?

        01   Typical travel days
        02   Non-typical travel days **(GO TO NDATE)**

NDATE.   How about **<INSERT DAY OF WEEK AND DATE plus 7 OF TRAVEL DAYS>?**

        01   Typical travel days
        02   Non-typical travel days **(GO TO NDATE)**

(ASK IF DATE=02)
ASSURE.   Your household will represent many others in the Puget Sound area, and no one else can be substituted for you. Your input will help the Washington State Department of Transportation and the Puget Sound Regional Council better plan for future transportation improvements in the region. Will you help us out with this important project?

        01   Yes – willing to participate
        02   No – not willing to participate   **(TERMINATE)**

GPS RECRUIT

SKIP IF HHNUMVEH=0 OR 97 OR>3 OR IF FEDEX=2)
ASK IF GPS_NDATE=1 OR GPSDATECHK=1
GPS.   As part of this study we're asking a small number of households to help evaluate a new technology that's providing greater insight into how people travel. This technology is called GPS, or the Global Positioning System. The Global Positioning System is a worldwide navigation system using satellites that can be used to identify the exact locations of vehicles, ships, and airplanes.

        What we'll do is send you a GPS unit for each one of your vehicles before your travel dates. All you'll need to do is temporarily attach a small unit on the dashboard of your vehicle and it will record where you travel. You won't need to do anything else to operate the unit. After your travel dates you will return the unit using a postage-paid envelope that we will provide.

        If you volunteer to participate in the GPS portion of this study, you will receive $30. However, not all households will be able to participate in the GPS portion of the study, due to the limited number of GPS units available. Each of your household members will also need to fill out the diaries if selected. Are you willing to participate in the GPS portion of the study?

01   Yes   **(GO TO GPS_ONUM)**
02   No

(READ IF GPS=1)
GPS_ONUM.   Great! If available the GPS units for your vehicles will be sent along with the diaries for each of your household members before your travel day. When we receive the GPS units and your completed diaries back, we will mail a check for $30.

INCENTIVES ADDED AFTER NON-RESPONSE OF CERTAIN GROUPS WAS DOCUMENTED

ASK IF HHNUMVEH=0 AND HHNUMPPL=1)
INCENT_20   As a token of appreciation, we will send you a check for $10.00. The check will be sent after we have collected all of the activity and travel information from all members of your household.

(ASK IF HHNUMVEH=0 AND HHNUMPPL≥2)
INCENT_30   As a token of appreciation, we will send you a check for $15.00. The check will be sent after we have collected all of the activity and travel information from all members of your household.

(ASK IF HHNUMVEH≥1 AND HHNUMPPL≥4)
INCENT_40. As a token of appreciation, we will send you a check for $20.00. The check will be sent after we have collected all of the activity and travel information from all members of your household.

INTRO2.   On one last topic, planners know there are relationships between the decisions people make about where to live and where they have to travel. We have a few questions about your current residence, and whether you have moved recently within the region.

CHOMEOWN.   Is your current residence owned or rented? (DO NOT READ LIST)
(INTERVIEWER NOTE: Code OWNED if home is not owned outright, but is under mortgage or land contract OR if respondent rents, but someone who lives in the home owns it.)

01   Owned
02   Rented
03   Provided by job or military
04   Vacation home/Not the primary residence of respondent   **(TERMINATE)**

96   Other (Specify _____)
98   Don't Know
99   Refused

CHOMETYPE. What type of structure is it? Is it a …(READ LIST)
(INTERVIEWER NOTE: Code two-unit townhouse as duplex)

01   Detached single house
02   Duplex
03   Triplex or 4-plex (or fourplex)
04   Rowhouse, townhouse
05   Apartment, condominium
06   Mobile home or trailer
07   Dorm room, fraternity or sorority house (DO NOT READ)

96   Other (Specify _____)

       98   Don't Know
       99   Refused

CHOMEAGE. How old is your current home? (READ LIST)

       01   Less than a year
       01   1 to less than 3 years
       02   3 to less than 5 years
       03   5 to less than 7 years
       04   7 years to less than 10 years
       05   10 to less than 20 years
       06   20 or more years old

CHOMEYEAR. How long have you lived at this place?

       01   Less than a year
       02   Between 1 and 2 years
       03   Between 2 and 3 years
       04   Between 3 and 5 years
       05   Between 5 and 10 years
       06   Between 10 and 20 years
       07   More than 20 years

CHOMEAREA. Is your current home located in an urban area, suburban area, or rural/exurban area?
(IF NEEDED: urban=dense urban environment, suburban=lower-density suburban environment, and rural/exurban area=very low density environment or a mixture of low-density household and open space) (CHECK ONE)

       01   **Urban**
       02   **Suburban**
       03   **Rural/Exurban**

       998   **Don't Know**
       999   **Refused**

(ASK IF CHOMEAREA=01 OR HOMEAREA=998 OR 999)
CUHOME.   **Is this . . . . .(READ LIST AND CHECK ONE)**

       01   **Mostly a single family area?**
       02   **Mostly a multi-family area of apartments and condos?**
       03   **An area of a mixture of housing and businesses?**

       998   **Don't Know**
       999   **Refused**

(ASK IF CHOMEAREA=02)
CSHOME.   **Is this . . . . .(READ LIST AND CHECK ONE)**

       01   **Mostly a single family area?**
       02   **Mostly a multi-family area of apartments and condos?**
       03   **An area of a mixture of housing and businesses?**

       998   **Don't Know**
       999   **Refused**

(ASK IF CHOMEYEAR < 06 – Moved into this residence in the previous 10 years)
PREV_CTY.   In what COUNTY was your previous address located?

01	King (city of Seattle)
02	King (outside of Seattle)
03	Kitsap
04	Pierce
05	Snohomish
06	Other Washington State location
07	Other state

998	Don't Know	**(GO TO AREA_TM)**
999	Refused	**(GO TO AREA_TM)**

(ASK IF PREV_CTY < 06)
PREVADD.   What was your previous address?
              (RECORD STREET ADDRESS)
              (BE SURE TO INCLUDE APARTMENT NUMBER, IF APPLICABLE)

              _____

(ASK IF PREV_CTY < 07)
PMAILCITY.   City

              (RECORD NUMBER FOR APPROPRIATE CITY FROM THE CITY LIST)
              (RECORD 9996 FOR OTHER SPECIFY)

(ASK IF PREV_CTY < 06)
PMAILZIP.   Zip code?
              (VERIFY/EDIT ZIP CODE OR RECORD NEW ZIP CODE)

          __ __ __ __ __
          <INSERT ZIP>

(ASK IF CHOMEYEAR < 06)
PHOMEOWN.   Was your previous residence owned or rented?
              (DO NOT READ LIST)
              (INTERVIEWER NOTE: Code OWNED if home is not owned outright, but is under
              mortgage or land contract OR if respondent rents, but someone who lives in the home
              owns it.)

01	Owned
02	Rented
03	Provided by job or military
04	Vacation home/Not the primary residence of respondent

96	Other (Specify _____)
98	Don't Know
99	Refused

(ASK IF CHOMEYEAR<06))
PHOMETYPE. And what kind of structure was it? Was it a…? (READ LIST)
                (INTERVIEWER NOTE: Code two-unit townhouse as duplex.)

        01   Detached single house
        02   Duplex
        03   Triplex or 4plex (or fourplex)
        04   Rowhouse, townhouse
        05   Apartment, condominium
        06   Mobile home or trailer
        07   Dorm room, fraternity or sorority house (DO NOT READ)

        96   Other (Specify _____)
        98   Don't Know
        99   Refused

(ASK IF CHOMEYEAR<06))
PHOMEAGE. How old was your previous home? (READ LIST)

        01   Less than a year
        01   1 to less than 3 years
        02   3 to less than 5 years
        03   5 to less than 7 years
        04   7 years to less than 10 years
        05   10 to less than 20 years
        06   20 or more years old

(ASK IF CHOMEYEAR<06))
PHOMEYEAR. How long have did you live at this place?

        01   Less than a year
        02   Between 1 and 2 years
        03   Between 2 and 3 years
        04   Between 3 and 5 years
        05   Between 5 and 10 years
        06   Between 10 and 20 years
        07   More than 20 years

(ASK IF CHOMEYEAR<06))
PHOMEAREA. Was your previous home located in an urban area, suburban area, or rural/exurban area?
        (IF NEEDED: urban=dense urban environment, suburban=lower-density suburban environment, and rural/exurban area=very low density environment or a mixture of low-density household and open space) (CHECK ONE)

        01   **Urban**
        02   **Suburban**
        03   **Rural/Exurban**

        998   **Don't Know**
        999   **Refused**

(ASK IF PHOMEAREA=01 OR HOMEAREA=998 OR 999)
PUHOME.   Is this . . . . .(READ LIST AND CHECK ONE)

               01   **Mostly a single family area?**
               02   **Mostly a multi-family area of apartments and condos?**
               03   **An area of a mixture of housing and businesses?**

               998   **Don't Know**
               999   **Refused**

(ASK IF HOMEAREA=02)
PSHOME.   Is this . . . . .(READ LIST AND CHECK ONE)

               01   **Mostly a single family area?**
               02   **Mostly a multi-family area of apartments and condos?**
               03   **An area of a mixture of housing and businesses?**

               998   **Don't Know**
               999   **Refused**

(ASK IF CHOMEYEAR < 06) (DELETED AFTER FIRST 1, 000+ RECRUITS)
PMOVE3.   What was the most important reason you chose your current home location?
                (DO NOT READ LIST AND CHECK ONE)

                Precodes
                01   Housing or rental price
                02   The local schools
                03   Location to a job site
                04   Location a school site
                05   Location to shopping, entertainment, restaurants
                06   Location to a social, religious, civic, cultural or recreational facility
                07   Transit access
                08   Closeness to relatives or friends
                09   Other (*Please Specify*)_____

(ASK IF MAILADDR IS NOT MISSING)
MAILADD1.   In order to mail the project materials to you, I need to verify that your address is …?
                (VERIFY/EDIT ADDRESS OR RECORD NEW STREET ADDRESS)
                (BE SURE TO INCLUDE APARTMENT NUMBER, IF APPLICABLE)

(ASK IF MAILADDR IS MISSING)
MAILADD2.   In order to mail the project materials to you, could you please tell me your mailing
                address?
                (RECORD STREET ADDRESS)
                (BE SURE TO INCLUDE APARTMENT NUMBER, IF APPLICABLE)
                (INTERVIEWER NOTE: FOR GPS RESPONDENTS – Do Not Record PO Box. Record
                PHYSICAL ADDRESS OF HOUSE.)

                _____
                <INSERT MAILADDR IF NOT MISSING>

MAILTYPE.   INTERVIEWER: RECORD IF THE ADDRESS IS …

        01   Normal street address
        02   P O Box

MAILCITY.   City?

        (RECORD NUMBER FOR APPROPRIATE CITY FROM CITY LIST)
        (RECORD 9996 FOR OTHER SPECIFY)

MAILZIP.   Zip code?
        (VERIFY/EDIT ZIP CODE OR RECORD NEW ZIP CODE)

        __ __ __ __ __
        <INSERT ZIP>

MAILATTN.   To whom should we address the envelope?
        (RECORD FULL NAME)

        _____

(ASK IF MAILTYPE=1)
MAILXSTS.   What intersection is closest to this address?
        (RECORD TWO NEAREST CROSS STREETS)

        _____

MAILHOME.   Is this your home address?

        01   Yes
        02   No

(ASK IF MAILTYPE=2 OR MAILHOME=2)
HOMEADD.   So we know where most of your trips will begin, I need to know the location of your home.
        What is your home address?
        (INTERVIEWER: Do NOT record a P O Box. Record the PHYSICAL ADDRESS of the
        household, even if mail cannot be received at this address.)
        (RECORD HOME STREET NAME AND NUMBER)

        _____

(ASK IF MAILTYPE=2 OR MAILHOME=2)
HOMECITY.   City?

        (RECORD NUMBER FOR APPROPRIATE CITY FROM CITY LIST)
        (RECORD 9996 FOR OTHER SPECIFY)

(ASK IF MAILTYPE=2 OR MAILHOME=2)

HOMESTAT.   INTERVIEWER: HIT "1" TO CONTINUE

        001   Washington

(ASK IF MAILTYPE=2 OR MAILHOME=2)
HOMEZIP.   Zip code?
           (RECORD ZIP CODE)

           __ __ __ __ __

(ASK IF MAILTYPE=2 OR MAILHOME=2)
HOMEXSTS.   What intersection is closest to this address?
           (RECORD TWO NEAREST CROSS STREETS)

           _____

HHINC.   Finally, in order to be sure that the project accurately represents all Puget Sound area
           residents, could you tell me what the total 2005 combined annual income is for your
           HOUSEHOLD? Is it:
           (IF NEEDED: "I understand your reluctance to divulge your household income.
           However, I can assure you that this information is used for classification purposes only.
           We must be sure that our project accurately represents Washington residents, and
           income is an important factor in projecting transportation needs.")
           (READ LIST)

        01   Below $50,000, or   **(GO TO INC_U50)**
        02     $50,000 to $100, 000 (G0 TO INC_**O50)**
        03   **Above $100,000 (GO TO INC_0100)**

        98   Don't Know
        99   Refused

(ASK IF HHINC=1)
INC_U50.   Please stop me when I get to the category that best describes the total 2005 combined
           income for everyone living in your household. Was it …?
           (IF NEEDED: "I understand your reluctance to divulge your household income.
           However, I can assure you that this information is used for classification purposes only.
           We must be sure that our project accurately represents Washington residents, and
           income is an important factor in projecting transportation needs.")

        01   Less than $10,000
        02     $10,000 to less than $20,000
        03     $20,000 to less than $30,000
        04     $30,000 to less than $40,000
        05     $40,000 to less than $50,000

        98   Don't Know
        99   Refused

(ASK IF HHINC=2)
INC_O50.   Please stop me when I get to the category that best describes the total 2005 combined
           income for everyone living in your household. Was it …?

(IF NEEDED: "I understand your reluctance to divulge your household income. However, I can assure you that this information is used for classification purposes only. We must be sure that our project accurately represents Washington residents, and income is an important factor in projecting transportation needs.")

01	$50,000 to less than $60,000
02	$60,000 to less than $70,000
03	$70,000 to less than $80,000
04	$80,000 to less than $90,000
05	$90,000 to less than $100,000

(ASK IF HHINC=3)

INC_O50.   Please stop me when I get to the category that best describes the total 2005 combined income for everyone living in your household. Was it …?
(IF NEEDED: "I understand your reluctance to divulge your household income. However, I can assure you that this information is used for classification purposes only. We must be sure that our project accurately represents Washington residents, and income is an important factor in projecting transportation needs.")

01	$100,000 to less than $110,000
02	$110,000 to less than $120,000
03	$120,000 to less than $130,000
04	$130,000 to less than $140,000
05	$140,000 to less than $150,000
06	$150,000 OR MORE
98	Don't Know
99	Refused
98	Don't Know
97	Refused

OTHER.   For future contact, where is the best place to reach you?
(DO NOT READ LIST. PROMPT, IF NEEDED.)

01	Home	
02	Work	**(GO TO O_NUM)**
03	Cell phone	**(GO TO O_NUM)**
04	Other	**(GO TO O_NUM)**
98	Don't Know	
99	Refused	

(ASK IF OTHER>1 AND OTHER<98)

O_NUM.   Can I have that number please?
(RECORD PHONE NUMBER TO REACH RESPONDENT AT)

(__ __ __) __ __ __ - __ __ __ __

END.   That completes this portion of the project. The travel diaries will be sent to you in the mail and need to be completed on **<INSERT TRAVEL DATES>**. A MORPACE interviewer will call to collect your household's travel information over the phone the day

following your second assigned travel day, or within a few days if we have trouble reaching you.

If you have any questions, a toll-free number will be provided with your project package, along with information to verify the project's legitimacy.

Your household's participation in this project is greatly appreciated. Thank you for your time.

(PROVIDE IF REQUESTED: 1-800-294-9668)
(PROVIDE IF REQUESTED: www. psrc.org)

Draft Retrieval Script
PSRC Household Activity Survey 2006
FINAL VERSION   05/02/06

Puget Sound Regional Council
Retrieval Interview

NOT IN CATI:
Proxy Rules: A proxy interview is REQUIRED for persons under 14 years old. Persons 14 or 15 years of age SHOULD be proxy interviews, unless an adult requests we talk directly to the individual. Persons 16 years of age and older should NOT be interviewed by proxy until Day 4, unless the interview will be lost if a proxy is not allowed sooner.

Interview 1:   "Hello, may I speak with (READ FIRST NAME ON HOUSEHOLD LIST)?"

If first person is not available, ask to speak to the next household member who is at least 16 years of age.

Interview >1:   "Now let's talk about (READ NEXT NAME ON HOUSEHOLD LIST)."

If next person is at least 16 years old, read:
"We would prefer to talk to (NAME) directly. Is (NAME) available to give me his/her travel information?"

If next person is available, conduct interview with respondent.
If next person is NOT available, conduct a proxy interview or schedule a callback.

CATI:
FIRST.   (INTERVIEWER: Is this the first person in the household that you are interviewing during this call?)

01   Yes   **(GO TO INT_CALL)**
02   No   **(GO TO PROXY)**

(ASK IF FIRST=1, IF CALLING USING NO INCENTIVE RETRIEVAL SCRIPT)
INT_CALL.   Hello, my name is **<INSERT INTERVIEWER'S FIRST NAME>** and I'm calling on behalf of the Puget Sound Regional Council. Your household recently agreed to participate in "the Household Travel Survey", a study to better understand travel patterns of Puget Sound area residents. I'm calling now to collect your household's travel information from **<INSERT TRAVEL DAY 1>** and **<INSERT TRAVEL DAY 2>**.

01   Continue with interview   **(GO TO PROXY)**
02   TERMINATE – No longer willing to participate   **(THANK AND TERMINATE)**
03   Mailed Diaries   **(GO TO MAIL_D)**

(ASK IF CALLING USING INCENTIVE RETRIEVAL SCRIPT)
INT_CALL_1.   Hello, my name is **<INSERT INTERVIEWER'S FIRST NAME>** and I'm calling on behalf of the Puget Sound Regional Council. Your household recently agreed to participate in "The Household Travel Survey", a study to better understand travel patterns of Puget Sound residents. As a token of our appreciation, we will send you a check for $10.00 after we collect travel information from all members of your household. I am calling now to collect your household's travel information for the last two days.

       01   Continue with interview   **(GO TO PROXY)**
       02   TERMINATE – No longer willing to participate **(THANK AND TERMINATE)**
       03   Mailed Diaries   **(GO TO MAIL_D)**

(ASK IF CALLING USING INCENTIVE RETRIEVAL SCRIPT)
INT_CALL_2.   Hello, my name is **<INSERT INTERVIEWER'S FIRST NAME>** and I'm calling on behalf of the Puget Sound Regional Council. Your household recently agreed to participate in "The Household Travel Survey", a study to better understand travel patterns of Puget Sound residents. As a token of our appreciation, we will send you a check for $15.00 after we collect travel information from all members of your household. I am calling now to collect your household's travel information for the last two days.

       01   Continue with interview   **(GO TO PROXY)**
       02   TERMINATE – No longer willing to participate **(THANK AND TERMINATE)**
       03   Mailed Diaries   **(GO TO MAIL_D)**

(ASK IF CALLING USING INCENTIVE RETRIEVAL SCRIPT)
INT_CALL_4.   Hello, my name is **<INSERT INTERVIEWER'S FIRST NAME>** and I'm calling on behalf of the Puget Sound Regional Council. Your household recently agreed to participate in "The Household Travel Survey", a study to better understand travel patterns of Puget Sound residents. As a token of our appreciation, we will send you a check for $20.00 after we collect travel information from all members of your household. I am calling now to collect your household's travel information for the last two days.

       01   Continue with interview   **(GO TO PROXY)**
       02   TERMINATE – No longer willing to participate **(THANK AND TERMINATE)**
       03   Mailed Diaries   **(GO TO MAIL_D)**

(ASK IF CALLING USING INCENTIVE/GPS RETRIEVAL SCRIPT)
GPS_1.   Hello, my name is **<INSERT INTERVIEWER'S FIRST NAME>** and I'm calling on behalf of the Puget Sound Regional Council. Your household recently agreed to participate in "The Household Travel Survey", a study to better understand travel in your area. As a token of our appreciation, we will send you a check for $30.00 after we collect both the GPS information for all assigned household vehicles and the diary travel information from all members of your household

Was the GPS vehicle information collected for both assigned travel days for your household?

       01   Yes
       02   No

(ASK IF CALLING USING INCENTIVE/GPS RETRIEVAL SCRIPT)
GPS_2.   Have the GPS units been sent back, or has the pick-up been scheduled?

       01   Yes, units have been sent back (GO TO INT_CALL_3)

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| | 02 | No, units have not been sent back (GO TO GPS _3) |

IF GPS_2=02   "Your household will still receive a check for $15 if all members complete their travel information.

GPS_3   Please return the units in the FedEX return package provided. (IF NEEDED, "Drop the return package in any FedEX box")
Will you be able to this in the next day or two?

| | 1 | Yes (GO TO INT_CALL_3) |
| | 2 | No   (GO TO GPS_4) |

GPDS_4   Someone will call you back in the next day or two to make arrangements (GO TO INT_CALL_3)

I**(ASK IF CALLING USING INCENTIVE/GPS RETRIEVAL SCRIPT)**
INT_CALL_3.   I am calling now to collect your household's DIARY travel information for your assigned travel period **(INSERT DAY 1)** and **(INSERT DAY2).**

	01	Continue with interview	**(GO TO COMP_D)**
	02	TERMINATE – No longer willing to participate	**(THANK AND TERMINATE)**
	03	Mailed Diaries	**(GO TO MAIL_D)**

COMP_D   Has everyone in the household completed their diary?

	01	Yes
	02	No (No one in the household has completed their diary)
	03	Some but not all members have completed their diary

(ASK IF COMP_D=01 OR 03)
HAVE_D   Do you have the diary (diaries) in front of you now? ("I'll wait while you get them.")

| | 01 | Yes |
| | 02 | No |

(ASK IF HAVE_D=2)
HAVE_DNEW   Please recall your travel for (INSERT DAY 1) **and** (INSERT DAY2) as best as you can.

| | 01 | Continue |
| | 02 | Can't recall travel (THANK AND TERMINATE) |

(ASK IF INT_CALL=03 OR INT_CALL_2=03 OR INT_CALL_3=03)
MAIL_D.   Thank you very much. We will check our system to confirm the information. You will hear from us shortly.

(ASK IF FIRST=2 OR INT_CALL=1)
PROXY.   (INTERVIEWER: Is the respondent on the phone?)

	01	Respondent IS on the phone
	02	PROXY interview/Respondent IS NOT on the phone
	03	Entering information from a MAILED in diary

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(ASK IF PROXY=2)
PROXYNAM.   (INTERVIEWER: Who is providing the proxy information?)

                 <LIST HOUSEHOLD MEMBERS 16 YEARS OF AGE AND OLDER (OR DK/OR REFUSED AGE), NOT INCLUDING THE RESPONDENT >

(ASK IF FIRST PERSON/ PERSON FROM RECRUIT)
C_PPL.   Before recording the travel information, I need to confirm the number of people living in your household. In our first call to your household, you indicated **<INSERT HHNUMPPL FROM RECRUIT>** person(s) live(s) in your household. Is that correct?

         01   Yes - Household size is correct
         02   No - ADD a household member
         03   No - REMOVE a household member

(ASK IF C_PPL=2)
ADD_HM.   I need to ask a few quick questions about this household member.

         (INTERVIEWER: COMPLETE ADDITIONAL PERSON FORM FOR EACH ADDITIONAL HOUSEHOLD MEMBER!)

(ASK IF C_PPL=3)
REM_HM.   Which person(s) are not actually members of your household?

         (INTERVIEWER: COMPLETE REMOVAL FORM FOR EACH HOUSEHOLD MEMBER!)

         <LIST NAME_# FOR EACH HOUSEHOLD MEMBER>

(ASK IF FIRST PERSON/CONTACT PERSON FROM RECRUIT)
C_VEH.   I also need to confirm the number of vehicles available to your household. . In our first call to your household, you indicated, **<INSERT HHNUMVEH FROM RECRUIT>** vehicle(s) are/is available to your household for regular use. Is that correct?

         01   Yes - Number of vehicles is correct
         02   No - Change number of vehicles

(ASK IF C_VEH=2)
CORR_VH.   How many working vehicles are available to your household?
               (INTERVIEWER: Verify if more than 6 vehicles.)
               (RECORD NUMBER OF HOUSEHOLD VEHICLES) (FOR MORE THAN 10 VEHICLES, RECORD MAKE AND MODEL AND YEAR ON ADD VEHICLE FORM)

         __ __   (PROGRAMMER: Allow 0 to 10 vehicles.)

         97   Zero/None
         98   Don't Know
         99   Refused

(ASK IF CORR_VH>0 and <97)
HHVEHTYPE_1 What is the make and model of the first vehicle in your household?
HHVEHTYPE_# What is the make and model of the next vehicle in your household?

(SEARCH QUESTION)

_____

9999   REFUSED

HHVEHYEAR_# What is the year of this vehicle?

__ __ __ __   (PROGRAMMER NOTE: MUST BE BETWEEN 1900 AND 2006)

9999   REFUSED

START.   Now I need to ask a few questions about school and work. These questions were
              included in the diary sent for each member of your household.

> PROGRAMMER NOTE: Throughout the interview, when (text1/text2) is used,
> text1 should be used if PROXY=1. Text2 should be used if PROXY>1.

S_STATUS.   (Are you/Is NAME) currently attending any level of school?
              (INTERVIEWER NOTE: From preschool/nursery school to college.)

              01   Yes
              02   No - NOT CURRENTLY A STUDENT

              98   Don't Know
              99   Refused

(ASK IF S_STATUS=1)
S_TYPE.   What type of school (do you/does NAME) attend?
              (DO NOT READ LIST. IF NEEDED, PROMPT WITH CATEGORIES.)

              01   Pre-school/Nursery school
              02   K-12 (elementary/grammar school, middle/junior high, high school)
              03   Vocational/Technical
              04   FULL-time college student (including graduate or professional school)
              05   PART-time college student (including graduate or professional school)

              98   Don't Know
              99   Refused

(ASK IF S_STATUS=1)
S_NAME.   What is the NAME of (your/NAME's) school?
              (PROBE FOR FULL NAME OF SCHOOL)

_____

(ASK IF S_STATUS=1)
S_ADDR.   What is the ADDRESS of (your/NAME's) school?
              (IF NEEDED, ASK FOR SPELLING.)
              (IF DK/REF, DO NOT TYPE – HIT ENTER)

(RECORD STREET NUMBER AND NAME)

_____

(ASK IF S_STATUS=1)
S_CITY.   City?
             (RECORD CITY NUMBER FROM LIST OF PUGET SOUND AREA CITIES)

           ___ ___ ___ ___

           9996   Other (Specify _____)

           9998   Don't Know
           9999   Refused

(ASK IF S_STATUS=1 AND S_CITY>9995)
S_STATE.   State?
             (DO NOT READ LIST)

           001   Washington
           996   Other (Specify _____)

           998   Don't Know
           999   Refused

ASK IF S_STATUS=1)
S_ZIP.   Zip Code?

            ___ ___ ___ ___ ___

                99998   Don't Know
                99999   Refused

(ASK IF S_STATUS=1)
S_XSTS.   What are the nearest cross streets?
                (RECORD CROSS STREETS)

            _____

(ASK IF WRKR_# =1:2)
W_CONF.   In our first call to your household, you indicated that (you are/NAME is) currently
employed. Is that correct?

                01   Yes - employed
                02   No - NOT employed

(ASK IF W_CONF=2)
CNOWK.   (Are you/Is NAME) looking for paid work?

                01   Yes
                02   No

                98   Don't Know
                99   Refused

(ASK IF WRKR_# =3:4)
NW_CONF.   In our first call to your household, you indicated (you are/NAME is) NOT currently
                employed in paid work. Is that correct?

                01   Yes - NOT employed
                02   No - employed

(ASK IF NW_CONF=2)
CWRKR_1.   (Are you/Is NAME) a…?
                (READ LIST)

                01   Full-time worker
                02   Part-time worker

                98   Don't Know
                99   Refused

(ASK IF W_CONF=1 OR NW_CONF=2)
MJOB_#   (Do you/Does NAME) have more than one job?

                    01   Yes
                    02   No

(ASK IF MJ0B=1)
JOB#_#   How many jobs (do you/does NAME) have?

               — —

(ASK IF W_CONF=1 OR CWRKR_# =1:2)
W1_NAME.   Puget Sound's transportation community is interested in where people work because travel to work often affects other daily travel. What is the name of (your/NAME's) employer?
                 (INTERVIEWER: If respondent has more than one job, the following questions refer to the primary job – where the respondent goes to work most often)
                 (RECORD FULL COMPANY NAME)

                 _____

(ASK IF W_CONF=1 OR CWRKR_# =1:2)
W1_TYPE.   What type of business is that?
                 (RECORD TYPE OF COMPANY)

                 _____

(ASK IF W_CONF=1 OR CWRKR_# =1:2)
W1_ADDR.   What is the street address of (your/NAME's) workplace?
                 (INTERVIEWER NOTE: If respondent works both at home and at work, enter "1" and then enter the work address.)
                 (DO NOT READ LIST)

                 01   Workplace
                 02   Works only at home
                 03   No fixed workplace

(ASK IF W1_ADDR=1)
W1_STR.   (RECORD WORKPLACE STREET ADDRESS)
                 (INTERVIEWER NOTE: Do NOT enter a Post Office Box!)
                 (IF NEEDED: "We are not going to contact the employer.")
                 (IF DK/REF, DO NOT TYPE – HIT ENTER)
                 (RECORD STREET NUMBER AND STREET NAME)

                 _____

(ASK IF W1_ADDR=1)
W1_CITY.   City?
(RECORD CITY NUMBER FROM LIST OF WASHINGTON CITIES)

___ ___ ___ ___

9996   Other (Specify _____)

9998   Don't Know
9999   Refused

(ASK IF W1_ADDR=1 AND W1_CITY>9995)
W1_STATE.   State?
(DO NOT READ LIST)

001   Washington
996   Other (Specify _____)

998   Don't Know
999   Refused

(ASK IF W1_ADDR=1)
W1_ZIP.   Zip Code?

___ ___ ___ ___ ___

99998 Don't Know
99999 Refused

(ASK IF W1_ADDR=1)
W1_XSTS.   What are the nearest cross streets?
(RECORD CROSS STREETS)

_____

(ASK IF W_CONF=1 OR CWRKR_# =1:2)
W1_IND.   What is (your/NAME's) employer's industry?
(IF NEEDED: By industry, we mean the employer's principal business or activity.)
(DO NOT READ LIST)

001   Agriculture, Forestry, Fishing and Hunting
002   Mining
003   Utilities
004   Construction
005   Manufacturing
006   Wholesale Trade
007   Retail Trade
008   Transportation and Warehousing
009   Information
010   Finance and Insurance
011   Real Estate, Rental/Leasing
012   Professional, Scientific and Technical Services
013   Management of Companies and Enterprises

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014	Administrative and Support and Waste Management and Remediation Services
015	Educational Services
016	Health Care and Social Services
017	Arts, Entertainment, and Recreation
018	Accommodation and Food Services
019	Public Administration/Government
020	Other Services
021	Military
996	Other (Specify _____)
998	Don't Know
999	Refused

(ASK IF W_CONF=1 OR CWRKR_# =1:2)
W1_TIMES.   Does (your/NAME's) job involve …?

| W1_EVES. | A. | Evenings |
| W1_ONITE. | B. | Overnight shifts |

01	Yes
02	No
98	Don't Know
99	Refused

(ASK IF W_CONF=1 OR CWRKR_# =1:2)
W1_HRS.   On average, how many hours per week (do you/does NAME) work at this job?

___ ___ ___   (PROGRAMMER: Allow 1 to 120.)

| 998 | Don't Know |
| 999 | Refused |

(ASK IF W_CONF=1 OR CWRKR_# =1:2)
W1_FLEX.   Which of the following statements best describes (your/NAME's) work schedule?

01	"I have NO FLEXIBILITY in my work schedule."
02	"I have SOME FLEXIBILITY in my work schedule."
03	"I'm PRETTY MUCH FREE to adjust my schedule as I like."
98	Don't Know
99	Refused

(ASK IF W_CONF=1 OR CWRKR_# =1:2)
W1_COMP.   Does (your/NAME's) employer offer compressed work week options?
(IF NEEDED: "A compressed work week is working 40 hours in less than 5 days.")

01	Yes
02	No
98	Don't Know
99	Refused

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W1_YEARS   How long have you worked at that address? Is it:

01   Less than a year
02   Between 1 and 2 years
03   Between 2 and 3 years
04   Between 3 and 5 years
05   Between 5 and 10 years
06   Between 10 and 20 years
07   More than 20 years

(ASK IF PROXY=01)
W1_FREQ.   How many days per week do you typically go to work at that address? (ALLOW 1 THROUGH 7)

_____

(ASK IF PROXY=01)
W1_MODE   In the last 10 times you went to work at this address, roughly how many of those times did you travel by…

_____   Car, driving alone
_____   Car, sharing a ride with others
_____   Bus or train using park and ride
_____   Other bus or train
_____   Bicycle
_____   Walking the entire way
_____   Ferry with car
_____   Other Ferry

(TOTAL=10, ELSE CORRECT)

(ASK IF PROXY=01) (SKIP IF W1_EVES=01 AND/OR W1_ONITE=01)
W1_ARRIVE   And in the last 10 times you went to work at this address, roughly how many of those times did you ARRIVE there….

_____   Before 6 am
_____   Between 6 and 6:30 am
_____   Between 6:30 and 7 am
_____   Between 7 and 7:30 am
_____   Between 7:30 and 8 am
_____   Between 8 and 8:30 am
_____   Between 8:30 and 9 am
_____   After 9 am

(ASK IF PROXY=01)
W1_LEAVE   And in the last 10 times you went to work at this address, roughly how many of those times did you LEAVE there….

_____   Before 3:30 pm
_____   Between 3:30 and 4 pm
_____   Between 4 and 4:30 pm
_____   Between 4:30 and 5 pm
_____   Between 5 and 5:30 pm

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_____ Between 5:30 and 6 pm
_____ Between 6 and 6:30 pm
_____ After 6:30 pm

(ASK IF PROXY=01)
W1_CONGT   Do you choose the times you go to and from work in order to avoid traffic congestion?

_____ No
_____ Yes, occasionally
_____ Yes, usually

(ASK IF PROXY=01 AND W1_YEARS<06)
INTRO3.   Planners know there are relationships between the decisions people make about where they work and where they have to travel. We have a few questions about your previous work location

(ASK IF PROXY=01 AND W1_YEARS<06)
PREV_WCTY. In what COUNTY was your previous work address located?

01   King (city of Seattle)
02   King (outside of Seattle)
03   Kitsap
04   Pierce
05   Snohomish
06   Other Washington State location
07   Other state

998   Don't Know   **(GO TO AREA_TM)**
999   Refused   **(GO TO AREA_TM)**

(ASK IF PREV_WCTY < 07)
PREVWADD.   What was your previous work address?
            (RECORD STREET ADDRESS)
            (BE SURE TO INCLUDE SUITE NUMBER, IF APPLICABLE)

            _____

(ASK IF PREV_WCTY < 07)
PMAILWCITY. City
            (RECORD NUMBER FOR APPROPRIATE CITY FROM THE CITY LIST)
            (RECORD 9996 FOR OTHER SPECIFY)
            ___ ___ ___

(ASK IF PREV_WCTY < 07)
PMAILWZIP. Zip code?
            (VERIFY/EDIT ZIP CODE OR RECORD NEW ZIP CODE)

            __ __ __ __ __
            <INSERT ZIP>

(ASK IF W1_YEARS < 06)
PWMOVE1.   What was the <u>primary</u> reason you moved from your previous work address? (ASK AS OPEN END. MULTIPLE RESPONSES ALLOWED)

        01   Changed job
        02   Transferred
        03   Employer moved
        04   Other

(IF PWMOVE1=01)
PWMWHY1   Why did you change jobs?

_____

(ASK IF MJOB=01)
W2_NAME.   What is the name of (your/NAME's) SECONDARY employer?
                  (RECORD FULL COMPANY NAME)

_____

(ASK IF MJOB=01)
W2_TYPE.   What type of business is that?
                  (RECORD TYPE OF COMPANY)

_____

(ASK IF MJOB=01)
W2_ADDR.   What is the street address of this workplace?
                  (INTERVIEWER NOTE: If respondent works both at home and at work, enter "1" and then enter the work address.)
                  (DO NOT READ LIST)

        01   Workplace
        02   Works only at home
        03   No fixed workplace

(ASK IF W2_ADDR=1)
W2_STR.   (RECORD WORKPLACE STREET ADDRESS)
                (INTERVIEWER NOTE: Do NOT enter a Post Office Box!)
                (IF NEEDED: "We are not going to contact the employer.")
                (IF DK/REF, DO NOT TYPE – HIT ENTER)
                (RECORD STREET NUMBER AND STREET NAME)

_____

(ASK IF W2_ADDR=1)
W2_CITY.   City?
                (RECORD CITY NUMBER FROM LIST OF WASHINGTON CITIES)

    ___ ___ ___ ___

```
                9996    Other (Specify _____ )

                9998    Don't Know
                9999    Refused
```

(ASK IF W2_ADDR=1 AND W2_CITY=9996)
W2_STATE.   State?
             (DO NOT READ LIST)

```
                001     Washington
                996     Other (Specify _____ )

                998     Don't Know
                999     Refused
```

(ASK IF W2_ADDR=1)
W2_ZIP.   Zip Code?

              ___ ___ ___ ___ ___

```
                99998   Don't Know
                99999   Refused
```

(ASK IF W2_ADDR=1)
W2_XSTS.   What are the nearest cross streets?
             (RECORD CROSS STREETS)

             _____

(ASK IF MJOB=01)
W2_IND.   What is (your/NAME's) employer's industry?
             (IF NEEDED: By industry, we mean the employer's principal business or activity.)
             (DO NOT READ LIST)

```
                001     Agriculture, Forestry, Fishing and Hunting
                002     Mining
                003     Utilities
                004     Construction
                005     Manufacturing
                006     Wholesale Trade
                007     Retail Trade
                008     Transportation and Warehousing
                009     Information
                010     Finance and Insurance
                011     Real Estate, Rental/Leasing
                012     Professional, Scientific and Technical Services
                013     Management of Companies and Enterprises
                014     Administrative and Support and Waste Management and Remediation Services
                015     Educational Services
                016     Health Care and Social Services
                017     Arts, Entertainment, and Recreation
                018     Accommodation and Food Services
                019     Public Administration/Government
```

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020	Other Services
021	Military
996	Other (Specify _____)

(ASK IFMJOB=01)
W2_TIMES.   Does this job involve …?

W2_EVES.   A.   Evenings
W2_ONITE.   B.   Overnight shifts

01	Yes
02	No
98	Don't Know
99	Refused

(ASK IF MJOB=01)
W2_HRS.   On average, how many hours per week (do you/does NAME) work at this job?

___ ___ ___   (PROGRAMMER: Allow 1 to 120.)

998	Don't Know
999	Refused

(ASK IF MJOB=01)
W2_FLEX.   Which of the following statements best describes (your/NAME's) work schedule?

01	"I have NO FLEXIBILITY in my work schedule."
02	"I have SOME FLEXIBILITY in my work schedule."
03	"I'm PRETTY MUCH FREE to adjust my schedule as I like."
98	Don't Know
99	Refused

(ASK IF MJOB=01)
W2_COMP.   Does (your/NAME's) employer offer compressed work week options?
(IF NEEDED: "A compressed work week is working 40 hours in less than 5 days.")

01	Yes
02	No
98	Don't Know
99	Refused

TRANSIT_#   Have you used public transit within the last 30 days?
Has <INSERT NAME-#> used public transit within the last 30 days?

01	Yes
02	No
98	Don't Know
99	Refused

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TPASS_1.   Do you have a bus or transit pass?
TPASS_#.   Does **<INSERT NAME_#>** have a bus or transit pass?

           01   Yes
           02   No

           98   Don't Know
           99   Refused

(ASK IF TPASS_# =1)
PTYPE_1.   What bus or transit passes do you have?
               Any others?
PTYPE_#.   What bus or transit pass does **<INSERT NAME_#>** have?
               Any others?
               (MULTIPLE MENTION. UP TO THREE RESPONSES.)

           01   Puget Pass
           02   Metro Transit Ticketbooks
           03   Van/Pool Transit Pass (Metro)
           04   Reduced Fare Sticker (Metro)
           05   Ship to Shore PugetPass
           06   ACCESS Pass (Metro)
           07   Visitor Pass (Metro)
           08   Kitsap Transit Regular Routed Monthly Bus Pass
           09   Kitsap Transit *ACCESS and **Reduced Fare Monthly Bus Pass
           10   Bus-Ferry Pass (Auto-Ferry for walk-on passengers)
           11   Puget Pass (Auto-Ferry for walk-on passengers)
           12   Kitsap Transit Worker/Driver 40-Ride Punch Ticket
           13   Kitsap Transit Worker/Driver Monthly Pass
           14   Transit Ticketbooks (Pierce Transit or Sound Transit)
           15   U-Pass
           16   EdPass
           17   FlexPass
           18   ET Passes (Everett Transit)
           19   Ferry Only Passes (Washington State Ferries)
           20   Ticket Vending Machine Tickets (Sound Transit)

           996   Other (Specify _____)

           998   Don't Know
           999   Refused

FVALUE1_#.   How much is the face value of this transit pass?
               <INSERT TEXT FROM PTYPE_# FIRST MENTION ANSWER>
               (DO NOT READ LIST)

           01   (Amount (to be recorded in next question)

           98   Don't Know
           99   Refused

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(ASK IF FVALUE1_# =1)
FVCOST1A_#. (RECORD TRANSIT PASS FACE VALUE - DOLLARS)

___ ___ ___ ___   (PROGRAMMER: Allow 0 to 9000.)

(ASK IF FVALUE1_# =1)
FVCOST1B_#. (RECORD TRANSIT PASS FACE VALUE - CENTS)

___ ___   (PROGRAMMER: Allow 0 to 99.)

(ASK IF FVALUE1_# =1)
FVALUE1C_#. Is this rate…?
             (READ LIST)

      001   Weekly
      002   Monthly
      003   Annually
      996   Other (Specify _____)

      998   Don't Know
      999   Refused

(ASK IF PVALUE1_# =1 OR 998)
PCOST1_1.   How much do you <u>personally</u> pay for this transit pass?
PCOST1_!#.   How much does **<INSERT NAME_#>** <u>personally</u> pay for this transit pass?
             <INSERT TEXT FROM PTYPE SECOND MENTION ANSWER>
             (DO NOT READ LIST)

      01   NOTHING
      02   Amount (to be recorded in next question)

      98   Don't Know
      99   Refused

(ASK IF PCOST1_# =2)
COST1A_#.   (RECORD TRANSIT PASS COST - DOLLARS)

___ ___ ___ ___   (PROGRAMMER: Allow 0 to 9000.)

(ASK IF PCOST1_# =2)
COST1B_#.   (RECORD TRANSIT PASS COST - CENTS)

___ ___   (PROGRAMMER: Allow 0 to 99.)

(ASK IF PCOST1_# =2)
COST1C_#.   Is this rate…?
             (READ LIST)

      001   Weekly
      002   Monthly
      003   Annually

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996   Other (Specify _____)

998   Don't Know
999   Refused

FVALUE2_#.   How much is the face value of this transit pass?
               <INSERT TEXT FROM PTYPE_# SECOND MENTION ANSWER>
               (DO NOT READ LIST)

               01   (Amount (to be recorded in next question)

               98   Don't Know
               99   Refused

(ASK IF FVALUE2_# =1)
FVCOST2A_#.   (RECORD TRANSIT PASS FACE VALUE - DOLLARS)

               ___ ___ ___ ___   (PROGRAMMER: Allow 0 to 9000.)

(ASK IF FVALUE2_# =1)
FVCOST2B_#.   (RECORD TRANSIT PASS FACE VALUE - CENTS)

               ___ ___   (PROGRAMMER: Allow 0 to 99.)

(ASK IF FVALUE2_# =1)
FVALUE2C_#.   Is this rate…?
               (READ LIST)

               001   Weekly
               002   Monthly
               003   Annually
               996   Other (Specify _____)

               998   Don't Know
               999   Refused

(ASK IF PVALUE2_# =1 OR 998)
PCOST2_1.   How much do you <u>personally</u> pay for this transit pass?
PCOST2_!#.   How much does **<INSERT NAME_#>** <u>personally</u> pay for this transit pass?
               <INSERT TEXT FROM PTYPE SECOND MENTION ANSWER>
               (DO NOT READ LIST)

               01   NOTHING
               02   Amount (to be recorded in next question)

               98   Don't Know
               99   Refused

(ASK IF PCOST2_# =2)
COST2A_#.   (RECORD TRANSIT PASS COST - DOLLARS)

               ___ ___ ___ ___   (PROGRAMMER: Allow 0 to 9000.)

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(ASK IF PCOST2_# =2)
COST2B_#.   (RECORD TRANSIT PASS COST - CENTS)

___ ___   (PROGRAMMER: Allow 0 to 99.)

(ASK IF PCOST2_# =2)
COST2C_#.   Is this rate…?
             (READ LIST)

             001   Weekly
             002   Monthly
             003   Annually
             996   Other (Specify _____)

             998   Don't Know
             999   Refused

FVALUE3_#.   How much is the face value of this transit pass?
             <INSERT TEXT FROM PTYPE_# THIRD MENTION ANSWER>
             (DO NOT READ LIST)

             01   (Amount (to be recorded in next question)

             98   Don't Know
             99   Refused

(ASK IF FVALUE3_# =1)
FVCOST3A_#. (RECORD TRANSIT PASS FACE VALUE - DOLLARS)

___ ___ ___ ___   (PROGRAMMER: Allow 0 to 9000.)

(ASK IF FVALUE3_# =1)
FVCOST3B_#. (RECORD TRANSIT PASS FACE VALUE - CENTS)

___ ___   (PROGRAMMER: Allow 0 to 99.)

(ASK IF FVALUE3_# =1)
FVALUE3C_#. Is this rate…?
             (READ LIST)

             001   Weekly
             002   Monthly
             003   Annually
             996   Other (Specify _____)

             998   Don't Know
             999   Refused

(ASK IF PVALUE3_# =1 OR 998)
PCOST3_1.   How much do you <u>personally</u> pay for this transit pass?
PCOST3_!#.   How much does **<INSERT NAME_#>** <u>personally</u> pay for this transit pass?

<INSERT TEXT FROM PTYPE SECOND MENTION ANSWER>
(DO NOT READ LIST)

01   NOTHING
02   Amount (to be recorded in next question)

98   Don't Know
99   Refused

(ASK IF PCOST3_# =2)
COST3A_#.   (RECORD TRANSIT PASS COST - DOLLARS)

    ___ ___ ___ ___   (PROGRAMMER: Allow 0 to 9000.)

(ASK IF PCOST3_# =2)
COST3B_#.   (RECORD TRANSIT PASS COST - CENTS)

    ___ ___   (PROGRAMMER: Allow 0 to 99.)

(ASK IF PCOST3_ # =2)
COST3C_#.   Is this rate…?
    (READ LIST)

001   Weekly
002   Monthly
003   Annually
996   Other (Specify _____)

998   Don't Know
999   Refused

DISABL_#   **Do (you?NAME) have any disability that makes it difficult for you to travel?**

1   **Yes**
2   **No**

998   **Don't Know**
999   **Refused**

(ASK IF COMP_D=02 OR 03)
D_MEM.   Even if (you/NAME) didn't fill out all the diary information, each household member's travel information is important to us. Please try to recall the information as best you can.

START.   Now for your travel information, starting at 3:00 am on **<INSERT TRAVEL DAY 1>**, (were you/was NAME) …?
    (READ LIST)

01   Traveling (GO to LOCINFO_#)
02   At a location

LOCINFO_1   What is the name of this place?
LOCINFO_#   What is the name of the place you went next?
    _____

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STOP_#   Did you make any stops on the way to <INSERT LOCINFO_#>

                01   Yes   (GO TO SLOCINFO_#)
                02   No   (GO TO LOCATE_#)

IF PREVIOUS STOP_#=01, ASK)

STOPA_#   Did you stop anywhere else along the way.

                03   Yes   (GO TO SLOCINFO_#)
                04   No   (GO TO LOCATE_#)

SLOCINFO_   What is the name of the place where you stopped?

                _____

(ASK IF START=2)
LOCATE_S.   Where (were you/was NAME) at 3:00 am?

LOCATE_#.   Where is <INSERT LOCINFO_#)?

SLOCATE_#   Where is this?

                (DO NOT READ LIST)

                01   Home
                02   New location
                03   Previously reported location   (SHOW IF OTHER LOCATIONS COLLECTED)
                04   Primary workplace   (SHOW IF W1_ADDR=1)
                05   Secondary workplace   (SHOW IF W2_ADDR=1)
                06   School   (SHOW IF S_STATUS=1)
                07   (SHOW PLACE, START TIME, AND END TIME OF THE **FIRST** TRIP
                        ANOTHER HOUSEHOLD MEMBER TOOK WITH THE SUBJECT - IF START
                        TIME IS AFTER THE PREVIOUS END TIME)
                08   (SHOW PLACE, START TIME, AND END TIME OF THE **NEXT** TRIP ANOTHER
                        HOUSEHOLD MEMBER TOOK WITH THE SUBJECT - IF START TIME IS
                        AFTER THE PREVIOUS END TIME)
                09   (SHOW PLACE, START TIME, AND END TIME OF THE **NTH** TRIP ANOTHER
                        HOUSEHOLD MEMBER TOOK WITH THE SUBJECT - IF START TIME IS
                        AFTER THE PREVIOUS END TIME)

(ASK IF LOCATE_# OR SLOCATE_# =03)
LOC_PREV_#. Which location?
                (IF NEEDED, READ LIST)

                01   (SHOW LNAME AND CITY OF THE **FIRST** PREVIOUS LOCATION)
                02   (SHOW LNAME AND CITY OF THE **NEXT** PREVIOUS LOCATION)
                03   (SHOW LNAME AND CITY OF THE **NTH** PREVIOUS LOCATION)

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(ASK IF LOCATE_# OR SLOCATE_# =02)
LOC_NAME_#. What is the NAME of this location?
        (IF NEEDED, ASK FOR SPELLING.)
        (RECORD NAME OF LOCATION)

        _____

(ASK IF LOCATE_# OR SLOCATE_# =02)

ADDR_#.   What is the ADDRESS of this location?
        (IF NEEDED, ASK FOR SPELLING.)
        (INTERVIEWER NOTE: Do NOT enter a Post Office Box!)
        (IF DK/REF, DO NOT TYPE – HIT ENTER)
        (RECORD STREET NUMBER AND NAME)

        _____

(ASK IF LOCATE_# OR SLOCATE_# =02)
CITY_#.   City?
        (RECORD CITY NUMBER FROM LIST OF SEATTLE AREA CITIES)

        ___ ___ ___ ___

        9996   Other (Specify _____)

        9998   Don't Know
        9999   Refused

(ASK IF CITY_# >995)
STATE_#.   State?
        (DO NOT READ LIST)

        001   Washington
        996   Other (Specify _____)

        998   Don't Know
        999   Refused

(ASK IF LOCATE_# OR SLOCATE_# =02)
ZIP_#.   Zip Code?

        ___ ___ ___ ___ ___

        99998 Don't Know
        99999 Refused

(ASK IF LOCATE_# OR SLOCATE_# =02)
TYPE_#.   What type of place or business is that?
        (DO NOT READ LIST. IF NEEDED, PROMPT WITH CATEGORIES.)

        001   Residential
        002   Automotive Dealer/Repair
        003   Bank/Financial Institution
        004   Barber/Beauty/Nail Salon
        005   Bookstore/Library/Newsstand
        006   Construction Site

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007	Convenience/Drug Store
008	Daycare Facility/Preschool/Nursery School
009	Gas Station
010	Government/Municipal/City Offices
011	Grocery
012	Hotel/Motel/Other Lodging Facility
013	Indoor Recreation - gym/health club, skating rink
014	Industrial Site
015	Medical Facility/Hospital
016	Movie Theater/Theatre/Concert Venue/Sports Arena
017	Museum/Zoo/Historic Site
018	Office Building
019	Outdoor Recreation - Park, Athletic Field, Beach
020	Religious - Church/Synagogue/Houses of Worship
021	Restaurant/Fast Food/Bar & Grill
022	School - K-12
023	School - College/University/Technical/Vocational
024	Shopping Mall/Department Store
025	Transportation Station, Stop, Terminal (airport, train, or bus)
996	Other (Specify _____)
998	Don't Know
999	Refused

(ASK IF LOCATE_# OR SLOCATE_# =02)
XSTS_#.   What are the nearest cross streets?
(RECORD CROSS STREETS)

_____

(ASK IF LOCATE_# =02 AND PROXY=01)
NLOCFREQ_#. How often have you visited <INSERT LOCINFO_#?

(ASK IF SLOCATE_# =02 AND PROXY=01)
SNLOCFREQ_# How often have you visited this stop?

01	Never before
02	Very rarely
03	1-10 times per year
04	1-3 times per month
05	Once per week or more

(ASK IF NLOC_FREQ OR SNLOCFREW>02)
NLOCMODE_#.Have you ever used any modes of travel to get to this location besides the one you used
this time? (ALLOW MULTIPLE RESPONSES)

01	No
02	Yes, by car
03	Yes, by transit
04	Yes, by bicycle
05	Yes, by foot

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(ASK IF NLOC_MODE >01)
NLOC_MR_#   What is the <u>main</u> reason you did not use that mode (those modes) for this trip?

             001   Did not have time
             002   Was not convenient
             003   Car was not available
             004   Someone gave me a ride
             005   Too expensive
             996   Other *(Please Specify)* _____

((ASK IF TRAV_# =1 OR NOTRV_1=2 OR DDONE_# =2)
DHOUR_#.   What time did (you/NAME) LEAVE this location?
                  (SELECT HOUR OF DEPARTURE TIME)

001	3:00 AM
002	4:00 AM
003	5:00 AM
004	6:00 AM
005	7:00 AM
006	8:00 AM
007	9:00 AM
008	10:00 AM
009	11:00 AM
010	12:00 PM (NOON)
011	1:00 PM
…	
020	10:00 PM
021	11:00 PM
022	12:00 AM (MIDNIGHT)
023	1:00 AM
024	2:00 AM

(ASK IF TRAV_# =1 OR NOTRV_1=2 OR DDONE_# =2)
LOC_TIME2_#. (SELECT MINUTE OF DEPARTURE TIME)

001	#:01
002	#:02
003	#:03
004	#:04
005	#:05
006	#:06
007	#:07
008	#:08
009	#:09
010	#:10
…	
053	#:53
054	#:54
055	#:55
056	#:56
057	#:57
058	#:58
059	#:59
060	#:00

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A1_#. What was (your/NAME's) PRIMARY activity at this location?
(DO NOT READ LIST. IF NEEDED, PROMPT WITH CATEGORIES.)

001	1 Home – Paid Work	(SHOW IF LOCATE_ # =1 AND (W_CONF=1 OR CWRKR_# =1:2))
002	2 Home – Other	(SHOW IF LOCATE_ # =1)
003	3 Work	
004	4 Attend Childcare	
005	5 Attend School	
006	6 Attend College	
007	7 Eat Out	
008	8 Personal Business	
009	9 Everyday Shopping	
010	10 Major Shopping	
011	11 Religious/Community	
012	12 Social	
013	13 Recreation – Participate	
014	14 Recreation – Watch	
015	15 Accompany Another Person	
016	16 Pick-Up/Drop-Off Passenger	
017	17 Turn Around	

A2_#. Did (you/NAME) do anything else at this location?
(MULTIPLE MENTION, UP TO THREE RESPONSES.)
(DO NOT READ LIST. IF NEEDED, PROMPT WITH CATEGORIES.)
(PROGRAMMER NOTE: Do not show A1_# answer.)

001	1 Home – Paid Work	(SHOW IF LOCATE_ # =1 AND (W_CONF=1 OR CWRKR_# =1:2))
002	2 Home – Other	(SHOW IF LOCATE_# =1)
003	3 Work	
004	4 Attend Childcare	
005	5 Attend School	
006	6 Attend College	
007	7 Eat Out	
008	8 Personal Business	
009	9 Everyday Shopping	
010	10 Major Shopping	
011	11 Religious/Community	
012	12 Social	
013	13 Recreation – Participate	
014	14 Recreation – Watch	
015	15 Accompany Another Person	
016	16 Pick-Up/Drop-Off Passenger	
017	17 Turn Around	
097	97 NO OTHER ACTIVITY	

(ASK IF PROXY=01 AND LOCATE_# OR SLOCATE_# =2 AND A1_ # >006 AND NLOCFREQ_# OR SNLOCFREQ_# >02)
NLOC_WHY_# Which of the following best describes why you went to this location at the time of day you did? (READ LIST)

   01 I had an appointment for that time
   02 I usually go there at that time

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	03	It was the most convenient time to go
	04	I stopped off on my way to somewhere else
	05	Other *(Please Specify)* _____-

(ASK FOR LOCATE_#1)
TRAV_1_#.   Did (you/NAME) LEAVE this location on **(INSERT ASSIGNED TRAVEL DAY 1)**?

> 01   Yes
> 02   No

(ASK IF TRAV_#1=2)
NOTRV_1_#.   Does this mean that (you/NAME) stayed at the same place for all of **(INSERT ASSIGNED TRAVEL DAY 1)**?

> 01   Yes
> 02   No

(ASK IF NOTRV_1=1)
WHYNO_S1_#. Why did (you/NAME) stay at the same place for **(INSERT ASSIGNED TRAVEL DAY 1)**?

> 001   Sick/Ill
> 002   Other household member sick/ill
> 003   Worked at home
> 004   Vacation
> 996   Other *(Please Specify)* _____)

(ASK if NOTRV_1_# =01)
TRAV_2_#.   Did (you/NAME) LEAVE this location on **(INSERT ASSIGNED TRAVEL DAY 2)**?

> 01   Yes
> 02   No

(ASK IF TRAV_2=2)
NOTRV_2_#   Does this mean that (you/NAME) stayed at the same place for all of **(INSERT ASSIGNED TRAVEL DAY 2)**?

> 01   Yes
> 02   No

(ASK IF NOTRV_1=1)
WHYNO_S2_#. Why did (you/NAME) stay at the same place?

> 001   Sick/Ill
> 002   Other household member sick/ill
> 003   Worked at home
> 004   Vacation
> 996   Other *(Please Specify)* _____)

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(IF A1_1=1 OR A2_1=1 GO TO WKHM_S, ELSE GO TO LD_INT)
[ASK IF NOTRV_1=1 OR NOTRV_2=1] AND [A1_1=1 OR A2_1=1])
WKHM_S.   What time did you do paid work at home on Day 1? On Day 2?
                 (EXAMPLE: 8 am to 1 pm on Day 1, 10 am to 3:30 pm on Day 2)

_____

                 (GO TO LD_INT)

(ASK IF DDONE_# = 01 and LOCATE_# <>01)
DDONE_#.   Does this mean that (you/NAME) didn't go anywhere else during the 48-hour travel
                 period?

                 01   Yes – NO MORE TRAVEL
                 02   No – CONTINUE RECORDING TRAVEL

(ASK IF DDONE_# = 01 and LOCATE_# <>01)
NOTHMEND   So, at the end of the 48 hour diary period, you were not at home?

                 01   Yes—Not at home – No more travel
                 02   No – Was at home – Collect last trip home information

┌───┐
│   PROGRAMMER NOTE: │
│   DEPARTURE TIME MUST BE LATER THAN PREVIOUS ARRIVAL TIME.   │
└───┘

┌───┐
│ IF PREVIOUS STOP_ #=01, GO TO STOPA_#. IF PREVIOUS STOP_# =02 OR STOPA_# =1 0R 2 , │
│ GO TO LOCINFO_#   │
└───┘

(IF TRS_TYPE_1, READ:)
Now we're going to ask you how you got to place 2. We want to know every method of travel you used,
including car, bus, train, ferry, bicycle, and walking for more than five minutes.

TRS_TYPE_1. What was (your/NAME's) <u>first</u> method of travel to get to the next place?   (DO NOT
TRS_TYPE_# What was your next method of travel?
(IF PREVIOUS STOP_# =1 OR STOPOTH_# =1, ASK:)
                 What method of travel where you using when you left this place?

READ LIST. IF NEEDED, PROMPT WITH CATEGORIES.)

                 001   1 Car, van, truck
                 002   2 Motorcycle/Moped
                 003   3 Bicycle
                 004   4 Walk
                 005   5 School Bus
                 006   6 Taxi/Shuttle
                 007   7 Dial-A-Ride
                 008   8 Train
                 009   9 Public Bus
                 010   10 Ferry
                 011   Other (Specify _____)

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(DO NOT SHOW FOR TRS_TYPE_1 OR IF PREVIOUS STOP_# =1 OR PREVIOUS STOPOTH_# =1)
997   No other means of travel **(GO TO AHOUR_#)**

(ASK IF TRS_TYPE_# =7)
DAR_#.   Which DIAL-A-RIDE provider did (you/NAME) ride?
                (MULTIPLE MENTION, UP TO THREE RESPONSES.)
                (RECORD NUMBER FOR BUS PROVIDER FROM TRANSIT LIST)
                (RECORD 996 FOR OTHER SPECIFY)
                (DO NOT READ LIST. IF NEEDED, PROMPT WITH CATEGORIES.)

          996   Other (Specify _____)

          998   Don't Know
          999   Refused

(ASK IF TRS_TYPE_# =9)
BUS_#.   Which BUS operator did (you/NAME) ride?
                (MULTIPLE MENTION, UP TO THREE RESPONSES.)
                (RECORD NUMBER FOR BUS OPERATOR FROM TRANSIT LIST)
                (RECORD 996 FOR OTHER SPECIFY)
                (DO NOT READ LIST. IF NEEDED, PROMPT WITH CATEGORIES.)

          996   Other (Specify _____)

          998   Don't Know
          999   Refused

(ASK IF TRS_TYPE_# =9)
BUS_RTE1_#   What BUS route did you use first?

          __ __ __

(ASK IF TRS_TYPE_# =9)
BUS_RTE2_#. What Bus route did you use next?

          --- --- ---

          997   No other bus routes used for this trip. **(GO TO PAY9_#)**

(ASK IF BUS_RTE2_# <> 997)
BUS_RTE3_#. What Bus route did you use next?

          --- --- ---

          997   No other bus routes used for this trip. **(GO TO TRFS1_MIN_#)**

(ASK IF BUS_RTE3_# <> 997)
BUS_RTE4_#. What Bus route did you use next?

          --- --- ---

          997   No other bus routes used for this trip. **(GO TO TRFS1_MIN_#)**

(ASK IF BUS_RTE4_# <> 997)
BUS_RTE5_#. What Bus route did you use next?

--- --- ---

        997   No other bus routes used for this trip. **(GO TO TRFS1_MIN_#)**

(ASK IF BUS_RTE2_# <> 997)
TRFS1_MIN_# How many minutes did the first transfer take?   __ __

(ASK IF BUS_RTE3_# <> 997)
TRFS2_MIN_# How many minutes did the second transfer take?   __ __

(ASK IF BUS_RTE4_# <> 997)
TRFS3_MIN_#   How many minutes did the third transfer take?   __ __

(ASK IF BUS_RTE5_# <> 997)
TRFS4_MIN_#   How many minutes did the fourth transfer take?   __ ____ __

(ASK IF TRS_TYPE_#=6)
PAY6_#.   How much, in total, did (you/NAME) pay for the TAXI or SHUTTLE?
          (DO NOT READ LIST)

          01   NOTHING
          02   Amount (to be recorded in next question)

          98   Don't Know
          99   Refused

(ASK IF PAY6_# =2)
PAY6A_#.   (RECORD TAXI/SHUTTLE COST - DOLLARS)

          ___ ___ ___ ___   (PROGRAMMER: Allow 0 to 9000.)

(ASK IF PAY6_# =2)
PAY6B_#.   (RECORD TAXI/SHUTTLE COST - CENTS)

          ___ ___   (PROGRAMMER: Allow 0 to 99.)

ASK IF PAY6_# =7)
PAY7_#.   How much, in total, did (you/NAME) pay for the DIAL-A-RIDE service, or was a transit
          pass used?
          (DO NOT READ LIST)

          01   NOTHING
          02   Amount (to be recorded in next question)
          03   Used transit pass

          98   Don't Know
          99   Refused

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(ASK IF PAY7_# =2)
PAY7A_#.   (RECORD DIAL-A-RIDE COST - DOLLARS)

    ___ ___ ___ ___   (PROGRAMMER: Allow 0 to 9000.)

(ASK IF TRS_TYPE_# =8)
PAY8_#.   How much, in total, did (you/NAME) pay for the TRAIN or was a transit pass used?
     (DO NOT READ LIST)

     01   NOTHING
     02   Amount (to be recorded in next question)
     03   Used transit pass

     98   Don't Know
     99   Refused

(ASK IF PAY8_# =2)
PAY8A_#.   (RECORD TRAIN COST - DOLLARS)

    ___ ___ ___ ___   (PROGRAMMER: Allow 0 to 9000.)

(ASK IF PAY8_# =2)
PAY8B_#.   (RECORD TRAIN COST - CENTS)

    ___ ___   (PROGRAMMER: Allow 0 to 99.)

(ASK IF TRS_TYPE_# =9)
PAY9_#.   How much, in total, did (you/NAME) pay for the BUS, or was a bus or transit pass used?
     (DO NOT READ LIST)

     01   NOTHING
     02   Amount (to be recorded in next question)
     03   Used bus or transit pass

     98   Don't Know
     99   Refused

(ASK IF PAY9_# =2)
PAY9A_#.   (RECORD BUS COST - DOLLARS)

    ___ ___ ___ ___   (PROGRAMMER: Allow 0 to 9000.)

(ASK IF PAY9_# =2)
PAY9B_#.   (RECORD BUS COST - CENTS)

    ___ ___   (PROGRAMMER: Allow 0 to 99.)

(ASK IF TRS_TYPE_# =10)
PAY10_#.   How much, in total, did (you/NAME) pay for the FERRY, or was a ferry or transit pass
     used?
     (DO NOT READ LIST)

```
01      NOTHING
02      Amount (to be recorded in next question)
03      Used ferry or transit pass

98      Don't Know
99      Refused
```

(ASK IF PAY9_# =2)
PAY10A_#.   (RECORD FERRY COST - DOLLARS)

___ ___ ___ ___   (PROGRAMMER: Allow 0 to 9000.)

(ASK IF PAY9_# =2)
PAY10B_#.   (RECORD FERRY COST - CENTS)

___ ___   (PROGRAMMER: Allow 0 to 99.)

 (ASK IF TRS_TYPE_# >2)
HHM_WTR_#   How many household members were with you on the (**IF TRS_TYPE_# =3,** "bicycle")
(**IF TRS_TYPE_# =4**, "walk") (**IF TRS_TYPE_# =5,** "school bus") (**IF TRS_TYPE_# =8,** "train"**) (IF
TRS_TYPE_# =9** "bus"**) (IF TRS_TYPE_#10,** "ferry"**)**?

___ ___

997   None/Zero

(ASK IF TRS_TYPE_# =1 OR 2 AND (SVAGE_# >15 AND SVAGE_# <116)
TRS_DP_#.   (Were you/was NAME) the driver or passenger?
               (DO NOT READ LIST)

```
01      Driver
02      Passenger

98      Don't Know
99      Refused
```

(ASK IF TRS_TYPE_# =1 OR 2)
VTNUM_#.   NOT including (yourself/NAME), how many people were in the vehicle?

```
01      1
02      2
03      3
04      4
05      5
06      6+
97      0 - ALONE

98      Don't Know
99      Refused
```

(ASK IF VTNUM_# =1:6 AND HHNUMPPL>1
VHNUM_#.   How many of these people are members of your household?

        01   1
        02   2   (DO NOT ALLOW IF VTNUM_#=1 OR HHNUMPPL=2)
        03   3   (DO NOT ALLOW IF VTNUM_#=2 OR HHNUMPPL=3)
        04   4   (DO NOT ALLOW IF VTNUM_#=3 OR HHNUMPPL=4)
        05   5   (DO NOT ALLOW IF VTNUM_#=4 OR HHNUMPPL=5)
        06   6+   (DO NOT ALLOW IF VTNUM_#=5 OR HHNUMPPL=6)
        97   0 – None   (POSTCODE IF VTNUM_#=1 AND HHNUMPPL=1)

(ASK IF (HHM_WTR_# =1:996) OR (VHNUM_# =01:996)
WHOACC_#.   Which household member(s) was/were with (you/NAME)?
                (MULTIPLE MENTION, UP TO 15 HOUSEHOLD MEMBERS.)

                (PROGRAMMER: IF VHNUM_#=1, ALLOW ONE MENTION.)
                (PROGRAMMER: IF VHNUM_#=2, ALLOW TWO MENTIONS.)
                (PROGRAMMER: IF VHNUM_#=N, ALLOW N MENTIONS.)

        98   Don't Know
        99   Refused

(ASK IF TRS_TYPE_# =1 OR 2 AND (HHNUMVEH NE 0/97OR CORR_VH# NE 97)
HHV_#.   Was a vehicle from your household used for this trip?

        01   Yes
        02   No   (POSTCODE IF HHNUMVEH=0/97)

        98   Don't Know
        99   Refused

(ASK IF HHV_# =01)
HHV_WH_#   Which vehicle was used?

        01   (INSERT MAKE/MODEL1)
        02   (INSERT MAKE/MODEL2)
        03   (INSERT MAKE/MODEL3)
        04   (INSERT MAKE/MODEL4)
        05   (INSERT MAKE/MODEL5)
        06   (INSERT MAKE/MODEL6)
        07   (INSERT MAKE/MODEL7)
        08   (INSERT MAKE/MODEL8)
        09   (INSERT MAKE/MODEL9)
        10   (INSERT MAKE/MODEL10)

ASK IF PROXY =01 AND TRS_TYPE_# =01:10)
TRACT_#   Which of these activities did you do **for more than 15 minutes** while **(IF TRS_TYPE_#=1,** "in the vehicle") **(IF TRS_TYPE_#=2 OR TRS_TYPE_#=3,** "riding") **(IF TRS_TYPE_#=4,** "walking") (**IF TRS_TYPE_#=5 OR TRS_TYPE_#=9,** "on the bus") **(IF TRS_TYPE_#=8,** "on the train") **(IF** "bus") **(IF TRS_TYPE_#10,** "on the ferry")?**

                (READ LIST)

        1.   Work   (IF NEEDED, reading laptop computer use, cell phone, etc.)

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2.   Eating, Sleeping, or Personal Grooming   (IF NEEDED, Maintenance)

3.   Recreation, Entertainment, or Visiting   (IF NEEDED, radio, DVD, games, cell phone.)

4.   None of these activities

(ASK IF TRS_TYPE_# =1 OR 2)

PARK_#   Where did you park at your next place? (IF NEEDED: "Your trip destination") (DO NOT READ. CATEGORIZE RESPONSE)

01   In a parking lot **(GO TO PARK_LOT_#)**
03   In a parking structure
02   On the street
03   In a driveway or garage
04   Other *(Please Specify)*_____

(ASK IF PARK_# =1)

PARK_LOT_#. Did (you/NAME) use a park and ride lot?

01   Yes
02   No

(ASK IF PARK_LOT_# =01)

LOT_WH_#.   Which lot did (you/NAME) use?

_____ (ENTER NUMBER FROM LIST)

(ASK IF TRS_TYPE_# =1 OR 2)

PPAY_#.   How much, in total, did (you/NAME) personally pay for parking?

(DO NOT READ LIST)

01   NOTHING
02   Amount (to be recorded in next question)

98   Don't Know
99   Refused

(ASK IF PPAY_# =2)

PKA_#.   (RECORD PARKING AMOUNT - DOLLARS)

___ ___ ___ ___   (PROGRAMMER: Allow 0 to 9000.)

(ASK IF PPAY_# =2)

PK2B_#.   (RECORD PARKING AMOUNT - CENTS)

___ ___   (PROGRAMMER: Allow 0 to 99.)

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(ASK IF PPAY_# =2)
PK3_#.   Was the rate…?
               (READ LIST)

               001   Hourly
               002   Daily
               003   Monthly
               996   Other (Specify _____)

               998   Don't Know
               999   Refused

([ASK IF PREVIOUS STOP_# =01 OR PREVIOUS STOPOTH_# =1)
AHOUR_#.   What time did (you/NAME) ARRIVE at the place where you stopped?

AHOUR_#.   What time did (you/NAME) ARRIVE at your next place?
               (SELECT HOUR OF ARRIVAL TIME)

               001   3:00 AM
               002   4:00 AM
               003   5:00 AM
               004   6:00 AM
               005   7:00 AM
               006   8:00 AM
               007   9:00 AM
               008   10:00 AM
               009   11:00 AM
               010   12:00 PM (NOON)
               011   1:00 PM
               012   2:00 PM
               021   11:00 PM
               022   12:00 AM (MIDNIGHT)
               023   1:00 AM
               024   2:00 AM

LOC_ARR_#.   (SELECT MINUTE OF ARRIVAL TIME)

               001   #:01
               002   #:02
               003   #:03
               004   #:04
               005   #:05
               006   #:06
               007   #:07
               008   #:08
               009   #:09
               010   #:10
               056   #:56
               057   #:57
               058   #:58
               059   #:59
               060   #:00

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(IF [AHOUR_# + LOC_ARR_#] minus [DHOURS_# + LOC_DEP_#] = or > 1 HOUR, ASK:)
HOUR_CHK.   Then this trip took over one hour, is that correct?

        01   Yes   (CONTINUE)
        02   No   (CORRECT AHOUR_ AND LOC_ARR_#)
        98   Don't Know (CONTINUE)
        99   Refused (CONTINUE)

(AFTER DAY 2 TRAVEL IS COMPLETE, IF HOUR_CHK=01, ASK:)
LONGTRIP.   Did any of the trips you've reported take significantly longer than usual?

        01   Yes
        02   No (GO TO LD_INT)
        98   Don't Know (GO TO LD_INT)
        99   Refused (Go to LD_INT)

(IF LONGTRIP=01, ASK:)
REAS_LT. Was this due to: (READ LIST)

        01   Weather (rain or snow)
        02   Construction
        03   An accident
        04   Traffic congestion

        96   Other
        98   Don't Know
        99   Refused

ALL GO TO TRS_TYPE_#

ASKED OF CONTACT PERSON ONLY: HOMEACT, Q1_NEW, Q2_NEW, Q3_NEW, AND FUTURE

HOMEACT.   During your assigned travel days did you do any of the following at home activities?

        1.   Shopping on the Internet or by phone   01 Yes   02 No
        2.   Banking on the Internet or by phone   01 Yes   02 No
        3.   Other personal business/services on the Internet   01 Yes   02 No
        4.   Watching a DVD   01 Yes   02 No

Q1_NEW.   Please indicate your level of agreement or disagreement with each statement on a scale
        of 1 to 10, where 1 means that you strongly disagree, 10 means that you strongly agree.
        [ROTATE LIST]

        A.   Transit is a viable option for my daily trips to work or school.
        B.   I don't mind the delays so much if I can forecast accurately when I'm going to get
                there.
        C.   Existing roads and bridges should be safely and adequately maintained before
                building new ones.
        D.   A transportation system that supports many ways to travel (such as bus, rail,
                automobile, walking, biking) is more favorable than a transportation system that
                is built primarily to support travel by private automobile.

E. State and local governments have adequate financial resources to meet transportation needs.
F. Future growth should be concentrated in already developed areas.
G. Supporting freight movement and the region's economy should be an important consideration in deciding what transportation improvements are made.
H. The city or neighborhood I live in has a good mix of residential and non-residential land uses, which gives me the opportunity to do much of what I want without using a car.
I. I don't mind paying a toll in exchange for faster and more reliable travel time.
J. I would be concerned about increasing truck traffic on the roads I use.

Q2_NEW. I'm going to list 6 factors that many people consider when choosing a travel mode. [LIST 6 OPTIONS]. On a scale of 1 to 10, please indicate the importance to you of each of these, where 1 is not important at all and 10 is very important. **[ROTATE LIST]**

A. Predictable travel
B. Affordable cost
C. Comfort
D. Privacy
E. Flexibility
F. Quickest travel time

Q3_NEW. Finally, how many days per week (on average) do you experience only limited traffic delays and therefore get to work or school on time?

_____ days

98 Don't Know

(ASK IF FIRST PERSON/CONTACT PERSON FROM RECRUIT)
FUTURE. Would you be willing to be recontacted by THE PUGET SOUND REGIONAL COUNCIL for future studies?

01 Yes
02 No

98 Don't Know

([ASK IF FIRST PERSON/CONTACT PERSON FROM RECRUIT AND HHINC=98:99] OR OF EACH RESPONDENT AGE 18+ IN AN HOUSEHOLD NOT RELATED TO OTHER HOUSEHOLD MEMBERS)
HHINC2. In order to be sure that the project accurately represents all Washington residents, could you tell me if the total 2005 combined annual income for your HOUSEHOLD is …?
(IF NEEDED: "I understand your reluctance to divulge your household income. However, I can assure you that this information is used for classification purposes only. We must be sure that our project accurately represents Washington residents, and income is an important factor in projecting transportation needs.")
(READ LIST)

01 Below $50,000, or **(GO TO INC_U50)**
02 $50,000 to $100, 000 (G0 TO INC_**O50**)
03 **Above $100,000 (GO TO INC_0100)**

98 Don't Know
99 Refused

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(ASK IF HHINC=1)

INC_U50.   Please stop me when I get to the category that best describes the total 2005 combined income for everyone living in your household. Was it?
(IF NEEDED: "I understand your reluctance to divulge your household income. However, I can assure you that this information is used for classification purposes only. We must be sure that our project accurately represents Washington residents, and income is an important factor in projecting transportation needs.")

    01   Less than $10,000
    02     $10,000 to less than $20,000
    03     $20,000 to less than $30,000
    04     $30,000 to less than $40,000
    05     $40,000 to less than $50,000

    98   Don't Know
    99   Refused

(ASK IF HHINC=2)

INC_O50.   Please stop me when I get to the category that best describes the total 2005 combined income for everyone living in your household. Was it …?
(IF NEEDED: "I understand your reluctance to divulge your household income. However, I can assure you that this information is used for classification purposes only. We must be sure that our project accurately represents Washington residents, and income is an important factor in projecting transportation needs.")

    01     $50,000 to less than $60,000
    02     $60,000 to less than $70,000
    03     $70,000 to less than $80,000
    04     $80,000 to less than $90,000
    05     $90,000 to less than $100,000

(ASK IF HHINC=3)

INC_O50.   Please stop me when I get to the category that best describes the total 2005 combined income for everyone living in your household. Was it …?
(IF NEEDED: "I understand your reluctance to divulge your household income. However, I can assure you that this information is used for classification purposes only. We must be sure that our project accurately represents Washington residents, and income is an important factor in projecting transportation needs.")

    01     $100,000 to less than $110,000
    02     $110,000 to less than $120,000
    03     $120,000 to less than $130,000
    04     $130,000 to less than $140,000
    05     $140,000 to less than $150,000
    06     $150,000 OR MORE

    98   Don't Know
    99   Refused

END.   Thank you very much for your participation in this study.

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Puget Sound Regional Council
PSRC

Dear «MAILATTN»:

Thank you for agreeing to participate in the Puget Sound Household Travel Survey. Whether you travel by car, bus, train, ferry, boat, bike, or on foot—or even if you rarely travel--your participation is essential in helping the State of Washington and your community to create a safer and more efficient transportation system.

This is why your participation in this Survey is so important, and it's easy!

This packet contains everything your household needs to record travel.

> One Travel Diary for each member of your household is included.
> - Please record ALL locations you visit during your assigned 2-day travel period.
> - Each household member should complete his or her own diary whenever possible.
> - Even if your travel during the assigned period is not typical, we still need it reported.
> - A Person Information section is included at the beginning of each diary. Please fill in school and work information.
> - Instructions and an example are included in the front of the diary.

The information you provide will only be used for the statistical purposes of this study. It will be kept **confidential** and **secure**.

A few days after your travel period, an interviewer from MORPACE International will call on behalf of the Puget Sound Regional Council to collect your household's travel information. MORPACE would like to speak with each person age 16 or older. Adults will be asked to respond for children less than 16 years of age.

If you have questions about filling out the diary, contact MORPACE International at 1-800-566-6262, or visit *www.psrc.org*. If you have any other questions about the program, please contact Neil Kilgren at the Puget Sound Regional Council at 206-464-7964.

Thank you for helping move the Puget Sound area forward**!**

Sincerely,

Kevin Murphy
Director, Data Systems & Analysis
Puget Sound Regional Council

Place # 9

WHAT is Place #9? ☐ **Day 1** ☐ **Day 2**

☐ My Home
☐ My Primary Workplace
☐ My Regular School Location
☐ Another Place *(Complete the information below.)*

WHAT kind of place is this?
(bank, grocery, park, etc.) _____

_____
Name of Place

_____
Street Address

_____ _____ _____
City   State   Zip
&
_____
Nearby Cross Streets

At WHAT TIME did you ARRIVE at Place #9? ___ : ___ am/pm

WHAT did you do at Place #9?

Main Activity (Check only one)		Other Activities (Check all that apply)
☐	Home – Paid Work	☐
☐	Home – Other	☐
☐	Work	☐
☐	Attend Childcare	☐
☐	Attend School	☐
☐	Attend College	☐
☐	Eat Out	☐
☐	Personal Business	☐
☐	Everyday Shopping	☐
☐	Major Shopping	☐
☐	Religious/Community	☐
☐	Social	☐
☐	Recreation – Participate	☐
☐	Recreation – Watch	☐
☐	Accompany Another Person	☐
☐	Pick-Up/Drop-Off Passenger	☐
☐	Turn Around	☐

HOW did you get here from Place #8? Show all the methods of travel you used to make this trip and related travel details

		1st →	2nd →	3rd →	4th →	5th →
Travel method (See "List of Travel Methods" below)						
If an auto method (1 or 2)	Vehicle used					
	Driver or passenger					
	Total # of persons in vehicle					
	Parking cost paid	$	$	$	$	$
If a transit method (6 thru 11)	How long did you wait?					
	Payment method (cash, pass or ticket)					
	If cash or ticket, how much did you pay?	$	$	$	$	$
	If walk or bicycle - Time (minutes)					
While Traveling	Which activities did you do for more than 15 minutes? (See "List of Activities" below)					
	Name(s) of household member(s) with you for each segment of the trip					

List of Travel Methods

1	Car, van, truck	5	School Bus	9	Train (Operator) _____
2	Motorcycle/ Moped	6	Taxi/Shuttle	10	Public Bus
3	Bicycle	7	Dial-A-Ride/ ACESS		(Operators) _____ Rtes ___
4	Walk	8	Ferry	11	Other (Specify)

List of Activities

1 **Work** (reading, laptop computer, cell phone, etc.)
2 **Maintenance** (eating, sleeping, personal grooming, etc.)
3 **Recreation** (games, visiting, cell phone, DVD, etc.)
4 **None**

At what time did you leave Place #9 to go to Place #10 ___ : ___ am/pm

Next Place #10

Place # 10

WHAT is Place #10? ☐ **Day 1** ☐ **Day 2**

☐ My Home
☐ My Primary Workplace
☐ My Regular School Location
☐ Another Place *(Complete the information below.)*

WHAT kind of place is this?
(bank, grocery, park, etc.) _____

_____
Name of Place

_____
Street Address

_____ _____ _____
City   State   Zip
&
_____
Nearby Cross Streets

At WHAT TIME did you ARRIVE at Place #10? ___ : ___ am/pm

WHAT did you do at Place #10?

Main Activity (Check only one)		Other Activities (Check all that apply)
☐	Home – Paid Work	☐
☐	Home – Other	☐
☐	Work	☐
☐	Attend Childcare	☐
☐	Attend School	☐
☐	Attend College	☐
☐	Eat Out	☐
☐	Personal Business	☐
☐	Everyday Shopping	☐
☐	Major Shopping	☐
☐	Religious/Community	☐
☐	Social	☐
☐	Recreation – Participate	☐
☐	Recreation – Watch	☐
☐	Accompany Another Person	☐
☐	Pick-Up/Drop-Off Passenger	☐
☐	Turn Around	☐

HOW did you get here from Place #9? Show all the methods of travel you used to make this trip and related travel details

		1st →	2nd →	3rd →	4th →	5th →
Travel method (See "List of Travel Methods" below)						
If an auto method (1 or 2)	Vehicle used					
	Driver or passenger					
	Total # of persons in vehicle					
	Parking cost paid	$	$	$	$	$
If a transit method (6 thru 11)	How long did you wait?					
	Payment method (cash, pass or ticket)					
	If cash or ticket, how much did you pay?	$	$	$	$	$
	If walk or bicycle - Time (minutes)					
While Traveling	Which activities did you do for more than 15 minutes? (See "List of Activities" below)					
	Name(s) of household member(s) with you for each segment of the trip					

List of Travel Methods

1	Car, van, truck	5	School Bus	9	Train (Operator) _____
2	Motorcycle/ Moped	6	Taxi/Shuttle	10	Public Bus
3	Bicycle	7	Dial-A-Ride/ ACESS		(Operators) _____ Rtes ___
4	Walk	8	Ferry	11	Other (Specify)

List of Activities

1 **Work** (reading, laptop computer, cell phone, etc.)
2 **Maintenance** (eating, sleeping, personal grooming, etc.)
3 **Recreation** (games, visiting, cell phone, DVD, etc.)
4 **None**

At what time did you leave Place #10 to go to Place #11 ___ : ___ am/pm

Next Place #11

Place # 11

WHAT is Place #11? ☐ **Day 1** ☐ **Day 2**

☐ My Home
☐ My Primary Workplace
☐ My Regular School Location
☐ Another Place *(Complete the information below.)*

WHAT kind of place is this?
(bank, grocery, park, etc.) _____

_____
Name of Place

_____
Street Address

_____ _____ _____
City   State   Zip
_____ & _____
Nearby Cross Streets

At WHAT TIME did you ARRIVE at Place #11? [:] am/pm

WHAT did you do at Place #11?

Main Activity (Check only one)		Other Activities (Check all that apply)
☐	Home – Paid Work	☐
☐	Home – Other	☐
☐	Work	☐
☐	Attend Childcare	☐
☐	Attend School	☐
☐	Attend College	☐
☐	Eat Out	☐
☐	Personal Business	☐
☐	Everyday Shopping	☐
☐	Major Shopping	☐
☐	Religious/Community	☐
☐	Social	☐
☐	Recreation – Participate	☐
☐	Recreation – Watch	☐
☐	Accompany Another Person	☐
☐	Pick-Up/Drop-Off Passenger	☐
☐	Turn Around	☐

HOW did you get here from Place #10? Show all the methods of travel you used to make this trip and related travel details

	1st →	2nd →	3rd →	4th →	5th →
Travel method (See "List of Travel Methods" below)					
If an auto method (1 or 2) Vehicle used					
Driver or passenger					
Total # of persons in vehicle					
Parking cost paid	$	$	$	$	$
If a transit method (6 thru 11) How long did you wait?					
Payment method (cash, pass or ticket)					
If cash or ticket, how much did you pay?	$	$	$	$	$
If walk or bicycle - Time (minutes)					
While Traveling Which activities did you do for more than 15 minutes? (See "List of Activities" below)					
Name(s) of household member(s) with you for each segment of the trip					

List of Travel Methods
1 Car, van, truck
2 Motorcycle/Moped
3 Bicycle
4 Walk
5 School Bus
6 Taxi/Shuttle
7 Dial-A-Ride/ACESS
8 Ferry
9 Train (Operator) _____
10 Public Bus (Operators) _____ Rtes____
11 Other (Specify) _____

List of Activities
1 Work (reading, laptop computer, cell phone, etc.)
2 Maintenance (eating, sleeping, personal grooming, etc.)
3 Recreation (games, visiting, cell phone, DVD, etc.)
4 None

At what time did you leave Place #11 to go to Place #12 [:] am/pm

Next Place #12

Place # 8

WHAT is Place #8? ☐ **Day 1** ☐ **Day 2**

☐ My Home
☐ My Primary Workplace
☐ My Regular School Location
☐ Another Place *(Complete the information below.)*

WHAT kind of place is this?
(bank, grocery, park, etc.) _____

_____
Name of Place

_____
Street Address

_____ _____ _____
City   State   Zip
_____ & _____
Nearby Cross Streets

At WHAT TIME did you ARRIVE at Place #8? [:] am/pm

WHAT did you do at Place #8?

Main Activity (Check only one)		Other Activities (Check all that apply)
☐	Home – Paid Work	☐
☐	Home – Other	☐
☐	Work	☐
☐	Attend Childcare	☐
☐	Attend School	☐
☐	Attend College	☐
☐	Eat Out	☐
☐	Personal Business	☐
☐	Everyday Shopping	☐
☐	Major Shopping	☐
☐	Religious/Community	☐
☐	Social	☐
☐	Recreation – Participate	☐
☐	Recreation – Watch	☐
☐	Accompany Another Person	☐
☐	Pick-Up/Drop-Off Passenger	☐
☐	Turn Around	☐

HOW did you get here from Place #7? Show all the methods of travel you used to make this trip and related travel details

	1st →	2nd →	3rd →	4th →	5th →
Travel method (See "List of Travel Methods" below)					
If an auto method (1 or 2) Vehicle used					
Driver or passenger					
Total # of persons in vehicle					
Parking cost paid	$	$	$	$	$
If a transit method (6 thru 11) How long did you wait?					
Payment method (cash, pass or ticket)					
If cash or ticket, how much did you pay?	$	$	$	$	$
If walk or bicycle - Time (minutes)					
While Traveling Which activities did you do for more than 15 minutes? (See "List of Activities" below)					
Name(s) of household member(s) with you for each segment of the trip					

List of Travel Methods
1 Car, van, truck
2 Motorcycle/Moped
3 Bicycle
4 Walk
5 School Bus
6 Taxi/Shuttle
7 Dial-A-Ride/ACESS
8 Ferry
9 Train (Operator) _____
10 Public Bus (Operators) _____ Rtes____
11 Other (Specify) _____

List of Activities
1 Work (reading, laptop computer, cell phone, etc.)
2 Maintenance (eating, sleeping, personal grooming, etc.)
3 Recreation (games, visiting, cell phone, DVD, etc.)
4 None

At what time did you leave Place #8 to go to Place #9 [:] am/pm

Next Place #9

Place # 7

WHAT is Place #7? ☐ **Day 1** ☐ **Day 2**

☐ My Home
☐ My Primary Workplace
☐ My Regular School Location
☐ Another Place *(Complete the information below.)*

WHAT kind of place is this?
(bank, grocery, park, etc.) _____

_____
Name of Place

_____
Street Address

_____ _____ _____
City **State** **Zip**

&
_____
Nearby Cross Streets

At WHAT TIME did you ARRIVE at Place #7? ____ : ____ am/pm

WHAT did you do at Place #7?

Main Activity (Check only one)		Other Activities (Check all that apply)
☐	Home – Paid Work	☐
☐	Home – Other	☐
☐	Work	☐
☐	Attend Childcare	☐
☐	Attend School	☐
☐	Attend College	☐
☐	Eat Out	☐
☐	Personal Business	☐
☐	Everyday Shopping	☐
☐	Major Shopping	☐
☐	Religious/Community	☐
☐	Social	☐
☐	Recreation – Participate	☐
☐	Recreation – Watch	☐
☐	Accompany Another Person	☐
☐	Pick-Up/Drop-Off Passenger	☐
☐	Turn Around	☐

HOW did you get here from Place #6? Show all the methods of travel you used to make this trip and related travel details

	1st →	2nd →	3rd →	4th →	5th →
Travel method (See "List of Travel Methods" below)					
If an auto method (1 or 2) — Vehicle used					
Driver or passenger					
Total # of persons in vehicle					
Parking cost paid	$	$	$	$	$
If a transit method (6 thru 11) — How long did you wait?					
Payment method (cash, pass or ticket)					
If cash or ticket, how much did you pay?	$	$	$	$	$
If walk or bicycle - Time (minutes)					
While Traveling — Which activities did you do for more than 15 minutes? (See "List of Activities" below)					
Name(s) of household member(s) with you for each segment of the trip					

List of Travel Methods
1 Car, van, truck
2 Motorcycle/Moped
3 Bicycle
4 Walk
5 School Bus
6 Taxi/Shuttle
7 Dial-A-Ride/ACESS
8 Ferry
9 Train (Operator) _____
10 Public Bus (Operators) _____ Rtes ____
11 Other (Specify)

List of Activities
1 Work (reading, laptop computer, cell phone, etc.)
2 Maintenance (eating, sleeping, personal grooming, etc.)
3 Recreation (games, visiting, cell phone, DVD, etc.)
4 None

At what time did you leave Place #7 to go to Place #8 ____ : ____ am/pm

Next Place #8

Place # 12

WHAT is Place #12? ☐ **Day 1** ☐ **Day 2**

☐ My Home
☐ My Primary Workplace
☐ My Regular School Location
☐ Another Place *(Complete the information below.)*

WHAT kind of place is this?
(bank, grocery, park, etc.) _____

_____
Name of Place

_____
Street Address

_____ _____ _____
City **State** **Zip**

&
_____
Nearby Cross Streets

At WHAT TIME did you ARRIVE at Place #12? ____ : ____ am/pm

WHAT did you do at Place #12?

Main Activity (Check only one)		Other Activities (Check all that apply)
☐	Home – Paid Work	☐
☐	Home – Other	☐
☐	Work	☐
☐	Attend Childcare	☐
☐	Attend School	☐
☐	Attend College	☐
☐	Eat Out	☐
☐	Personal Business	☐
☐	Everyday Shopping	☐
☐	Major Shopping	☐
☐	Religious/Community	☐
☐	Social	☐
☐	Recreation – Participate	☐
☐	Recreation – Watch	☐
☐	Accompany Another Person	☐
☐	Pick-Up/Drop-Off Passenger	☐
☐	Turn Around	☐

HOW did you get here from Place #11? Show all the methods of travel you used to make this trip and related travel details

	1st →	2nd →	3rd →	4th →	5th →
Travel method (See "List of Travel Methods" below)					
If an auto method (1 or 2) — Vehicle used					
Driver or passenger					
Total # of persons in vehicle					
Parking cost paid	$	$	$	$	$
If a transit method (6 thru 11) — How long did you wait?					
Payment method (cash, pass or ticket)					
If cash or ticket, how much did you pay?	$	$	$	$	$
If walk or bicycle - Time (minutes)					
While Traveling — Which activities did you do for more than 15 minutes? (See "List of Activities" below)					
Name(s) of household member(s) with you for each segment of the trip					

List of Travel Methods
1 Car, van, truck
2 Motorcycle/Moped
3 Bicycle
4 Walk
5 School Bus
6 Taxi/Shuttle
7 Dial-A-Ride/ACESS
8 Ferry
9 Train (Operator) _____
10 Public Bus (Operators) _____ Rtes ____
11 Other (Specify)

List of Activities
1 Work (reading, laptop computer, cell phone, etc.)
2 Maintenance (eating, sleeping, personal grooming, etc.)
3 Recreation (games, visiting, cell phone, DVD, etc.)
4 None

At what time did you leave Place #12 to go to Place #13 ____ : ____ am/pm

Next Place #13

Place # 13

WHAT is Place #13? ☐ **Day 1** ☐ **Day 2**

☐ My Home
☐ My Primary Workplace
☐ My Regular School Location
☐ Another Place *(Complete the information below.)*

WHAT kind of place is this?
(bank, grocery, park, etc.) _____

Name of Place _____

Street Address _____

City _____ State _____ Zip _____

& _____
Nearby Cross Streets

At WHAT TIME did you ARRIVE at Place #13? ___ : ___ am/pm

WHAT did you do at Place #13?

Main Activity (Check only one)		Other Activities (Check all that apply)
☐	Home – Paid Work	☐
☐	Home – Other	☐
☐	Work	☐
☐	Attend Childcare	☐
☐	Attend School	☐
☐	Attend College	☐
☐	Eat Out	☐
☐	Personal Business	☐
☐	Everyday Shopping	☐
☐	Major Shopping	☐
☐	Religious/Community	☐
☐	Social	☐
☐	Recreation – Participate	☐
☐	Recreation – Watch	☐
☐	Accompany Another Person	☐
☐	Pick-Up/Drop-Off Passenger	☐
☐	Turn Around	☐

HOW did you get here from Place #12? Show all the methods of travel you used to make this trip and related travel details

	1st →	2nd →	3rd →	4th →	5th →
Travel method (See "List of Travel Methods" below)					
If an auto method (1 or 2) Vehicle used					
Driver or passenger					
Total # of persons in vehicle					
Parking cost paid	$	$	$	$	$
If a transit method (6 thru 11) How long did you wait?					
Payment method (cash, pass or ticket)					
If cash or ticket, how much did you pay?	$	$	$	$	$
If walk or bicycle - Time (minutes)					
While Traveling Which activities did you do for more than 15 minutes? (See "List of Activities" below)					
Name(s) of household member(s) with you for each segment of the trip					

List of Travel Methods
1 Car, van, truck
2 Motorcycle/Moped
3 Bicycle
4 Walk
5 School Bus
6 Taxi/Shuttle
7 Dial-A-Ride/ACESS
8 Ferry
9 Train (Operator) _____
10 Public Bus (Operators) _____ Rtes _____
11 Other (Specify)

List of Activities
1 Work (reading, laptop computer, cell phone, etc.)
2 Maintenance (eating, sleeping, personal grooming, etc.)
3 Recreation (games, visiting, cell phone, DVD, etc.)
4 None

At what time did you leave Place #13 to go to Place #14 ___ : ___ am/pm

Next Place #14

Place # 6

WHAT is Place #6? ☐ **Day 1** ☐ **Day 2**

☐ My Home
☐ My Primary Workplace
☐ My Regular School Location
☐ Another Place *(Complete the information below.)*

WHAT kind of place is this?
(bank, grocery, park, etc.) _____

Name of Place _____

Street Address _____

City _____ State _____ Zip _____

& _____
Nearby Cross Streets

At WHAT TIME did you ARRIVE at Place #6? ___ : ___ am/pm

WHAT did you do at Place #6?

Main Activity (Check only one)		Other Activities (Check all that apply)
☐	Home – Paid Work	☐
☐	Home – Other	☐
☐	Work	☐
☐	Attend Childcare	☐
☐	Attend School	☐
☐	Attend College	☐
☐	Eat Out	☐
☐	Personal Business	☐
☐	Everyday Shopping	☐
☐	Major Shopping	☐
☐	Religious/Community	☐
☐	Social	☐
☐	Recreation – Participate	☐
☐	Recreation – Watch	☐
☐	Accompany Another Person	☐
☐	Pick-Up/Drop-Off Passenger	☐
☐	Turn Around	☐

HOW did you get here from Place #5? Show all the methods of travel you used to make this trip and related travel details

	1st →	2nd →	3rd →	4th →	5th →
Travel method (See "List of Travel Methods" below)					
If an auto method (1 or 2) Vehicle used					
Driver or passenger					
Total # of persons in vehicle					
Parking cost paid	$	$	$	$	$
If a transit method (6 thru 11) How long did you wait?					
Payment method (cash, pass or ticket)					
If cash or ticket, how much did you pay?	$	$	$	$	$
If walk or bicycle - Time (minutes)					
While Traveling Which activities did you do for more than 15 minutes? (See "List of Activities" below)					
Name(s) of household member(s) with you for each segment of the trip					

List of Travel Methods
1 Car, van, truck
2 Motorcycle/Moped
3 Bicycle
4 Walk
5 School Bus
6 Taxi/Shuttle
7 Dial-A-Ride/ACESS
8 Ferry
9 Train (Operator) _____
10 Public Bus (Operators) _____ Rtes _____
11 Other (Specify)

List of Activities
1 Work (reading, laptop computer, cell phone, etc.)
2 Maintenance (eating, sleeping, personal grooming, etc.)
3 Recreation (games, visiting, cell phone, DVD, etc.)
4 None

At what time did you leave Place #6 to go to Place #7 ___ : ___ am/pm

Next Place #7

Place # 5

WHAT is Place #5? ☐ **Day 1** ☐ **Day 2**
- ☐ My Home
- ☐ My Primary Workplace
- ☐ My Regular School Location
- ☐ Another Place *(Complete the information below.)*

WHAT kind of place is this?
(bank, grocery, park, etc.) _____

_____
Name of Place

_____
Street Address

_____ _____ _____
City   State   Zip

_____ & _____
Nearby Cross Streets

At WHAT TIME did you ARRIVE at Place #5? ____ : ____ am/pm

WHAT did you do at Place #5?

Main Activity (Check only one)		Other Activities (Check all that apply)
☐	Home – Paid Work	☐
☐	Home – Other	☐
☐	Work	☐
☐	Attend Childcare	☐
☐	Attend School	☐
☐	Attend College	☐
☐	Eat Out	☐
☐	Personal Business	☐
☐	Everyday Shopping	☐
☐	Major Shopping	☐
☐	Religious/Community	☐
☐	Social	☐
☐	Recreation – Participate	☐
☐	Recreation – Watch	☐
☐	Accompany Another Person	☐
☐	Pick-Up/Drop-Off Passenger	☐
☐	Turn Around	☐

HOW did you get here from Place #4? Show all the methods of travel you used to make this trip and related travel details

	1st →	2nd →	3rd →	4th →	5th →
Travel method (See "List of Travel Methods" below)					
If an auto method (1 or 2) — Vehicle used					
Driver or passenger					
Total # of persons in vehicle					
Parking cost paid	$	$	$	$	$
If a transit method (6 thru 11) — How long did you wait?					
Payment method (cash, pass or ticket)					
If cash or ticket, how much did you pay?	$	$	$	$	$
If walk or bicycle - Time (minutes)					
While Traveling — Which activities did you do for more than 15 minutes? (See "List of Activities" below)					
Name(s) of household member(s) with you for each segment of the trip					

List of Travel Methods
1 Car, van, truck
2 Motorcycle/Moped
3 Bicycle
4 Walk
5 School Bus
6 Taxi/Shuttle
7 Dial-A-Ride/ACESS
8 Ferry
9 Train (Operator) _____
10 Public Bus (Operators) _____ Rtes _____
11 Other (Specify)

List of Activities
1 **Work** (reading, laptop computer, cell phone, etc.)
2 **Maintenance** (eating, sleeping, personal grooming, etc.)
3 **Recreation** (games, visiting, cell phone, DVD, etc.)
4 **None**

At what time did you leave Place #5 to go to Place #6 ____ : ____ am/pm

Next Place #6

Place # 14

WHAT is Place #14? ☐ **Day 1** ☐ **Day 2**
- ☐ My Home
- ☐ My Primary Workplace
- ☐ My Regular School Location
- ☐ Another Place *(Complete the information below.)*

WHAT kind of place is this?
(bank, grocery, park, etc.) _____

_____
Name of Place

_____
Street Address

_____ _____ _____
City   State   Zip

_____ & _____
Nearby Cross Streets

At WHAT TIME did you ARRIVE at Place #14? ____ : ____ am/pm

WHAT did you do at Place #14?

Main Activity (Check only one)		Other Activities (Check all that apply)
☐	Home – Paid Work	☐
☐	Home – Other	☐
☐	Work	☐
☐	Attend Childcare	☐
☐	Attend School	☐
☐	Attend College	☐
☐	Eat Out	☐
☐	Personal Business	☐
☐	Everyday Shopping	☐
☐	Major Shopping	☐
☐	Religious/Community	☐
☐	Social	☐
☐	Recreation – Participate	☐
☐	Recreation – Watch	☐
☐	Accompany Another Person	☐
☐	Pick-Up/Drop-Off Passenger	☐
☐	Turn Around	☐

HOW did you get here from Place #13? Show all the methods of travel you used to make this trip and related travel details

	1st →	2nd →	3rd →	4th →	5th →
Travel method (See "List of Travel Methods" below)					
If an auto method (1 or 2) — Vehicle used					
Driver or passenger					
Total # of persons in vehicle					
Parking cost paid	$	$	$	$	$
If a transit method (6 thru 11) — How long did you wait?					
Payment method (cash, pass or ticket)					
If cash or ticket, how much did you pay?	$	$	$	$	$
If walk or bicycle - Time (minutes)					
While Traveling — Which activities did you do for more than 15 minutes? (See "List of Activities" below)					
Name(s) of household member(s) with you for each segment of the trip					

List of Travel Methods
1 Car, van, truck
2 Motorcycle/Moped
3 Bicycle
4 Walk
5 School Bus
6 Taxi/Shuttle
7 Dial-A-Ride/ACESS
8 Ferry
9 Train (Operator) _____
10 Public Bus (Operators) _____ Rtes _____
11 Other (Specify)

List of Activities
1 **Work** (reading, laptop computer, cell phone, etc.)
2 **Maintenance** (eating, sleeping, personal grooming, etc.)
3 **Recreation** (games, visiting, cell phone, DVD, etc.)
4 **None**

At what time did you leave Place #14 to go to Place #15 ____ : ____ am/pm

Next Place #15

Place # 15

WHAT is Place #15? ☐ **Day 1** ☐ **Day 2**

☐ My Home
☐ My Primary Workplace
☐ My Regular School Location
☐ Another Place *(Complete the information below.)*

WHAT kind of place is this?
(bank, grocery, park, etc.) _____

_____
Name of Place

_____
Street Address

_____ _____ _____
City   State   Zip
_____ **&** _____
Nearby Cross Streets

At WHAT TIME did you ARRIVE at Place #15? ☐ : ___ am/pm

WHAT did you do at Place #15?

Main Activity (Check only one)		Other Activities (Check all that apply)
☐	Home – Paid Work	☐
☐	Home – Other	☐
☐	Work	☐
☐	Attend Childcare	☐
☐	Attend School	☐
☐	Attend College	☐
☐	Eat Out	☐
☐	Personal Business	☐
☐	Everyday Shopping	☐
☐	Major Shopping	☐
☐	Religious/Community	☐
☐	Social	☐
☐	Recreation – Participate	☐
☐	Recreation – Watch	☐
☐	Accompany Another Person	☐
☐	Pick-Up/Drop-Off Passenger	☐
☐	Turn Around	☐

HOW did you get here from Place #14? Show all the methods of travel you used to make this trip and related travel details

	1st →	2nd →	3rd →	4th →	5th →
Travel method (See "List of Travel Methods" below)					
If an auto method (1 or 2) Vehicle used					
Driver or passenger					
Total # of persons in vehicle					
Parking cost paid	$	$	$	$	$
If a transit method (6 thru 11) How long did you wait?					
Payment method (cash, pass or ticket)					
If cash or ticket, how much did you pay?	$	$	$	$	$
If walk or bicycle - Time (minutes)					
While Traveling Which activities did you do for more than 15 minutes? (See "List of Activities" below)					
Name(s) of household member(s) with you for each segment of the trip					

List of Travel Methods
1 Car, van, truck 5 School Bus 9 Train (Operator) _____
2 Motorcycle/Moped 6 Taxi/Shuttle
3 Bicycle 7 Dial-A-Ride/ACESS 10 Public Bus (Operators) _____ Rtes____
4 Walk 8 Ferry 11 Other (Specify)

List of Activities
1 **Work** (reading, laptop computer, cell phone, etc.)
2 **Maintenance** (eating, sleeping, personal grooming, etc.)
3 **Recreation** (games, visiting, cell phone, DVD, etc.)
4 **None**

At what time did you leave Place #15 to go to Place #16 ___ : ___ am/pm

Next Place #16

Place # 4

WHAT is Place #4? ☐ **Day 1** ☐ **Day 2**

☐ My Home
☐ My Primary Workplace
☐ My Regular School Location
☐ Another Place *(Complete the information below.)*

WHAT kind of place is this?
(bank, grocery, park, etc.) _____

_____
Name of Place

_____
Street Address

_____ _____ _____
City   State   Zip
_____ **&** _____
Nearby Cross Streets

At WHAT TIME did you ARRIVE at Place #4? ☐ : ___ am/pm

WHAT did you do at Place #4?

Main Activity (Check only one)		Other Activities (Check all that apply)
☐	Home – Paid Work	☐
☐	Home – Other	☐
☐	Work	☐
☐	Attend Childcare	☐
☐	Attend School	☐
☐	Attend College	☐
☐	Eat Out	☐
☐	Personal Business	☐
☐	Everyday Shopping	☐
☐	Major Shopping	☐
☐	Religious/Community	☐
☐	Social	☐
☐	Recreation – Participate	☐
☐	Recreation – Watch	☐
☐	Accompany Another Person	☐
☐	Pick-Up/Drop-Off Passenger	☐
☐	Turn Around	☐

HOW did you get here from Place #3? Show all the methods of travel you used to make this trip and related travel details

	1st →	2nd →	3rd →	4th →	5th →
Travel method (See "List of Travel Methods" below)					
If an auto method (1 or 2) Vehicle used					
Driver or passenger					
Total # of persons in vehicle					
Parking cost paid	$	$	$	$	$
If a transit method (6 thru 11) How long did you wait?					
Payment method (cash, pass or ticket)					
If cash or ticket, how much did you pay?	$	$	$	$	$
If walk or bicycle - Time (minutes)					
While Traveling Which activities did you do for more than 15 minutes? (See "List of Activities" below)					
Name(s) of household member(s) with you for each segment of the trip					

List of Travel Methods
1 Car, van, truck 5 School Bus 9 Train (Operator) _____
2 Motorcycle/Moped 6 Taxi/Shuttle
3 Bicycle 7 Dial-A-Ride/ACESS 10 Public Bus (Operators) _____ Rtes____
4 Walk 8 Ferry 11 Other (Specify)

List of Activities
1 **Work** (reading, laptop computer, cell phone, etc.)
2 **Maintenance** (eating, sleeping, personal grooming, etc.)
3 **Recreation** (games, visiting, cell phone, DVD, etc.)
4 **None**

At what time did you leave Place #4 to go to Place #5 ___ : ___ am/pm

Next Place #5

Place # 3

WHAT is Place #3? ☐ **Day 1** ☐ **Day 2**

☐ My Home
☐ My Primary Workplace
☐ My Regular School Location
☐ Another Place *(Complete the information below.)*

WHAT kind of place is this?
(bank, grocery, park, etc.) _____

_____
Name of Place

_____
Street Address

_____
City   State   Zip

&
_____
Nearby Cross Streets

At WHAT TIME did you ARRIVE at Place #3? ___ : ___ am/pm

WHAT did you do at Place #3?

Main Activity (Check only one)		Other Activities (Check all that apply)
☐	Home – Paid Work	☐
☐	Home – Other	☐
☐	Work	☐
☐	Attend Childcare	☐
☐	Attend School	☐
☐	Attend College	☐
☐	Eat Out	☐
☐	Personal Business	☐
☐	Everyday Shopping	☐
☐	Major Shopping	☐
☐	Religious/Community	☐
☐	Social	☐
☐	Recreation – Participate	☐
☐	Recreation – Watch	☐
☐	Accompany Another Person	☐
☐	Pick-Up/Drop-Off Passenger	☐
☐	Turn Around	☐

HOW did you get here from Place #2? Show all the methods of travel you used to make this trip and related travel details

		1st →	2nd →	3rd →	4th →	5th →
Travel method	(See "List of Travel Methods" below)					
If an auto method (1 or 2)	Vehicle used					
	Driver or passenger					
	Total # of persons in vehicle					
	Parking cost paid	$	$	$	$	$
If a transit method (6 thru 11)	How long did you wait?					
	Payment method (cash, pass or ticket)					
	If cash or ticket, how much did you pay?	$	$	$	$	$
	If walk or bicycle - Time (minutes)					
While Traveling	Which activities did you do for more than 15 minutes? (See "List of Activities" below)					
	Name(s) of household member(s) with you for each segment of the trip					

List of Travel Methods

1 Car, van, truck
2 Motorcycle/ Moped
3 Bicycle
4 Walk
5 School Bus
6 Taxi/Shuttle
7 Dial-A-Ride/ ACESS
8 Ferry
9 Train (Operator) _____
10 Public Bus (Operators) _____ Rtes_____
11 Other (Specify)

List of Activities

1 **Work** (reading, laptop computer, cell phone, etc.)
2 **Maintenance** (eating, sleeping, personal grooming, etc.)
3 **Recreation** (games, visiting, cell phone, DVD, etc.)
4 **None**

At what time did you leave Place #3 to go to Place #4 ___ : ___ am/pm

Next Place #4

Place # 16

WHAT is Place #16? ☐ **Day 1** ☐ **Day 2**

☐ My Home
☐ My Primary Workplace
☐ My Regular School Location
☐ Another Place *(Complete the information below.)*

WHAT kind of place is this?
(bank, grocery, park, etc.) _____

_____
Name of Place

_____
Street Address

_____
City   State   Zip

&
_____
Nearby Cross Streets

At WHAT TIME did you ARRIVE at Place #16? ___ : ___ am/pm

WHAT did you do at Place #16?

Main Activity (Check only one)		Other Activities (Check all that apply)
☐	Home – Paid Work	☐
☐	Home – Other	☐
☐	Work	☐
☐	Attend Childcare	☐
☐	Attend School	☐
☐	Attend College	☐
☐	Eat Out	☐
☐	Personal Business	☐
☐	Everyday Shopping	☐
☐	Major Shopping	☐
☐	Religious/Community	☐
☐	Social	☐
☐	Recreation – Participate	☐
☐	Recreation – Watch	☐
☐	Accompany Another Person	☐
☐	Pick-Up/Drop-Off Passenger	☐
☐	Turn Around	☐

HOW did you get here from Place #15? Show all the methods of travel you used to make this trip and related travel details

		1st →	2nd →	3rd →	4th →	5th →
Travel method	(See "List of Travel Methods" below)					
If an auto method (1 or 2)	Vehicle used					
	Driver or passenger					
	Total # of persons in vehicle					
	Parking cost paid	$	$	$	$	$
If a transit method (6 thru 11)	How long did you wait?					
	Payment method (cash, pass or ticket)					
	If cash or ticket, how much did you pay?	$	$	$	$	$
	If walk or bicycle - Time (minutes)					
While Traveling	Which activities did you do for more than 15 minutes? (See "List of Activities" below)					
	Name(s) of household member(s) with you for each segment of the trip					

List of Travel Methods

1 Car, van, truck
2 Motorcycle/ Moped
3 Bicycle
4 Walk
5 School Bus
6 Taxi/Shuttle
7 Dial-A-Ride/ ACESS
8 Ferry
9 Train (Operator) _____
10 Public Bus (Operators) _____ Rtes_____
11 Other (Specify)

List of Activities

1 **Work** (reading, laptop computer, cell phone, etc.)
2 **Maintenance** (eating, sleeping, personal grooming, etc.)
3 **Recreation** (games, visiting, cell phone, DVD, etc.)
4 **None**

At what time did you leave Place #16 to go to Place #17 ___ : ___ am/pm

Next Place #17

Place # 17

WHAT is Place #17? ☐ **Day 1** ☐ **Day 2**

☐ My Home
☐ My Primary Workplace
☐ My Regular School Location
☐ Another Place *(Complete the information below.)*

WHAT kind of place is this?
(bank, grocery, park, etc.) _____

_____
Name of Place

_____
Street Address

_____ _____ _____
City   State   Zip
&
_____
Nearby Cross Streets

At WHAT TIME did you ARRIVE at Place #17? ☐ : ☐ am/pm

WHAT did you do at Place #17?

Main Activity (Check only one)		Other Activities (Check all that apply)
☐	Home – Paid Work	☐
☐	Home – Other	☐
☐	Work	☐
☐	Attend Childcare	☐
☐	Attend School	☐
☐	Attend College	☐
☐	Eat Out	☐
☐	Personal Business	☐
☐	Everyday Shopping	☐
☐	Major Shopping	☐
☐	Religious/Community	☐
☐	Social	☐
☐	Recreation – Participate	☐
☐	Recreation – Watch	☐
☐	Accompany Another Person	☐
☐	Pick-Up/Drop-Off Passenger	☐
☐	Turn Around	☐

HOW did you get here from Place #16? Show all the methods of travel you used to make this trip and related travel details

	1st →	2nd →	3rd →	4th →	5th →
Travel method (See "List of Travel Methods" below)					
If an auto method (1 or 2) Vehicle used					
Driver or passenger					
Total # of persons in vehicle					
Parking cost paid	$	$	$	$	$
If a transit method (6 thru 11) How long did you wait?					
Payment method (cash, pass or ticket)					
If cash or ticket, how much did you pay?	$	$	$	$	$
If walk or bicycle - Time (minutes)					
While Traveling Which activities did you do for more than 15 minutes? (See "List of Activities" below)					
Name(s) of household member(s) with you for each segment of the trip					

List of Travel Methods
1 Car, van, truck
2 Motorcycle/Moped
3 Bicycle
4 Walk
5 School Bus
6 Taxi/Shuttle
7 Dial-A-Ride/ACESS
8 Ferry
9 Train (Operator) _____
10 Public Bus (Operators) _____ Rtes ____
11 Other (Specify)

List of Activities
1 Work *(reading, laptop computer, cell phone, etc.)*
2 Maintenance *(eating, sleeping, personal grooming, etc.)*
3 Recreation *(games, visiting, cell phone, DVD, etc.)*
4 None

At what time did you leave Place #17 to go to Place #18 ☐ : ☐ am/pm

Next Place #18

Place # 2

WHAT is Place #2? ☐ **Day 1** ☐ **Day 2**

☐ My Home
☐ My Primary Workplace
☐ My Regular School Location
☐ Another Place *(Complete the information below.)*

WHAT kind of place is this?
(bank, grocery, park, etc.) _____

_____
Name of Place

_____
Street Address

_____ _____ _____
City   State   Zip
&
_____
Nearby Cross Streets

At WHAT TIME did you ARRIVE at Place #2? ☐ : ☐ am/pm

WHAT did you do at Place #2?

Main Activity (Check only one)		Other Activities (Check all that apply)
☐	Home – Paid Work	☐
☐	Home – Other	☐
☐	Work	☐
☐	Attend Childcare	☐
☐	Attend School	☐
☐	Attend College	☐
☐	Eat Out	☐
☐	Personal Business	☐
☐	Everyday Shopping	☐
☐	Major Shopping	☐
☐	Religious/Community	☐
☐	Social	☐
☐	Recreation – Participate	☐
☐	Recreation – Watch	☐
☐	Accompany Another Person	☐
☐	Pick-Up/Drop-Off Passenger	☐
☐	Turn Around	☐

HOW did you get here from Place #1? Show all the methods of travel you used to make this trip and related travel details

	1st →	2nd →	3rd →	4th →	5th →
Travel method (See "List of Travel Methods" below)					
If an auto method (1 or 2) Vehicle used					
Driver or passenger					
Total # of persons in vehicle					
Parking cost paid	$	$	$	$	$
If a transit method (6 thru 11) How long did you wait?					
Payment method (cash, pass or ticket)					
If cash or ticket, how much did you pay?	$	$	$	$	$
If walk or bicycle - Time (minutes)					
While Traveling Which activities did you do for more than 15 minutes? (See "List of Activities" below)					
Name(s) of household member(s) with you for each segment of the trip					

List of Travel Methods
1 Car, van, truck
2 Motorcycle/Moped
3 Bicycle
4 Walk
5 School Bus
6 Taxi/Shuttle
7 Dial-A-Ride/ACESS
8 Ferry
9 Train (Operator) _____
10 Public Bus (Operators) _____ Rtes ____
11 Other (Specify)

List of Activities
1 Work *(reading, laptop computer, cell phone, etc.)*
2 Maintenance *(eating, sleeping, personal grooming, etc.)*
3 Recreation *(games, visiting, cell phone, DVD, etc.)*
4 None

At what time did you leave Place #2 to go to Place #3 ☐ : ☐ am/pm

Next Place #3

Place # 1 — START HERE

WHAT is Place #1? ☐ My Home
☐ My Regular School Location ☐ My Primary Workplace
☐ Another Place *(Complete the information below.)*

WHAT kind of place is this?
(bank, grocery, park, etc.)

_____
Name of Place

_____
Street Address

_____
City   State   Zip

_____ & _____
Nearby Cross Streets

Diary start time at place #1   `3:00 am`

WHAT did you do at Place #1?

Main Activity (Check only one)		Other Activities (Check all that apply)
☐	Home – Paid Work	☐
☐	Home – Other	☐
☐	Work	☐
☐	Attend Childcare	☐
☐	Attend School	☐
☐	Attend College	☐
☐	Eat Out	☐
☐	Personal Business	☐
☐	Everyday Shopping	☐
☐	Major Shopping	☐
☐	Religious/Community	☐
☐	Social	☐
☐	Recreation – Participate	☐
☐	Recreation – Watch	☐
☐	Accompany Another Person	☐
☐	Pick-Up/Drop-Off Passenger	☐
☐	Turn Around	☐

For this diary, your day begins at 3:00 a.m. Many people are home asleep at 3:00 a.m. If this is the case, then under "START HERE" check "My Home" and check the "Home" activities you did before leaving home. Then record the exact time you left home below and continue with the diary.

At what time did you leave Place #1 to go to Place #2
`___ : ___ am/pm`

Next Place #2

Place # 18

WHAT is Place #18?   ☐ Day 1   ☐ Day 2
☐ My Home
☐ My Primary Workplace
☐ My Regular School Location
☐ Another Place *(Complete the information below.)*

WHAT kind of place is this?
(bank, grocery, park, etc.)

_____
Name of Place

_____
Street Address

_____
City   State   Zip

_____ & _____
Nearby Cross Streets

At WHAT TIME did you ARRIVE at Place #18?   `___ : ___ am/pm`

WHAT did you do at Place #18?

Main Activity (Check only one)		Other Activities (Check all that apply)
☐	Home – Paid Work	☐
☐	Home – Other	☐
☐	Work	☐
☐	Attend Childcare	☐
☐	Attend School	☐
☐	Attend College	☐
☐	Eat Out	☐
☐	Personal Business	☐
☐	Everyday Shopping	☐
☐	Major Shopping	☐
☐	Religious/Community	☐
☐	Social	☐
☐	Recreation – Participate	☐
☐	Recreation – Watch	☐
☐	Accompany Another Person	☐
☐	Pick-Up/Drop-Off Passenger	☐
☐	Turn Around	☐

HOW did you get here from Place #17? Show all the methods of travel you used to make this trip and related travel details

		1st →	2nd →	3rd →	4th →	5th →
Travel method (See "List of Travel Methods" below)						
If an auto method (1 or 2)	Vehicle used					
	Driver or passenger					
	Total # of persons in vehicle					
	Parking cost paid	$	$	$	$	$
If a transit method (6 thru 11)	How long did you wait?					
	Payment method (cash, pass or ticket)					
	If cash or ticket, how much did you pay?	$	$	$	$	$
If walk or bicycle - Time (minutes)						
While Traveling	Which activities did you do for more than 15 minutes? (See "List of Activities" below)					
	Name(s) of household member(s) with you for each segment of the trip					

List of Travel Methods

1 Car, van, truck   5 School Bus   9 Train (Operator) _____
2 Motorcycle/Moped   6 Taxi/Shuttle
3 Bicycle   7 Dial-A-Ride/ACESS   10 Public Bus (Operators) _____ Rtes ____
4 Walk   8 Ferry   11 Other (Specify)

List of Activities

1 Work (reading, laptop computer, cell phone, etc.)
2 Maintenance (eating, sleeping, personal grooming, etc.)
3 Recreation (games, visiting, cell phone, DVD, etc.)
4 None

At what time did you leave Place #18 to go to Place #19
`___ : ___ am/pm`

Next Place #19

Place # 19

WHAT is Place #19? ☐ **Day 1** ☐ **Day 2**

☐ My Home
☐ My Primary Workplace
☐ My Regular School Location
☐ Another Place *(Complete the information below.)*

WHAT kind of place is this?
(bank, grocery, park, etc.) _____

_____
Name of Place

_____
Street Address

_____ _____ _____
City **State** **Zip**

_____ & _____
Nearby Cross Streets

At WHAT TIME did you ARRIVE at Place #19? ____ : ____ am/pm

WHAT did you do at Place #19?

Main Activity (Check only one)		Other Activities (Check all that apply)
☐	Home – Paid Work	☐
☐	Home – Other	☐
☐	Work	☐
☐	Attend Childcare	☐
☐	Attend School	☐
☐	Attend College	☐
☐	Eat Out	☐
☐	Personal Business	☐
☐	Everyday Shopping	☐
☐	Major Shopping	☐
☐	Religious/Community	☐
☐	Social	☐
☐	Recreation – Participate	☐
☐	Recreation – Watch	☐
☐	Accompany Another Person	☐
☐	Pick-Up/Drop-Off Passenger	☐
☐	Turn Around	☐

HOW did you get here from Place #18? Show all the methods of travel you used to make this trip and related travel details

	1st →	2nd →	3rd →	4th →	5th →
Travel method (See "List of Travel Methods" below)					
If an auto method (1 or 2) Vehicle used					
Driver or passenger					
Total # of persons in vehicle					
Parking cost paid	$	$	$	$	$
If a transit method (6 thru 11) How long did you wait?					
Payment method (cash, pass or ticket)					
If cash or ticket, how much did you pay?	$	$	$	$	$
If walk or bicycle - Time (minutes)					
While Traveling Which activities did you do for more than 15 minutes? (See "List of Activities" below)					
Name(s) of household member(s) with you for each segment of the trip					

List of Travel Methods
1 Car, van, truck 5 School Bus 9 Train (Operator) _____
2 Motorcycle/Moped 6 Taxi/Shuttle 10 Public Bus (Operators) _____ Rtes ____
3 Bicycle 7 Dial-A-Ride/ACESS
4 Walk 8 Ferry 11 Other (Specify)

List of Activities
1 Work (reading, laptop computer, cell phone, etc.)
2 Maintenance (eating, sleeping, personal grooming, etc.)
3 Recreation (games, visiting, cell phone, DVD, etc.)
4 None

At what time did you leave Place #19 to go to Place #20 ____ : ____ am/pm

Next Place #20

Place # 2

WHAT is Place #2? ☒ **Day 1** ☐ **Day 2**

☐ My Home
☐ My Primary Workplace
☐ My Regular School Location
☒ Another Place *(Complete the information below.)*

WHAT kind of place is this?
(bank, grocery, park, etc.) **Health Club**

Health Happy Fitness Club
Name of Place

314 Pleasant Rd.
Street Address

Anytown **WA** **98000**
City **State** **Zip**

Lovely Lane & **Sea Way**
Nearby Cross Streets

At WHAT TIME did you ARRIVE at Place #2? **7 : 45** (am)/pm

WHAT did you do at Place #2?

Main Activity (Check only one)		Other Activities (Check all that apply)
☐	Home – Paid Work	☐
☐	Home – Other	☐
☐	Work	☐
☐	Attend Childcare	☐
☐	Attend School	☐
☐	Attend College	☐
☐	Eat Out	☐
☐	Personal Business	☐
☐	Everyday Shopping	☐
☐	Major Shopping	☐
☐	Religious/Community	☐
☐	Social	☒
☒	Recreation – Participate	☐
☐	Recreation – Watch	☐
☐	Accompany Another Person	☐
☐	Pick-Up/Drop-Off Passenger	☐
☐	Turn Around	☐

HOW did you get here from Place #1? Show all the methods of travel you used to make this trip and related travel details

	1st →	2nd →	3rd →	4th →	5th →
Travel method (See "List of Travel Methods" below)	1	8	4	10	4
If an auto method (1 or 2) Vehicle used	Honda Civic				
Driver or passenger	Driver				
Total # of persons in vehicle	2				
Parking cost paid	$ 0	$	$	$	$
If a transit method (6 thru 11) How long did you wait?		10 min		15 min	
Payment method (cash, pass or ticket)		Puget Pass		Puget Pass	
If cash or ticket, how much did you pay?	$	$	$	$	$
If walk or bicycle - Time (minutes)			5 min		7 min
While Traveling Which activities did you do for more than 15 minutes? (See "List of Activities" below)		1, 2		1, 3	
Name(s) of household member(s) with you for each segment of the trip	Mary	Mary			

List of Travel Methods
1 Car, van, truck 5 School Bus 9 Train (Operator) _____
2 Motorcycle/Moped 6 Taxi/Shuttle 10 Public Bus (Operators) **Metro** Rtes **30**
3 Bicycle 7 Dial-A-Ride/ACESS
4 Walk 8 Ferry 11 Other (Specify)

List of Activities
1 Work (reading, laptop computer, cell phone, etc.)
2 Maintenance (eating, sleeping, personal grooming, etc.)
3 Recreation (games, visiting, cell phone, DVD, etc.)
4 None

At what time did you leave Place #2 to go to Place #3 **8 : 45** (am)/pm

Next Place #3

Place # 1 — START HERE

WHAT is Place #1? ☒ My Home
☐ My Regular School Location   ☐ My Primary Workplace
☐ Another Place *(Complete the information below.)*

WHAT kind of place is this?
(bank, grocery, park, etc.)

_____
Name of Place

_____
Street Address

_____
City   **State**   **Zip**

_____&_____
Nearby Cross Streets

Diary start time at place #1   3:00 am

WHAT did you do at Place #1?

Main Activity (Check only one)		Other Activities (Check all that apply)
☐	Home – Paid Work	☒
☒	Home – Other	☐
☐	Work	☐
☐	Attend Childcare	☐
☐	Attend School	☐
☐	Attend College	☐
☐	Eat Out	☐
☐	Personal Business	☐
☐	Everyday Shopping	☐
☐	Major Shopping	☐
☐	Religious/Community	☐
☐	Social	☐
☐	Recreation – Participate	☐
☐	Recreation – Watch	☐
☐	Accompany Another Person	☐
☐	Pick-Up/Drop-Off Passenger	☐
☐	Turn Around	☐

For this diary, your day begins at 3:00 a.m. Many people are home asleep at 3:00 a.m. If this is the case, then under "START HERE" check "My Home" and check the "Home" activities you did before leaving home. Then record the exact time you left home below and continue with the diary.

At what time did you leave Place #1 to go to Place #2

7 : 00 (am)/pm

Next Place #2

Place # 20

WHAT is Place #20?   ☐ Day 1   ☐ Day 2
☐ My Home
☐ My Primary Workplace
☐ My Regular School Location
☐ Another Place *(Complete the information below.)*

WHAT kind of place is this?
(bank, grocery, park, etc.)

_____
Name of Place

_____
Street Address

_____
City   **State**   **Zip**

_____&_____
Nearby Cross Streets

At WHAT TIME did you ARRIVE at Place #20?   :   am/pm

WHAT did you do at Place #20?

Main Activity (Check only one)		Other Activities (Check all that apply)
☐	Home – Paid Work	☐
☐	Home – Other	☐
☐	Work	☐
☐	Attend Childcare	☐
☐	Attend School	☐
☐	Attend College	☐
☐	Eat Out	☐
☐	Personal Business	☐
☐	Everyday Shopping	☐
☐	Major Shopping	☐
☐	Religious/Community	☐
☐	Social	☐
☐	Recreation – Participate	☐
☐	Recreation – Watch	☐
☐	Accompany Another Person	☐
☐	Pick-Up/Drop-Off Passenger	☐
☐	Turn Around	☐

HOW did you get here from Place #19? Show all the methods of travel you used to make this trip and related travel details

		1st →	2nd →	3rd →	4th →	5th →
Travel method *(See "List of Travel Methods" below)*						
If an auto method (1 or 2)	Vehicle used					
	Driver or passenger					
	Total # of persons in vehicle					
	Parking cost paid	$	$	$	$	$
If a transit method (6 thru 11)	How long did you wait?					
	Payment method (cash, pass or ticket)					
	If cash or ticket, how much did you pay?	$	$	$	$	$
If walk or bicycle - Time (minutes)						
While Traveling	Which activities did you do for more than 15 minutes? *(See "List of Activities" below)*					
	Name(s) of household member(s) with you for each segment of the trip					

List of Travel Methods

1 Car, van, truck   5 School Bus   9 Train (Operator) _____
2 Motorcycle/ Moped   6 Taxi/Shuttle   7 Dial-A-Ride/ ACESS   10 Public Bus (Operators) _____ Rtes ____
3 Bicycle   8 Ferry   11 Other (Specify)
4 Walk

List of Activities

1 Work (reading, laptop computer, cell phone, etc.)
2 Maintenance (eating, sleeping, personal grooming, etc.)
3 Recreation (games, visiting, cell phone, DVD, etc.)
4 None

At what time did you leave Place #20 to go to Place #21

:   am/pm

Next Place #21

<table>
<tr><td>Place #
21</td><td colspan="2">**WHAT is Place #21?**
☐ Day 1 ☐ Day 2</td></tr>
</table>

Place # 21

WHAT is Place #21? ☐ **Day 1** ☐ **Day 2**

☐ My Home
☐ My Primary Workplace
☐ My Regular School Location
☐ Another Place *(Complete the information below.)*

WHAT kind of place is this?
(bank, grocery, park, etc.)

_____

Name of Place

_____
Street Address

_____
City   **State**   **Zip**
_____ **&** _____
Nearby Cross Streets

At WHAT TIME did you ARRIVE at Place #21? ___ : ___ am/pm

WHAT did you do at Place #21?

Main Activity (Check only one)		Other Activities (Check all that apply)
☐	Home – Paid Work	☐
☐	Home – Other	☐
☐	Work	☐
☐	Attend Childcare	☐
☐	Attend School	☐
☐	Attend College	☐
☐	Eat Out	☐
☐	Personal Business	☐
☐	Everyday Shopping	☐
☐	Major Shopping	☐
☐	Religious/Community	☐
☐	Social	☐
☐	Recreation – Participate	☐
☐	Recreation – Watch	☐
☐	Accompany Another Person	☐
☐	Pick-Up/Drop-Off Passenger	☐
☐	Turn Around	☐

HOW did you get here from Place #20? Show all the methods of travel you used to make this trip and related travel details

		1st ➤	2nd ➤	3rd ➤	4th ➤	5th ➤
Travel method (See "List of Travel Methods" below)						
If an auto method (1 or 2)	Vehicle used					
	Driver or passenger					
	Total # of persons in vehicle					
	Parking cost paid	$	$	$	$	$
If a transit method (6 thru 11)	How long did you wait?					
	Payment method (cash, pass or ticket)					
	If cash or ticket, how much did you pay?	$	$	$	$	$
	If walk or bicycle - Time (minutes)					
While Traveling	Which activities did you do for more than 15 minutes? (See "List of Activities" below)					
	Name(s) of household member(s) with you for each segment of the trip					

List of Travel Methods

1	Car, van, truck	5	School Bus	9	Train (Operator) _____
2	Motorcycle/ Moped	6	Taxi/Shuttle	10	Public Bus (Operators) _____ Rtes _____
3	Bicycle	7	Dial-A-Ride/ ACESS	11	Other (Specify)
4	Walk	8	Ferry		

List of Activities

1 **Work** (reading, laptop computer, cell phone, etc.)
2 **Maintenance** (eating, sleeping, personal grooming, etc.)
3 **Recreation** (games, visiting, cell phone, DVD, etc.)
4 **None**

At what time did you leave Place #21 to go to Place #22 ___ : ___ am/pm

Next Place #22

Instructions for Two-Day Travel Diary

- **Use this diary on your assigned travel days, shown on the cover. Begin at 3:00 AM on your first travel day and continue for 48 hours, ending at 3:00 AM.**

- **Fill out one page for EACH location you go to. If uncertain whether to include a location at which you stop, include it.**

- **Record ALL locations visited, even short stops for coffee or gas.**

- **Record the EXACT time that you arrive and leave each location.**

- **Provide as much address information as you can. Include:**
  - **street address**
  - **type of place or business**
  - **nearest cross streets**

- **Record your primary activity (what you did) at each location. (Refer to Activity Choices on each page.)**

- **If you take a round-trip without stopping at a location (walk the dog or ride around in the car), record the furthest point of the trip as the location and what you do there as TURN AROUND.**

- **If you park your car and walk MORE than five minutes to your destination, record your type of transportation as car first, then walk. If you walk more than five minutes from a bus to your destination, record your transportation as bus first, then walk.**

- **If your work involves frequent travel - truck driver, sales person, taxi driver, etc. - record where and when you start work and where and when you end work. If you make non-work related stops between work stops, record those locations. Do not report your frequent work-related stops.**

Example of Travel Day

Location 1 & 8 Home
Location 2 & 4 Work
Location 3 Restaurant
Location 5 Gas Station
Location 6 Grocery Store
Location 7 Daycare Center
Car / Walk, Bus / Bus, Walk / Car
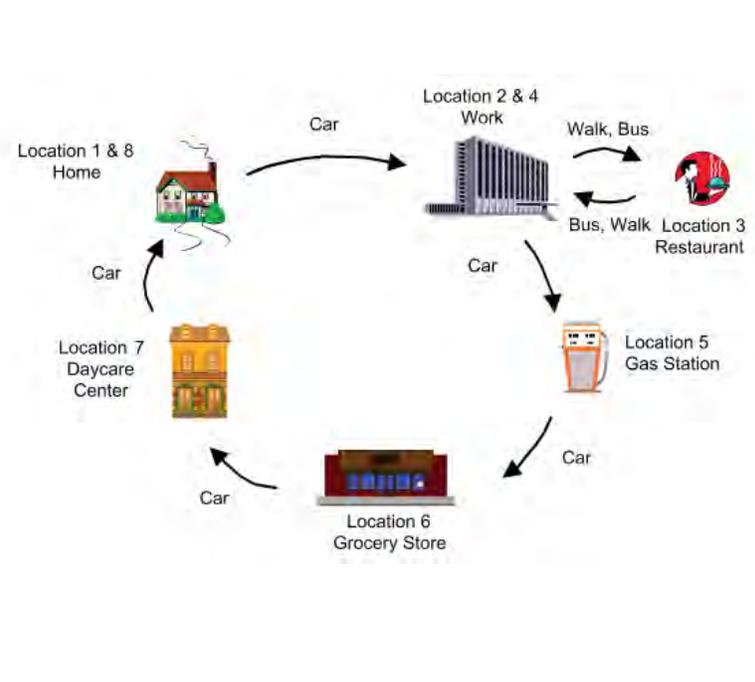
If you have any questions, please call or e-mail:
1-800-294-9668
surveyhelp@morpace.com

Person Information

School Information   ■ Not a student - Skip this section

- ☐ In pre-school/nursery school
- ☐ K-12 student
- ☐ Vocational/Technical
- ☐ Full-time college/graduate student
- ☐ Part-time college/graduate student

School/College Name: _____

Location: _____
Street Address or Closest Intersection   City, State, Zip

Work Information   ■ Not currently employed - Skip this section

Do you have more than one job?   ☐ Yes   ☐ No   If yes, how many? _____

If you have more than one job, please refer to the place you go to work at most often for the following questions

Your primary work place?
- Name of Employer _____
- Street Address _____
- City, State, Zip _____
- Closest Intersection _____

What is your employer's industry? (Please see categories on back) _____

Does your job involve...? ☐ Evenings ☐ Overnight Shifts

Average hours worked per week? _____ hours

Which of the following best describes your work schedule?
- ☐ "I have no flexibility in my work schedule."
- ☐ "I have some flexibility in my work schedule."
- ☐ "I'm pretty much free to adjust my schedule as I like."

Does your employer offer compressed workweek options? (e.g. 40 hrs in less than 5 days)
☐ Yes   ☐ No   ☐ Don't know

How long have you worked at this address? _____

Transit Pass Information   ■ Do not currently have a transit pass - Skip this section

	Pass 1	Pass 2	Pass 3
What transit passes do you have?	_____	_____	_____
What is the face value of the pass?	_____	_____	_____
How much did you personally pay for the pass?	_____	_____	_____

Place # 22

WHAT is Place #22?   ☐ Day 1   ☐ Day 2
- ☐ My Home
- ☐ My Primary Workplace
- ☐ My Regular School Location
- ☐ Another Place *(Complete the information below.)*

WHAT kind of place is this? (bank, grocery, park, etc.) _____

Name of Place _____

Street Address _____

City _____ State _____ Zip _____
& _____
Nearby Cross Streets

AT WHAT TIME did you ARRIVE at Place #22? ___:___ am/pm

WHAT did you do at Place #22?

Main Activity (Check only one)		Other Activities (Check all that apply)
☐	Home – Paid Work	☐
☐	Home – Other	☐
☐	Work	☐
☐	Attend Childcare	☐
☐	Attend School	☐
☐	Attend College	☐
☐	Eat Out	☐
☐	Personal Business	☐
☐	Everyday Shopping	☐
☐	Major Shopping	☐
☐	Religious/Community	☐
☐	Social	☐
☐	Recreation – Participate	☐
☐	Recreation – Watch	☐
☐	Accompany Another Person	☐
☐	Pick-Up/Drop-Off Passenger	☐
☐	Turn Around	☐

HOW did you get here from Place #21? Show all the methods of travel you used to make this trip and related travel details

		1st →	2nd →	3rd →	4th →	5th →
Travel method (See "List of Travel Methods" below)						
If an auto method (1 or 2)	Vehicle used					
	Driver or passenger					
	Total # of persons in vehicle					
	Parking cost paid	$	$	$	$	$
If a transit method (6 thru 11)	How long did you wait?					
	Payment method (cash, pass or ticket)					
	If cash or ticket, how much did you pay?	$	$	$	$	$
	If walk or bicycle - Time (minutes)					
While Traveling	Which activities did you do for more than 15 minutes? (See "List of Activities" below)					
	Name(s) of household member(s) with you for each segment of the trip					

List of Travel Methods
1 Car, van, truck
2 Motorcycle/Moped
3 Bicycle
4 Walk
5 School Bus
6 Taxi/Shuttle
7 Dial-A-Ride/ACESS
8 Ferry
9 Train (Operator) _____
10 Public Bus (Operators) _____ Rtes_____
11 Other (Specify)

List of Activities
1 Work (reading, laptop computer, cell phone, etc.)
2 Maintenance (eating, sleeping, personal grooming, etc.)
3 Recreation (games, visiting, cell phone, DVD, etc.)
4 None

At what time did you leave Place #22 ___:___ am/pm

Next Place

List of Employer Industries

  1 - Agriculture, Forestry, Fishing and Hunting
  2 - Mining
  3 - Utilities
  4 - Construction
  5 - Manufacturing
  6 - Wholesale Trade
  7 - Retail Trade
  8 - Transportation and Warehousing
  9 - Information
10 - Finance and Insurance
11 - Real Estate, Rental/Leasing
12 - Professional, Scientific and Technical Services
13 - Management of Companies and Enterprises
14 - Administrative and Support and Waste
      Management and Remediation Services
15 - Educational Services
16 - Health Care and Social Services
17 - Arts, Entertainment and Recreation
18 - Accommodation and Food Services
19 - Public Administration/Government
20 - Other Services
21 - Military
    - Other (Please Specify) _____

Notes/Additional Travel Locations:

_____

_____

_____

_____

_____

_____

_____

Thank you for your participation in this important study.
If you have any questions, please call or e-mail:

1-800-294-9668   - OR -   **surveyhelp@morpace.com**

MORPACE International, Inc.
Department M060100
31700 Middlebelt Road, Suite 200
Farmington Hills, MI 48334

Puget Sound Travel Survey

Puget Sound Regional Council
PSRC

Two-Day Travel Diary For:

C. Stated Preference Survey Forms

❑ *Sample Preference Survey*

❑ *Sample Preference Retrieval Script*

Puget Sound Regional Council

Dear John,

Thank you for completing the first phase of the transportation survey for the Puget Sound Region. You provided us with valuable information and we need your help one more time!

Whether you travel to work by car, bus, train, bike, or on foot, your participation is essential. Information about daily travel patterns—where we go and how we get there— shapes transportation planning decisions for the region, and will be used to impro

This survey will only take about 10 to 15 minutes to complete. Please mail back your completed survey as soon as possible, or we will follow-up and collect your responses by phone.

The survey has a few parts. In some sections, we will ask you to read some statements that may or may not describe your attitudes. For these questions, we ask you to tell us how much you agree with each statement by rating them 1 to 10 where:

- 1 means that you strongly disagree, and

- 10 means that you strongly agree

In other parts of the survey, we ask you to consider some potential travel choices related to one of the trips you told us about in the survey. Remember to mark your choices for each of the choice exercises. Please consider all factors presented for eac

Please complete this survey at your earliest convenience, and return it to us in the postage paid envelope provided. If an interviewer should contact you, just let them know that you have completed it by mail.

If you have questions or want to verify the legitimacy of this survey, you may contact MORPACE International at 1-800-294-9668 or SurveyHelp at the email address: surveyhelp@morpace.com.

Thank you in advance for your participation. Your assistance is appreciated.

Sincerely,

Lindsay Wiercinski
Project Director

Part 1 - Attitudes about Transportation

The following questions are about your day-to-day travel in the Puget Sound Region. Please read the statements below, as they relate to these trips.

There are no right or wrong answers. Please circle your level of agreement or disagreement with each statement on a scale of 1 to 10.

► 1 means that you strongly disagree,

► 10 means that you strongly agree.

Strongly Disagree ⟶ Strongly Agree

1.	I use the most convenient form of transportation regardless of cost.	1 2 3 4 5 6 7 8 9 10
2.	I would use another form of transportation if I could afford it.	1 2 3 4 5 6 7 8 9 10
3.	I wouldn't mind walking a few minutes to get to my destination.	1 2 3 4 5 6 7 8 9 10
4.	I don't know how to reach my destination using public transportation	1 2 3 4 5 6 7 8 9 10
5.	I need to make trips to a wide variety of locations each week.	1 2 3 4 5 6 7 8 9 10
6.	I need to have the flexibility to make many trips during the day if necessary.	1 2 3 4 5 6 7 8 9 10
7.	I am usually in a hurry when I make a trip.	1 2 3 4 5 6 7 8 9 10
8.	If my travel option is delayed, I want to know the cause and length of the delay.	1 2 3 4 5 6 7 8 9 10
9.	I wouldn't mind the traffic congestion if it was predictable from day to day.	1 2 3 4 5 6 7 8 9 10
10.	I am usually anxious and unsettled when traveling.	1 2 3 4 5 6 7 8 9 10
11.	Driving on Puget Sound freeways is stressful for me.	1 2 3 4 5 6 7 8 9 10
12.	I would switch to a different form of transportation if it would help the environment.	1 2 3 4 5 6 7 8 9 10

Part 2: Travel Method Choice Exercises

During the recent survey, you told us about the following trip:

ORIGIN: a place for conducting personal business at 24TH NE in AUBURN

DESTINATION: a workplace at 3401 AURBURN WAY N in AUBURN

DATE: Tuesday, 4/18/06

TIME: You left your trip origin at 1:00 p.m.

MEANS OF TRAVEL: You traveled by car, truck, or van

For the questions that follow, please consider your needs and your constraints for **this specific trip** even if you would make different choices for other trips.

Introduction to Travel Method Choice Exercises

In the following pages, you will be asked to evaluate several travel choices for the trip that you described during the recent telephone survey. Before you evaluate these choices, please review the information below:

- Each of the following 4 pages contains a Choice Exercise showing real and potential travel options for your trip. The options have different times, costs and features from each other. These may be different than what you actua

- Each of the four choice exercises deal specifically with the trip that you described to us during our initial telephone call.

- We understand that some of the Public Transportation alternatives that are described may not be available in your area. We want to

  understand if and how you would use the Public Transportation alternatives if they were available

Travel Method Features

Method of travel:
- Provides the form of transportation for your door-to-door trip, including an option of traveling by auto and by various forms of public transportation.
- Includes how you get to transit and how you get from transit to your destination.

Service frequency:
- This is how often buses or trains arrive at your stop at the day and time-of-day that you traveled. Assume buses and trains will arrive twice as frequently during peak travel times as during the rest of the day.

Time to get to transit:
- This is the time you spend by walking or driving to your primary form of transit (a bus, shuttle or train).

Time in vehicle(s):
- This is the time you are driving your car to your destination or riding in a bus, shuttle or train.

Time spent transferring between buses or trains:
- This is the total time you spend walking to the next bus or train and waiting for it. This may include up to three transfers.

Time to walk from your car or transit stop to your workplace:
- This is the time spent walking from where you park your car or from your last transit stop to your destination.

Gas cost:
- This is the daily cost of gas if you drive to the destination or to a transit stop close to where you live.

Fare cost:
- This is the cost of your transit fare, including all transfers.

Parking cost:
- This is how much it will cost to park for a day either at your destination or at a Park-n-Ride location if you drive to transit.

Seat availability:
- Sometimes transit services can be crowded, so that some passengers may need to stand. This is how often you would need to stand on the trip.

Reliability:
- Autos, buses, and trains can all be prone to unexpected delays. This is how often your trip will take more than 15 minutes longer than the usual total travel time.

Travel Methods

Bus Service A

- Bus service between stops that are placed every few blocks to keep walking distances short

- Buses operate on local streets and sometimes on freeways

- Bus floors are at two levels to accomodate wheelchair accessibility

- Passengers pay their cash fares onboard the bus or show their transit passes to the driver as they board

- Bus stops include shelters from the weather, maps, schedules, and transit information
- Buses routes are part of an extensive network, so passengers can transfer between buses to get to places throughout the region

Bus Service B

- Bus service between stations that are placed about every mile

- Buses operate on local streets, freeways, and sometimes on dedicated bus-only traffic lanes

- Buses have low floors throughout to accommodate wheelchair accessibility

- Passengers pay their fares by cash or credit/debit card at ticket vending machines in the stations

- Passengers may be asked by transit agency staff to present proof-of-payment or a transit pass as they ride
- Bus stations include heated waiting areas, maps, schedules, transit information, and electronic bus arrival information
- Bus routes are connected to the existing transit services, so passengers can transfer to other buses to complete trips throughout the region

Rail Transit Service

- Rail service between stations that are placed about every two to three miles

- Trains operate in specific corridors on dedicated railroad tracks

- Trains have low floors throughout to accommodate wheelchair accessibility

- Passengers pay their cash fares onboard the train or show their transit passes to the driver as they board
- Train stations include heated waiting areas, maps, schedules, transit information, and electronic train arrival information
- Rail lines are connected to the existing transit services, so passengers can transfer to buses to complete trips throughout the region

CHOICE EXERCISE 1

Suppose these were your transportation options for your trip from:
a place for conducting personal business at 24TH NE in AUBURN to a workplace at 3401 AURBURN WAY N in AUBURN

Your choices are…	OPTION 1	OPTION 2	OPTION 3
Method of travel	You drive by yourself from your trip origin to a parking place at or near your destination. You walk from the parking place to your destination.	You walk to the RAIL system and ride to a stop at or near your destination. You do not need to transfer between transit vehicles You walk from the final transit stop to your destination.	You walk to a BUS A stop and ride to a stop at or near your destination. You transfer between transit vehicles 1 time. You walk from the final transit stop to your destination.
Service frequency	---	Every 45 minutes	Every 45 minutes
Time to get to transit	---	12 minutes	8 minutes
Time in vehicle(s)	16 minutes	11 minutes	12 minutes
Time spent transferring between buses or trains	---	0 minutes	1 minute
Time to walk from your car or transit stop to your workplace	4 minutes	8 minutes	6 minutes
Gas cost	$3.40	$0.00	$0.00
Fare cost	---	$1.10	$1.20
Parking cost	$3.00	$0.00	$0.00
Seat Availability: You will need to stand on the bus or train…	---	Two times a month	One time a week
Reliability: You will be more than 15 minutes late…	Three times per month	One time per month	Five times per month

Which of the three options above would you choose? (Please circle one)

OPTION 1   OPTION 2   OPTION 3

What was the main reason you made that choice?

_____

_____

CHOICE EXERCISE 2

Suppose these were your transportation options for your trip from:
a place for conducting personal business at 24TH NE in AUBURN to a workplace at 3401 AURBURN WAY N in AUBURN

Your choices are…	OPTION 1	OPTION 2	OPTION 3
Method of travel	You drive by yourself from your trip origin to a parking place at or near your destination. You walk from the parking place to your destination.	You walk to the RAIL system and ride to a stop at or near your destination. You transfer between transit vehicles 1 time. You walk from the final transit stop to your destination.	You walk to a BUS A stop and ride to a stop at or near your destination. You transfer between transit vehicles 1 time. You walk from the final transit stop to your destination.
Service frequency	---	Every 60 minutes	Every 60 minutes
Time to get to transit	---	12 minutes	16 minutes
Time in vehicle(s)	14 minutes	11 minutes	8 minutes
Time spent transferring between buses or trains	---	4 minutes	8 minutes
Time to walk from your car or transit stop to your workplace	10 minutes	8 minutes	10 minutes
Gas cost	$1.80	$0.00	$0.00
Fare cost	---	$1.10	#VALUE!
Parking cost	$5.00	$0.00	$0.00
Seat Availability: You will need to stand on the bus or train…	---	One time a week	Two times a month
Reliability: You will be more than 15 minutes late…	One time per month	Five times per month	One time per month

Which of the three options above would you choose? (Please circle one)

OPTION 1   OPTION 2   OPTION 3

What was the main reason you made that choice?

_____

_____

CHOICE EXERCISE 3

Suppose these were your transportation options for your trip from:
a place for conducting personal business at 24TH NE in AUBURN to a workplace at 3401 AURBURN WAY N in AUBURN

Your choices are…	OPTION 1	OPTION 2	OPTION 3
Method of travel	You drive by yourself from your trip origin to a parking place at or near your destination. You walk from the parking place to your destination.	You walk to the RAIL system and ride to a stop at or near your destination. You transfer between transit vehicles 2 times. You walk from the final transit stop to your destination.	You walk to a BUS A stop and ride to a stop at or near your destination. You transfer between transit vehicles 2 times. You walk from the final transit stop to your destination.
Service frequency	---	Every 10 minutes	Every 60 minutes
Time to get to transit	---	12 minutes	12 minutes
Time in vehicle(s)	16 minutes	9 minutes	8 minutes
Time spent transferring between buses or trains	---	30 minutes	8 minutes
Time to walk from your car or transit stop to your workplace	10 minutes	2 minutes	6 minutes
Gas cost	$1.60	$0.00	$0.00
Fare cost	---	$0.90	#VALUE!
Parking cost	$3.00	$0.00	$0.00
Seat Availability: You will need to stand on the bus or train…	---	Five times a week	One time a week
Reliability: You will be more than 15 minutes late…	Three times per month	Two times per month	Four times per month

Which of the three options above would you choose? (Please circle one)

OPTION 1   OPTION 2   OPTION 3

What was the main reason you made that choice?

_____

_____

CHOICE EXERCISE 4

Suppose these were your transportation options for your trip from:
a place for conducting personal business at 24TH NE in AUBURN to a workplace at 3401 AURBURN WAY N in AUBURN

Your choices are…	OPTION 1	OPTION 2	OPTION 3
Method of travel	You drive by yourself from your trip origin to a parking place at or near your destination. You walk from the parking place to your destination.	You walk to the RAIL system and ride to a stop at or near your destination. You transfer between transit vehicles 1 time. You walk from the final transit stop to your destination.	You walk to a BUS A stop and ride to a stop at or near your destination. You transfer between transit vehicles 1 time. You walk from the final transit stop to your destination.
Service frequency	---	Every 20 minutes	Every 45 minutes
Time to get to transit	---	8 minutes	16 minutes
Time in vehicle(s)	11 minutes	11 minutes	11 minutes
Time spent transferring between buses or trains	---	8 minutes	1 minute
Time to walk from your car or transit stop to your workplace	2 minutes	2 minutes	8 minutes
Gas cost	$2.30	$0.00	$0.00
Fare cost	---	$1.10	$1.10
Parking cost	$3.00	$0.00	$0.00
Seat Availability: You will need to stand on the bus or train…	---	One time a month	One time a week
Reliability: You will be more than 15 minutes late…	Five times per month	Three times per month	One time per month

Which of the three options above would you choose? (Please circle one)

OPTION 1   OPTION 2   OPTION 3

What was the main reason you made that choice?

_____

_____

Part 3: Congestion and Tolls Choice Exercises

In the following pages, you will be asked to evaluate several hypothetical travel choices for the trip that you described during the recent telephone survey. During that survey, you told us about the following trip:

ORIGIN: a place for conducting personal business at 24TH NE in AUBURN

DESTINATION: a workplace at 3401 AURBURN WAY N in AUBURN

DATE: Tuesday, 4/18/06

TIME: You left your trip origin at 1:00 p.m.

MEANS OF TRAVEL: You traveled by car, truck, or van

For the questions that follow, please consider your needs and your constraints for **this specific trip** even if you would make different choices for other trips.

Introduction to Congestion and Tolls Choice Exercises

In the exercises that follow, we ask you to consider several different hypothetical options for taking an auto on the trip you described. As congestion increases, public agencies may take actions to help reduce people's travel times. In the following ex

- Traveling at the time you went or traveling earlier in the day

- Using a toll-free route or a route with tolls

For each option, we provide hypothetical levels for different important factors that affect how people might choose to travel. These factors include:

- Driving distance

- Driving travel time

- Reliability

- Toll cost

CHOICE EXERCISE 5

Suppose these were your transportation options for your trip from:
a place for conducting personal business at 24TH NE in AUBURN to a workplace at 3401 AURBURN WAY N in AUBURN

Travel Route	OPTION A		OPTION B		OPTION C		OPTION D
	You Travel During the Off-Peak Period **(9:00 a.m. to 3:00 p.m. or 7:00 p.m. to 6:00 am)**				**You Travel During the Peak Period** **(6:00 a.m. to 9:00 a.m. or 3:00 p.m. to 7:00 pm)**		
	Free Route		**Toll Route**		**Free Route**		**Toll Route**
Distance Traveled on Your Trip	8 miles		6 miles		9 miles		6 miles
Usual Travel Time of Your Trip	17 minutes		14 minutes		17 minutes		16 minutes
Reliability: You will be more than 15 minutes late…	1 time out of every 20 times you travel		2 times out of every 20 times you travel		3 times out of every 20 times you travel		1 time out of every 20 times you travel
Toll Cost of Your Trip	$0.00		$2.00		$0.00		$0.75
Which of the four options above would you choose? (Please circle one)	OPTION A		OPTION B		OPTION C		OPTION D

If these were the only options available to you on your travel day, how likely is it that you would have continued to make the trip by auto? (Please circle one)

Definitely would have made the trip by auto

Probably would have made the trip by auto

Not Sure

Probably would have made the trip by another means or not made the trip at all

Definitely would have made the trip by another means or not made the trip at all

CHOICE EXERCISE 6

Suppose these were your transportation options for your trip from:
a place for conducting personal business at 24TH NE in AUBURN to a workplace at 3401 AURBURN WAY N in AUBURN

Travel Route	OPTION A		OPTION B		OPTION C		OPTION D
	You Travel During the Off-Peak Period (9:00 a.m. to 3:00 p.m. or 7:00 p.m. to 6:00 am)				You Travel During the Peak Period (6:00 a.m. to 9:00 a.m. or 3:00 p.m. to 7:00 pm)		
	Free Route		**Toll Route**		**Free Route**		**Toll Route**
Distance Traveled on Your Trip	5 miles		6 miles		5 miles		6 miles
Usual Travel Time of Your Trip	21 minutes		16 minutes		14 minutes		15 minutes
Reliability: You will be more than 15 minutes late…	5 times out of every 20 times you travel		1 time out of every 20 times you travel		10 times out of every 20 times you travel		3 times out of every 20 times you travel
Toll Cost of Your Trip	$0.00		$2.00		$0.00		$0.75
Which of the four options above would you choose? (Please circle one)	OPTION A		OPTION B		OPTION C		OPTION D

If these were the only options available to you on your travel day, how likely is it that you would have continued to make the trip by auto? (Please circle one)

Definitely would have made the trip by auto

Probably would have made the trip by auto

Not Sure

Probably would have made the trip by another means or not made the trip at all

Definitely would have made the trip by another means or not made the trip at all

CHOICE EXERCISE 7

Suppose these were your transportation options for your trip from:

a place for conducting personal business at 24TH NE in AUBURN to a workplace at 3401 AURBURN WAY N in AUBURN

Travel Route	OPTION A		OPTION B		OPTION C		OPTION D
	You Travel During the Off-Peak Period (9:00 a.m. to 3:00 p.m. or 7:00 p.m. to 6:00 am)				**You Travel During the Peak Period** (6:00 a.m. to 9:00 a.m. or 3:00 p.m. to 7:00 pm)		
	Free Route		**Toll Route**		**Free Route**		**Toll Route**
Distance Traveled on Your Trip	8 miles		6 miles		8 miles		6 miles
Usual Travel Time of Your Trip	21 minutes		15 minutes		14 minutes		18 minutes
Reliability: You will be more than 15 minutes late…	8 times out of every 20 times you travel		2 times out of every 20 times you travel		5 times out of every 20 times you travel		3 times out of every 20 times you travel
Toll Cost of Your Trip	$0.00		$0.10		$0.00		$2.25

Which of the four options above would you choose? (Please circle one)

OPTION A   OPTION B   OPTION C   OPTION D

If these were the only options available to you on your travel day, how likely is it that you would have continued to make the trip by auto? (Please circle one)

Definitely would have made the trip by auto

Probably would have made the trip by auto

Not Sure

Probably would have made the trip by another means or not made the trip at all

Definitely would have made the trip by another means or not made the trip at all

CHOICE EXERCISE 8

Suppose these were your transportation options for your trip from:
a place for conducting personal business at 24TH NE in AUBURN to a workplace at 3401 AURBURN WAY N in AUBURN

Travel Route	OPTION A		OPTION B		OPTION C		OPTION D
	You Travel During the Off-Peak Period **(9:00 a.m. to 3:00 p.m. or 7:00 p.m. to 6:00 am)**				**You Travel During the Peak Period** **(6:00 a.m. to 9:00 a.m. or 3:00 p.m. to 7:00 pm)**		
	Free Route		**Toll Route**		**Free Route**		**Toll Route**
Distance Traveled on Your Trip	6 miles		6 miles		5 miles		6 miles
Usual Travel Time of Your Trip	15 minutes		16 minutes		27 minutes		18 minutes
Reliability: You will be more than 15 minutes late…	5 times out of every 20 times you travel		2 times out of every 20 times you travel		3 times out of every 20 times you travel		2 times out of every 20 times you travel
Toll Cost of Your Trip	$0.00		$1.00		$0.00		$1.50

Which of the four options above would you choose? (Please circle one)

OPTION A   **OPTION B**   **OPTION C**   **OPTION D**

If these were the only options available to you on your travel day, how likely is it that you would have continued to make the trip by auto? (Please circle one)

Definitely would have made the trip by auto

Probably would have made the trip by auto

Not Sure

Probably would have made the trip by another means or not made the trip at all

Definitely would have made the trip by another means or not made the trip at all

Toll Road Options

1. In making your choices about the free and toll roads, what factors were the most important to you?

   _____

   _____

The following questions describe some different options that might be available with the toll routes. Please assume the choices shown in the last choice exercise were available, and rate how likely you would be to use the options described below.

► 1 means that you would be very unlikely to use the option

► 10 means that you would be very likely to use the option.

Very Unlikely ➜ *Very Likely*

2.	Suppose in the last exercise, you had the opportunity to travel on the toll route without paying a toll, but in order to do this you would need to **carpool** with at least one other person. How likely would you be to carpool and use the toll route?	1 2 3 4 5 6 7 8 9 10
3.	Suppose in the last exercise, the free routes required using only signalized roadways, and that any freeway options for that trip would require paying a toll. How likely would you be to use the toll route?	1 2 3 4 5 6 7 8 9 10
4.	Suppose in the last exercise, there was an express bus service that used the toll route, and by using this service your trip would take 100 minutes and cost $5.00. How likely would you be to use the express bus service?	1 2 3 4 5 6 7 8 9 10
5.	Suppose in the last exercise, there was an express bus service that used the toll route, and by using this service your trip would take 200 minutes and cost $2.00. How likely would you be to use the express bus service?	1 2 3 4 5 6 7 8 9 10

Part 4 - Attitudes about Transportation

The following questions are about your day-to-day travel in the Puget Sound Region. Please read the statements below, as they relate to these trips.

There are no right or wrong answers. Please circle your level of agreement or disagreement with each statement on a scale of 1 to 10.

► <u>1 means that you strongly disagree,</u>

► <u>10 means that you strongly agree</u>.

Strongly Disagree ⟶ *Strongly Agree*

1. People who drive alone should pay more to help improve traffic congestion situation.	1 2 3 4 5 6 7 8 9 10
2. I always take the fastest route to my destination even if I have a cheaper alternative.	1 2 3 4 5 6 7 8 9 10
3. I prefer to make trips alone because I like time to myself.	1 2 3 4 5 6 7 8 9 10
4. I am comfortable riding a bus.	1 2 3 4 5 6 7 8 9 10
5. I need to make trips according to a fixed schedule.	1 2 3 4 5 6 7 8 9 10
6. I would change my form of travel if it would save me some time.	1 2 3 4 5 6 7 8 9 10
7. I don't like to drive but it is usually the fastest way to get where I need to go.	1 2 3 4 5 6 7 8 9 10
8. I don't mind taking a longer trip if I could make productive use of my time when I travel.	1 2 3 4 5 6 7 8 9 10
9. I don't mind delays as long as I am comfortable.	1 2 3 4 5 6 7 8 9 10
10. I avoid making certain trips at certain times because it is too stressful to make the trip.	1 2 3 4 5 6 7 8 9 10
11. Having a stress-free trip is more important than reaching my destination quickly.	1 2 3 4 5 6 7 8 9 10
12. I would be willing to pay more when I travel if it would help the environment.	1 2 3 4 5 6 7 8 9 10
13. Use of transit can help improve the environment.	1 2 3 4 5 6 7 8 9 10

Puget Sound Regional Council
2006 Stated Preference Interview

INTRODUCTION

INT_CALL.   Hello, my name is **<INSERT INTERVIEWER'S FIRST NAME>** and I'm calling
you back on behalf of the Puget Sound Regional Council about the travel survey.
May I please speak with **<INSERT NAME OF RECRUITED INDIVIDUAL>?**
(GET RESPONDENT ON THE PHONE AND REPEAT INRODUCTION)

PHONE.   For verification purposes, can I please have your phone number?

   __ __ __-__ __ __ __

COLLECT.   I'm calling to collect your responses to the travel survey that we mailed. Do you
have the survey form in front of you now? I'll take your responses over the
phone. **(IF NOT, "I'll wait while you get it.")**

   [INTERVIEWER NOTE: This survey will take about 10 minutes to complete.]

   1   Continue with interview **(GO TO VERSION)**
   2   Respondent has mailed in survey **(GO TO MAILED)**
   3   Respondent has not received survey **(GO TO REMAIL)**
   4   TERMINATE - No longer wishes to participate **(THANK AND TERMINATE)**

MAILED   Thank you very much for your participation in this study. We will callback if we
need any further information.

REMAIL   If you did not receive the survey we can mail you a new copy.

   1   Remail
   2   No longer wishes to participate **(Thank and Terminate)**

   (IF REMAIL=1)
   You should receive your survey in 3 to 5 days. Please mail back your completed
survey as soon as possible, or we will follow-up and collect your responses by phone.

VERSION1   There are several different versions of this survey, and I need to verify which
version you have. There is a word and a number on the first page of your
attitude questions**. (IF NEEDED: The word and number are in a box in the
upper right hand corner.)** Can you please tell me what version you have?

   **[INTERVIEWER NOTE: RESPONDENTS WILL HAVE ONE OF THE
FOLLOWING 3 VERSIONS: TOLL, TRANSIT, OR BOTH]**

   1   Tran 1 (A1)
   2   Toll 1 (A2)
   3   Both 1 (A3)
   4   Tran 2 (B1)
   5   Toll 2 (B2)
   6   Both 2 (B3)

    7   Tran 3 (C1)
    8   Toll 3 (C2)
    9   Both 3 (C3)
   10   Tran 4 (D1)
   11   Toll 4 (D2)
   12   Both 4 (D3)
   13   Cannot find version **(GO TO THANKCB)**

ATTITUDINAL QUESTIONS – PART 1

Now I would like to ask you about your <u>day-to-day travel in the Puget Sound Region</u>. I am going to read you a number of statements as they relate to these trips.

There are no right or wrong answers. I would like you to indicate **_your_** level of agreement or disagreement with each statement. Please indicate your rating level on a scale of 1 to 10, where

- <u>1 means that you strongly disagree,</u>
- <u>10 means that you strongly agree</u>.

[PROGRAMMER NOTE: 4 DIFFERENT VERSIONS FOR QUESTION LIST SEE ATTACHED EXCEL FILE]

1a.   I use the most convenient form of transportation regardless of cost .... > _____

2a.   I would use another form of transportation if I could afford it.......................... > _____

3a.   I wouldn't mind walking a few minutes to get to my destination .... > _____

4a.   I don't know how to reach my destination using public transportation............. > _____

5a.   I need to make trips to a wide variety of locations each week........................ > _____

6a.   I need to have the flexibility to make many trips during the day if necessary .. > _____

7a.   I am usually in a hurry when I make a trip.. > _____

8a.   If my travel option is delayed, I want to know the cause and length of

      the delay .... > _____

9a.   I wouldn't mind the traffic congestion if it was predictable from day to day...... > _____

10a. I am usually anxious and unsettled when traveling .... > _____

11a. Driving on Puget Sound freeways is stressful for me .... > _____

12a. I would switch to a different form of transportation if it would help the

      environment .... > _____

CHOICE EXPERIMENTS

CE_INTRO Now I would like to record your choices from the choice exercises.

[NOTE: TRANSIT CHOICE EXERCISES]
[PROGRAMMER NOTE: ASK TRANCE_1 THRU TRANCE_4 IF VERSION = A1, A3, B1, B3, C1, C3, D1, D3]
TRANCE_1   Which option did you choose for exercise 1?

- 1   Option 1
- 2   Option 2
- 3   Option 3

TRANCE_2   And for exercise 2?

- 1   Option 1
- 2   Option 2
- 3   Option 3

TRANCE_3   And lastly for exercise 3?

- 1   Option 1
- 2   Option 2
- 3   Option 3

TRANCE_4   And lastly for exercise 4?

- 1   Option 1
- 2   Option 2
- 3   Option 3

OVERALL, what was the main reason you chose the options that you did? **(Open End – ALLOW UP TO 5 RESPONSES)**

[NOTE: TOLL CHOICE EXERCISES]
[PROGRAMMER NOTE: ASK TOLLCE_1 THRU TOLLCE_4 IF VERSION = A2, A3, B2, B3, C2, C3, D2, D3]
TOLLCE_1   Which option did you choose for exercise <u>1</u>? **[PROGRAMMER NOTE: IF VERSION A3, B3, C3, OR D3 EXERCISE = 5]**

   1   Option A
   2   Option B
   3   Option C
   4   Option D

TOLLTRIP_1 If these were the only options available to you on your travel day, how likely is it that you would have continued to make the trip by auto?

   [IF NEEDED: READ LIST]
   1   Definitely would not have made the trip at all
   2   Probably would have made the trip, but by other means or by other routes
   3   Not Sure
   4   Probably would have made the trip by auto
   5   Definitely would have made the trip by auto

TOLLCE_2   And for exercise <u>2</u>? **[PROGRAMMER NOTE: IF VERSION A3, B3, C3, OR D3 EXERCISE = 6]**

   1   Option A
   2   Option B
   3   Option C
   4   Option D

TOLLTRIP_2 If these were the only options available to you on your travel day, how likely is it that you would have continued to make the trip by auto?

   [IF NEEDED: READ LIST]
   1   Definitely would not have made the trip at all
   2   Probably would have made the trip, but by other means or by other routes
   3   Not Sure
   4   Probably would have made the trip by auto
   5   Definitely would have made the trip by auto

TOLLCE_3   And lastly for exercise 3? **[PROGRAMMER NOTE: IF VERSION A3, B3, C3, OR D3 EXERCISE = 7]**

   1   Option A
   2   Option B
   3   Option C
   4   Option D

TOLLTRIP_3 If these were the only options available to you on your travel day, how likely is it that you would have continued to make the trip by auto?

   [IF NEEDED: READ LIST]
   1   Definitely would not have made the trip at all
   2   Probably would have made the trip, but by other means or by other routes
   3   Not Sure
   4   Probably would have made the trip by auto
   5   Definitely would have made the trip by auto

TOLLCE_4   And lastly for exercise <u>4</u>? **[PROGRAMMER NOTE: IF VERSION A3, B3, C3, OR D3 EXERCISE = 8]**

   1   Option A
   2   Option B
   3   Option C
   4   Option D

TOLLTRIP_4 If these were the only options available to you on your travel day, how likely is it that you would have continued to make the trip by auto?

   [IF NEEDED: READ LIST]
   1   Definitely would not have made the trip at all
   2   Probably would have made the trip, but by other means or by other routes
   3   Not Sure
   4   Probably would have made the trip by auto
   5   Definitely would have made the trip by auto

TOLL ROAD OPTIONS

[PROGRAMMER NOTE: ASK TOLL_1 THRU TOLL_5 IF VERSION = A2, A3, B2, B3, C2, C3, D2, D3]

TOLL_1.   In making your choices about the free and toll roads, what factors were the most important to you? **(Open End – ALLOW UP TO 5 RESPONSES)**

- 1 means that you strongly disagree,
- 10 means that you strongly agree.

TOLL_2.   Suppose in the last exercise, you had the opportunity to travel on the toll route without paying a toll, but in order to do this you would need to CARPOOL with at least one other person. How likely would you be to carpool and use the toll route?
     >   _____

TOLL_3.   Suppose in the last exercise, the free routes required using only signalized roadways, and that any freeway options for that trip would require paying a toll. How likely would you be to use the toll route?   > _____

TOLL_4.   Suppose in the last exercise, there was an express bus service that used the toll route. How likely would you be to use the express bus service described in question 4 **(IF NEEDED: Question 4 is located on the page labeled Toll Road Options)**?   > _____

TOLL_5.   Suppose in the last exercise, there was an express bus service that used the toll route. How likely would you be to use the express bus service described in question 5 **(IF NEEDED: Question 5 is located on the page labeled Toll Road Options)**?   > _____

ATTITUDINAL QUESTIONS – PART 2

Now I would like to ask you a few more questions about your day-to-day travel in the Puget Sound Region. I am going to read you a number of statements as they relate to these trips.

There are no right or wrong answers. I would like you to indicate **_your_** level of agreement or disagreement with each statement. Please indicate your rating level on a scale of 1 to 10, where

- 1 means that you strongly disagree,
- 10 means that you strongly agree.

[PROGRAMMER NOTE: 4 DIFFERENT VERSIONS FOR QUESTION LIST SEE ATTACHED EXCEL FILE]

1b.   People who drive alone should pay more to help improve traffic congestion

     situation... > _____

2b.   I always take the fastest route to my destination even if I have a cheaper alternative.. > _____

3b.   I prefer to make trips alone because I like time to myself............................... > _____

4b.   I am comfortable riding a bus .... > _____

5b.   I need to make trips according to a fixed schedule .... > _____

6b.   I would change my form of travel if it would save me some time.................... > _____

7b.   I don't like to drive but it is usually the fastest way to get where I need to go.. > _____

8b.   I don't mind taking a longer trip if I could make productive use of my time when I travel.. > _____

9b.   I don't mind delays as long as I am comfortable .... > _____

10b. I avoid making certain trips at certain times because it is too stressful to make the trip .... > _____

11b. Having a stress-free trip is more important than reaching my destination quickly .... > _____

12b. I would be willing to pay more when I travel if it would help the environment.. > _____

13b. Use of transit can help improve the environment... > _____

CLASSIFICATION QUESTIONS

END.   Those are all the questions we have! Thank you very much for your participation in this study.

(IF NEEDED ADD: " Information from this survey will help to shape transportation planning decisions within the Puget Sound region."

D. Final Codebook

❑ *Household Characteristics*

❑ *Person Characteristics*

❑ *Activity Data*

Order	Type	Variable Name	Variable Label	Response Category	Response Category Description
2	Numeric	QNO	Sample Number	Value	Value
1	Numeric	RECTYP	Record Type	1	Household Record
2A	Numeric	PRENOTE	Prenotification Letter Sent	1	Yes
2A				2	No
2B	Numeric	SAMPTYP	Sample Type	1	RDD
2B				2	Transit Access Area
2B				3	Ferry
2B				4	Park and Ride
3	Numeric	AREAST	Live in Washington	1	Yes
3				2	No
4	Numeric	AREACTY1	County	1	King
4				2	Kitsap
4				3	Pierce
4				4	Snohomish
4				96	Other
4				98	Don't Know
4				99	Refused
5	Numeric	AREACTY2	King County: Live in City of Seattle	1	Yes
5				2	No
5				8	Refused
7	Numeric	HHNUMVEH	Vehicles Available to Household	0-10	Valid Range
7				97	Zero/None
7				98	Don't Know
7				99	Refused
8	Numeric	HHVEHTY1	Vehicle make and model	Code List	See attached code list (Valid Range 7-9999)
8		HHVEHTY2	(Multiple Mention)	98	Don't Know
8		HHVEHTY3		99	Refused
8		HHVEHTY4			
8		HHVEHTY5			
8		HHVEHTY6			
8		HHVEHTY7			
8		HHVEHTY8			
8		HHVEHTY9			
8		HHVEHT10			
9	Numeric	HHVEHYR1	Vehicle year	1900-2006	Valid Range
9		HHVEHYR2	(Multiple Mention)	9998	Don't Know
9		HHVEHYR3		9999	Refused
9		HHVEHYR4			
9		HHVEHYR5			
9		HHVEHYR6			
9		HHVEHYR7			
9		HHVEHYR8			
9		HHVEHYR9			

Order	Type	Variable Name	Variable Label	Response Category	Response Category Description
9		HHVEHY10			
10	Numeric	HHNUMPPL	Number of Persons in Household	1-15	Valid Range
11	Numeric	WRKRS2	Number Employed in Household	0-15	Valid Range
11				98	Don't Know
11				99	Refused
12	Numeric	TYEAR	Travel Year	2006	2006
13	Numeric	MONTH1	Month of Day 1	1	January
13	Numeric	MONTH2	Month of Day 2	2	February
13				3	March
13				4	April
13				5	May
13				6	June
13				7	July
13				8	August
13				9	September
13				10	October
13				11	November
13				12	December
14	Numeric	DAYMO1	Day 1 - Day of the month	1-31	Range (Day 1)
14		DAYMO2	Day 2 - Day of the month	1-31	Range (Day 2)
15	Numeric	TRAVDATE	Days of Week	1	Monday/Tuesday
15				2	Tuesday/Wednesday
15				3	Wednesday/Thursday
15				4	Thursday/Friday
16	Numeric	DELIV	Interim Delivery	1653	1653 Household Delivery (as of 5/24/06)
16				4504	4504 Household Delivery (as of 6/30/06)
16				4746	4746 Household Delivery (September)
17	Numeric	ASSURE	NON-GPS Household	1	Yes
18	Numeric	GPS	GPS Household	1	Yes
19	Numeric	CHOMEOWN	Current Resident Owned/Rented	1	Owned
19				2	Rented
19				3	Provided by job or military
19				4	Vacation home/Not the primary residence of respondent
19				8	Retirement home/Group home
19				96	All other miscellaneous responses
19				97	None/Nothing
19				98	Don't Know
19				99	Refused
20	Numeric	CHOMETYP	Type of Structure	1	Detached single house
20				2	Duplex
20				3	Triplex or 4-plex
20				4	Rowhouse, townhouse
20				5	Apartment, condominium

Order	Type	Variable Name	Variable Label	Response Category	Response Category Description
20				6	Movile home or trailer
20				7	Dorm room, fraternity or sorority house
20				8	Boat
20				9	Warehouse
20				10	Military housing
20				11	Rented room/Room in a house
20				96	All other miscellaneous responses
20				97	None/Nothing
20				98	Don't Know
20				99	Refused
21	Numeric	CHOMEAGE	Age of Current Home	1	Less than a year
21				2	1 to less than 3 years
21				3	3 to less than 5 years
21				4	5 to less than 7 years
21				5	7 to less than 10 years
21				6	10 to less than 20 years
21				7	20 or more years old
21				98	Don't Know
21				99	Refused
22	Numeric	CHOMEYR	Length of Time Lived at Place	1	Less than a year
22				2	Between 1 and 2 years
22				3	Between 2 and 3 years
22				4	Between 3 and 5 years
22				5	Between 5 and 10 years
22				6	Between 10 and 20 years
22				7	More than 20 years
22				98	Don't Know
22				99	Refused
23	Numeric	CHOMEARE	Current Home Location Area	1	Urban
23				2	Suburban
23				3	Rural/Exurban
23				98	Don't Know
23				99	Refused
24	Numeric	CHOMEAR2	Current Home Location Area 2	1	Mostly a single family area
24				2	Mostly a multi-family area of apartments and condos
24				3	An area of a mixture of housing and businesses
24				4	Rural/Exurban
24				98	Don't Know
24				99	Refused
26	Numeric	PREVCTY	Previous County	1	King (city of Seattle)
26				2	King (outside of Seattle)
26				3	Kitsap

Order	Type	Variable Name	Variable Label	Response Category	Response Category Description
26				4	Pierce
26				5	Snohomish
26				6	Other Washington State location
26				7	Other state
26				98	Don't Know
26				99	Refused
27	Alphanum	PREVADD	Previous Address	Text	Text
27				98	Don't Know
27				99	Refused
28	Alphanum	PMAILCTY	Previous City	Text	See attached code list
28				9996	Other
28				9998	Don't Know
28				9999	Refused
29	Numeric	PMAILZIP	Previous Zip Code	Value	Value
29A	Alphanum	PGEOADDR	Geocoded Previous Home Address	Text	Text
29B	Alphanum	PGEOCITY	Geocoded Previous Home City	Text	Text
29C	Alphanum	PGEOSTAT	Geocoded Previous Home State	Text	Text
29D	Numeric	PGEOZIP	Geocoded Previous Home Zip	Text	Text
29E	Alphanum	PGEOXSTS	Geocoded Previous Home Nearest Cross Streets	Text	Text
29H	Numeric	PSCOR	Previous Home Geocoding Score	(0-100)	Range
29I	Alphanum	PSTAT	Previous Geocoding Status	Text	Text (M, T, U)
29J	Numeric	PLOCN	Previous Geocoding Location Name	1	KingAddr
29J				2	KingStr
29J				3	KitsapAddr
29J				4	KitsapStr
29J				5	PierceAddr
29J				6	Pierce Str
29J				7	SnohomishAddr
29J				8	SnohomishStr
29J				97	None (If Geododing is >2 will be None)
29K	Alphanum	PARCS	Previous Arc Street	Text	Text
29L	Alphanum	PSTAD	Previous standard address	Text	Text
29M	Alphanum	PGEOSS	Previous side of the street	Text	Text (L,R)
29N	Alphanum	PZONE	Previous Home TAZ	Text	Text
29O				88888888	Unknown Zone
29P	Alphanum	PXVALUE	Previous Home X value	Value	Value (13.6)
29P				0000000.000000	Unknown X
29Q	Alphanum	PYVALUE	Previous Home Y value	Value	Value (12.6)
29Q				000000.000000	Unknown Y
30	Numeric	PHOMEOWN	Previous Residence Owned/Rented	1	Owned
30				2	Rented

Order	Type	Variable Name	Variable Label	Response Category	Response Category Description
30				3	Provided by job or military
30				4	Vacation home/Not the primary residence of respondent
30				5	Parents home/Lived with parents/Family/Relative
30				6	Lived with someone who owned
30				7	Process of buying
30				8	Retirement home/Group home
30				96	All other miscellaneous responses
30				97	None/Nothing
30				98	Don't Know
30				99	Refused
31	Numeric	PHOMETYP	Type of Structure Previous Home	1	Detached single house
31				2	Duplex
31				3	Triplex or 4-plex
31				4	Rowhouse, townhouse
31				5	Apartment, condominium
31				6	Movile home or trailer
31				7	Dorm room, fraternity or sorority house
31				8	Boat
31				9	Warehouse
31				10	Military housing
31				11	Rented room/Room in a house
31				96	All other miscellaneous responses
31				97	None/Nothing
31				98	Don't Know
31				99	Refused
32	Numeric	PHOMEAGE	Age of Previous Home	1	Less than a year
32				2	1 to less than 3 years
32				3	3 to less than 5 years
32				4	5 to less than 7 years
32				5	7 to less than 10 years
32				6	10 to less than 20 years
32				7	20 or more years old
32				98	Don't Know
32				99	Refused
33	Numeric	PHOMEYR	Length of Time Lived at Previous Home	1	Less than a year
33				2	Between 1 and 2 years
33				3	Between 2 and 3 years
33				4	Between 3 and 5 years
33				5	Between 5 and 10 years
33				6	Between 10 and 20 years
33				7	More than 20 years
33				98	Don't Know
33				99	Refused

Order	Type	Variable Name	Variable Label	Response Category	Response Category Description
34	Numeric	PHOMEARE	Previous Home Location Area	1	Urban
34				2	Suburban
34				3	Rural/Exurban
34				98	Don't Know
34				99	Refused
35	Numeric	PHOMEAR2	Previous Home Location Area 2	1	Mostly a single family area
35				2	Mostly a multi-family area of apartments and condos
35				3	An area of a mixture of housing and businesses
35				4	Rural/Exurban
35				98	Don't Know
35				99	Refused
37	Numeric	PMOVE3	Reason Chose Your Current Location (PMOVE2 1st mention included)	1	Housing or rental price
37				2	The local schools
37				3	Location to a job site
37				4	Location to a school site
37				5	Location to shopping, entertainment, restaurants
37				6	Location to a social, religious, civic, cultural or recreational facility
37				7	Transit access
37				8	Closeness to relatives or friends
37				9	Liked the location/Quality of area/Quiet/Calmer
37				10	Size of property
37				11	Larger home/Space
37				12	Access to freeway
37				13	Affordable/Price/Investment
37				14	Available/Needed someplace to live
37				15	Safe/Away from crime
37				16	To own a home
37				17	Access to a lake/Beach
37				18	Be in the city/Closer to city
37				19	New house
37				20	Downsized
37				21	Wanted a single level home/Better floorplan
37				22	Military reason
37				23	Previously lived there/Returning to the area
37				24	Like it/Like the house
37				25	Divorce/Separated/Death of spouse
37				26	The view
37				27	Health reasons/Healthcare/Hospital
37				28	Retired/Retirement housing
37				29	Just needed a change/Relocate/Personal reasons
37				30	Leave the city/State
37				31	No choice/House burned/Sold/Lease expired/Unemployed
37				32	Time to move out parents home

Order	Type	Variable Name	Variable Label	Response Category	Response Category Description
37				33	Got married/Relationship
37				34	Taxes/Tax break
37				35	Less traffic/People
37				37	Built on property we owned/Had property
37				38	Less maintenance/Yard work/Cost of maintenance
37				39	Economic reasons/Expenses
37				40	Weather/Sun
37				41	Belongs to family member/Inherited/Friend
37				42	Disliked landlord/Owner
37				43	Income increased
37				44	Better commute
37				45	Convenience (unspec.)
37				46	Business reasons/Work at home
37				47	Temporary/Remodeling/Looking for place
37				48	Better place/New
37				49	Always lived in area/Close to old house
37				50	Home value/Increase/Profit
37				51	Parking
37				96	All other miscellaneous responses
37				97	None/Nothing
37				98	Don't Know
37				99	Refused
38	Alphanum	HOMEADD	Home Address MAILADD1 or 2	Text	Text
39	Alphanum	HOMECITY	Home City MAILCITY	Code List	See attached code list
40	Numeric	HOMESTAT	Home State	1	Washington
41	Numeric	HOMEZIP	Home Zip Code MAILZIP	Text	Text
41				99998	Don't Know
41				99999	Refused
42	Alphanum	HOMEXSTS	Nearest Cross Streets MAILXSTS	Text	Text
43	Alphanum	HGEOADDR	Geocoded Home Address	Text	Text
43A	Alphanum	HGEOCITY	Geocoded Home City	Text	Text
43B	Alphanum	HGEOSTAT	Geocoded Home State	Text	Text
43C	Numeric	HGEOZIP	Geocoded Home Zip	Text	Text
43D	Alphanum	HGEOXSTS	Geocoded Home Nearest Cross Streets	Text	Text
45A	Numeric	HSCOR	Home Geocoding Score	(0-100)	Range
45B	Alphanum	HSTAT	Home Geocoding Status	Text	Text (M, T, U)
45C	Numeric	HLOCN	Home Geocoding Location Name	1	KingAddr
45C				2	KingStr
45C				3	KitsapAddr
45C				4	KitsapStr
45C				5	PierceAddr
45C				6	Pierce Str

Order	Type	Variable Name	Variable Label	Response Category	Response Category Description
45C				7	SnohomishAddr
45C				8	SnohomishStr
45C				97	None (If Geododing is >2 will be None)
45D	Alphanum	HARCS	Home Arc Street	Text	Text
45E	Alphanum	HSTAD	Home standard address	Text	Text
45F	Alphanum	HGEOSS	Home side of the street	Text	Text (L,R)
45G	Alphanum	HZONE	Home TAZ	Text	Text
45G				88888888	Unknown Zone
46	Alphanum	HXVALUE	Home X value	Value	Value (13.6)
46				0000000.000000	Unknown X
47	Alphanum	HYVALUE	Home Y value	Value	Value (12.6)
47				000000.000000	Unknown Y
48	Numeric	HHINC	Household income	1	Below $50,000
48				2	$50,000 to $100,000
48				3	Above $100,000
48				98	Don't Know
48				99	Refused
49	Numeric	INCU50	Household income below $50,000	1	Less than $10,000
49				2	$10,000 to less than $20,000
49				3	$20,000 to less than $30,000
49				4	$30,000 to less than $40,000
49				5	$40,000 to less than $50,000
49				98	Don't Know
49				99	Refused
50	Numeric	INCO50	Household income $50,000 to $100,000	1	$50,000 to less than $60,000
50				2	$60,000 to less than $70,000
50				3	$70,000 to less than $80,000
50				4	$80,000 to less than $90,000
50				5	$90,000 to less than $100,000
50				98	Don't Know
50				99	Refused
51	Numeric	INCA50	Household income above $100,000	1	$100,000 to less than $110,000
51				2	$110,000 to less than $120,000
51				3	$120,000 to less than $130,000
51				4	$130,000 to less than $140,000
51				5	$140,000 to less than $150,000
51				6	$150,000 or more
51				98	Don't Know
51				99	Refused
51A	Numeric	TOTALINC	Total Household income	1	Less than $10,000
51A				2	$10,000 to less than $20,000
51A				3	$20,000 to less than $30,000
51A				4	$30,000 to less than $40,000

Order	Type	Variable Name	Variable Label	Response Category	Response Category Description
51A				5	$40,000 to less than $50,000
51A				6	$50,000 to less than $60,000
51A				7	$60,000 to less than $70,000
51A				8	$70,000 to less than $80,000
51A				9	$80,000 to less than $90,000
51A				10	$90,000 to less than $100,000
51A				11	$100,000 to less than $110,000
51A				12	$110,000 to less than $120,000
51A				13	$120,000 to less than $130,000
51A				14	$130,000 to less than $140,000
51A				15	$140,000 to less than $150,000
51A				16	$150,000 or more
51A				17	Below $50,000
51A				18	$50,000 to $100,000
51A				19	Above $100,000
51A				98	Don't Know
51A				99	Refused
52	Numeric	REACH	Best place to reach	1	Home
52				2	Work
52				3	Cell phone
52				4	Other
52				98	Don't Know
52				99	Refused
53	Numeric	FUTURE	Willing to Participate in the Future	1	Yes
53				2	No
53				98	Don't Know
54	Numeric	ACCEPT	PSRC Accept	0	Not Acceptable
54				1	Acceptable

Please use the following codes for any Variables that are missing response codes for Other, Don't Know, and Refused:

6, 96, 996, 9996, 99996, etc. = Other/Other Specify

8, 98, 998, 9998, 99998, etc. = Don't Know

9, 99, 999, 9999, 99999, etc. = Refused

Order	Type	Variable Name	Variable Label	Response Category	Response Category Description
1	Numeric	RECTYP	Record Type	2	Person Record
2	Numeric	QNO	Sample Number	Value	Value
3	Numeric	PERNUM	Person Number	1	Person 1
3				2	Person 2
3				3	Person 3
3				4	Person 4
3				5	Person 5
3				6	Person 6
3				7	Person 7
3				8	Person 8
3				9	Person 9
3				10	Person 10
3				11	Person 11
3				12	Person 12
3				13	Person 13
3				14	Person 14
3				15	Person 15
3AA	Numeric	SAMPTYP	Sample Type	1	RDD
3AA				2	Transit Access Area
3AA				3	Ferry
3AA				4	Park and Ride
3A	Numeric	PROXY	Proxy Status	1	Respondent
3A				2	Proxy
3A				3	Mailed Diary
3B	Numeric	PROXYNAM	Person Providing Proxy	1	Person 1
3B				2	Person 2
3B				3	Person 3
3B				4	Person 4
3B				5	Person 5
3B				6	Person 6
3B				7	Person 7
3B				8	Person 8
3B				9	Person 9
3B				10	Person 10
3B				11	Person 11
3B				12	Person 12
3B				13	Person 13
3B				14	Person 14
3B				15	Person 15
4	Numeric	WRKRS1	Currently Employed	1	Yes
4				2	No
4				3	Not Applicable (missing - member under 16)
4				99	Refused

Order	Type	Variable Name	Variable Label	Response Category	Response Category Description
5	Numeric	SEX	Gender	1	Male
5				2	Female
5				99	Refused
6	Numeric	AGE	Age	0-115	Valid Range
6				998	Don't Know
6				999	Refused
7	Numeric	AGERNG	Age Range	1	Under 5
7				2	5 to 15
7				3	16 to 17
7				4	18 to 24
7				5	25 to 34
7				6	35 to 44
7				7	45 to 54
7				8	55 to 64
7				9	65 to 74
7				10	75 to 84
7				11	85 and over
7				998	Don't Know
7				999	Refused
8	Numeric	AGE18	Age Above/Below 18	1	18 or older
8				2	Under 18
8				98	Don't Know
8				99	Refused
9	Numeric	RELAT	Relationship to first person	0	Contact Person (missing)
9				1	Husband/Wife/Unmarried Partner
9				2	Son/Daughter/In-Law
9				3	Brother/Sister/In-Law
9				4	Mother/Father/In-Law/Parent
9				5	Other Relative
9				6	Roommate/Friend
9				7	Household Help
9				8	Foster Home Resident
9				9	Grandchild/In-Law
9				10	Child of Boyfriend/Girlfriend/Spouse
9				11	Boyfriend/Girlfriend/Spouse of Son/Daughter
9				12	Tenant
9				13	Cousin
9				14	Exchange Student
9				15	Foster Child/Daughter/Son
9				16	Grandmother/Grandfather/In-Law
9				17	Great Grandchild
9				18	Stepdaughter's son/Stepson's Girlfriend
9				19	Legal Guardian

Order	Type	Variable Name	Variable Label	Response Category	Response Category Description
9				20	Step Granddaughter
9				21	Caregiver/Care Worker
9				22	Dependent
9				23	Niece/Nephew
9				24	Aunt/Uncle
9				25	Grandparent
9				26	Employers Child
9				27	Unmarried Partner's Daughter/Son
9				96	All other miscellaneous responses
9				98	Don't Know
9				99	Refused
10	Numeric	LDRV	Valid driver license	1	Yes
10				2	No
10				3	Not Applicable (missing - member under 16)
10				98	Don't Know
10				99	Refused
11	Numeric	EDU	Highest level of school completed	1	Less than high school
11				2	High school graduate
11				3	Some college
11				4	Vocational/Technical training
11				5	Associates degree
11				6	Bachelors degree
11				7	Graduate/Post-graduate degree
11				8	Not Applicable (missing - member under 16)
11				98	Don't Know
11				99	Refused
12	Numeric	SSTATUS	Currently attending any level of school	1	Yes
12				2	No
12				98	Don't Know
12				99	Refused
13	Numeric	STYPE	Type of school	1	Pre-school/Nursery school
13				2	K-12 (elementary/grammar school, middle/junior high, high school)
13				3	Vocational/Technical
13				4	FULL-time college student (including graduate or professional school)
13				5	PART-time college student (including graduate or professional school)
13				98	Don't Know
13				99	Refused
14	Alphanum	SNAME	Name of school	Text	Text
15	Alphanum	SADDR	Address of school	Text	Text
16	Alphanum	SCITY	School city	Text	Text
17	Alphanum	SSTATE	School state	Text	Text

Order	Type	Variable Name	Variable Label	Response Category	Response Category Description
18	Numeric	SZIP	School Zip Code	Text	Text
18				99998	Don't Know
18				99999	Refused
19	Alphanum	SXSTS	School cross streets	Text	Text
20	Alphanum	SGEOADDR	Geocoded School Address	Text	Text
20A	Alphanum	SGEOCITY	Geocoded School City	Text	Text
20B	Alphanum	SGEOSTAT	Geocoded School State	Text	Text
20C	Numeric	SGEOZIP	Geocoded School Zip	Text	Text
20D	Alphanum	SGEOXSTS	Geocoded School Nearest Cross Streets	Text	Text
22A	Numeric	SSCOR	School Geocoding Score	(0-100)	Range
22B	Alphanum	SSTAT	School Geocoding Status	Text	Text (M, T, U)
22C	Numeric	SLOCN	School Geocoding Location Name	1	KingAddr
22C				2	KingStr
22C				3	KitsapAddr
22C				4	KitsapStr
22C				5	PierceAddr
22C				6	Pierce Str
22C				7	SnohomishAddr
22C				8	SnohomishStr
22C				97	None (If Geododing is >2 will be None)
22D	Alphanum	SARCS	School Arc Street	Text	Text
22E	Alphanum	SSTAD	School standard address	Text	Text
22F	Alphanum	SGEOSS	School side of the street	Text	Text (L,R)
22G	Alphanum	SZONE	School TAZ	Text	Text
22G				88888888	Unknown Zone
23	Alphanum	SXVALUE	School X value	Value	Value (13.6)
23				0000000.000000	Unknown X
24	Alphanum	SYVALUE	School Y value	Value	Value (12.6)
24				000000.000000	Unknown Y
26	Numeric	WRKR	Type of worker	1	A PAID Full-time worker
26				2	A PAID Part-time worker
26				3	AN UNPAID worker or volunteer
26				4	Retired
26				5	Not working
26				98	Don't Know
26				99	Refused
27	Numeric	NOWRK	Looking for paid work	1	Yes
27				2	No
27				98	Don't Know
27				99	Refused
30	Numeric	MJOB	More than one job	1	Yes
30				2	No
31	Numeric	JOBNO	Number of jobs	(1-99)	Range

Order	Type	Variable Name	Variable Label	Response Category	Response Category Description
32	Alphanum	W1NAME	Primary job name of employer	Text	Text
33	Alphanum	W1TYPE	Primary type of business	1	Residential
33				2	Automotive Dealer/Repair
33				3	Bank/Financial Institution (Unknown)
33				4	Barber/Beauty/Nail Salon (Unknown)
33				5	Bookstore/Library/Newsstand (Unknown)
33				6	Construction Site
33				7	Convenience/Drug Store (Unknown)
33				8	Daycare Facility/Preschool/Nursery School
33				9	Gas Station
33				10	Government/Municipal/City Offices/Library/Fire Station/ Post Office/Dump/Recycling Center
33				11	Grocery
33				12	Hotel/Motel/Other Lodging Facility
33				13	Indoor Recreation - gym/health club, skating rink (unknown)
33				14	Industrial Site/Manufacturing Plant
33				15	Medical Facility/Hospital
33				16	Movie Theater/Theatre/Concert Venue/Sports Arena (Unknown)
33				17	Museum/Zoo/Historic Site
33				18	Office Building
33				19	Outdoor Recreation - Park, Athletic Field, Beach
33				20	Religious - Church/Synagogue/Houses of Worship
33				21	Restaurant/Fast Food/Bar & Grill (Unknown)
33				22	School - K-12
33				23	School - College/University/Technical/Vocational
33				24	Shopping Mall/Department Store (Unknown)
33				25	Transportation Station, Stop, Terminal (airport, train, bus)/Park and Ride lot
33				26	Bank/Financial Institution (Enclosed Mall)
33				27	Bank/Financial Institution (Standalone or Strip Mall)
33				28	Barber/Beauty/Nail Salon (Enclosed Mall)
33				29	Barber/Beauty/Nail Salon (Standalone or Strip Mall)
33				30	Bookstore/Library/Newsstand (Enclosed Mall)
33				31	Bookstore/Library/Newsstand (Standalone or Strip Mall)
33				32	Convenience/Drug Store (Enclosed Mall)
33				33	Convenience/Drug Store (Standalone or Strip Mall)
33				34	Indoor Recreation (Enclosed Mall)
33				35	Indoor Recreation (Standalone or Strip Mall)
33				36	Movie Theater/Theatre/Concert Venue/Sports Arena (Enclosed Mall)
33				37	Movie Theater/Theatre/Concert Venue/Sports Arena (Standalone or Strip Mall)
33				38	Restaurant/Fast Food/Bar & Grill (Enclosed Mall)

Order	Type	Variable Name	Variable Label	Response Category	Response Category Description
33				39	Restaurant/Fast Food/Bar & Grill (Standalone or Strip Mall)
33				40	Shopping Mall/Department Store (Enclosed Mall)
33				41	Shopping Mall/Department Store (Standalone or Strip Mall)
33				42	Senior Care (Assisted Living/Retirement Communities/Nursing Homes etc.)
33				43	Retail (Retail Shops/Unspecified Sales)
33				44	Agriculture (Farms/Dairy, Egg Production etc.)
33				45	Other Academic (Unspecified Teaching/School Administration/Dance Classes/Karate Classes etc.)
33				46	Animal Care/Control (Veterinary/Boarding/Grooming/Supplies etc.)
33				47	Military
33				48	Non-Profit
33				49	Cemeteries
33				50	Utilities (Gas/Electric/Water/Waste Disposal etc.)
33				51	Indoor Work (Non-Industrial Labor/Small Production)
33				52	Commercial Services (Shipping/Packaging/Plumbing/Tailoring etc.)
33				53	Art gallery/studio
33				54	Car wash
33				55	Casino
33				56	Community center/Meeting hall/Convention center
33				57	Marina/Yacht Club
33				58	Photo studio
33				59	Storage facility
33				60	Taking a walk/Street/Intersection (unspec.)
33				61	Warehouse/Wholesaler
33				62	Video store
33				63	Work related/Job site
33				64	Resort/Vacation
33				65	Nursery/Garden
33				66	Rental facility
33				67	Lumber yard/Store
33				68	Clubs/County Club/Social club
33				69	Tattoo parlor
33				70	Downtown area
33				71	Bakery
33				72	Music store/Shop
33				73	Public market/Outdoor market/Fruit stand
33				74	Home Improvement/Builder's store
33				75	Tanning Salon
33				76	Winery
33				77	Computers/Software
33				78	Manufacturers Rep
33				79	Self-Employed

Order	Type	Variable Name	Variable Label	Response Category	Response Category Description
33				80	Aerospace
33				81	Airline/Air craft/Aviation
33				82	Architecture
33				83	Insurance/Health insurance
33				84	Marketing/Market Research/Public Relations/Advertising
33				85	Consulting services
33				86	Engineering
33				87	Entertainment
33				88	Legal/Law
33				89	Real Estate/Property Management
33				90	Contractor
33				91	Travel
33				92	Counseling
33				93	Design/Clothing/Graphics/Arts/Crafts/Pottery
33				94	Accounting/Bookkeeping/CPA
33				95	Newspaper/Media/Publishing/Writer/Editor
33				96	Professional Services
33				97	Communications
33				98	Distribution/Distributor
33				99	Library
33				100	Technology/Electronics
33				101	Telecommunication/Phone
33				102	Mangement
33				103	Research
33				104	Collections/Collection Agency
33				105	Trucking
33				106	Technical
33				107	Union
33				996	All other miscellaneous responses
33				997	None/Nothing
33				998	Don't Know
33				999	Refused/No response
34	Numeric	W1ADDR	Primary job work at home or at work	1	Workplace
34				2	Works only at home
34				3	No fixed workplace
35	Alphanum	W1STR	Primary job street address	Text	Text
36	Alphanum	W1CITY	Primary job city	Text	Text
37	Alphanum	W1STATE	Primary job state	Text	Text
38	Numeric	W1ZIP	Primary job zip code	Text	Text
38				98	Don't Know
38				99	Refused
39	Alphanum	W1XSTS	Primary job cross streets	Text	Text
40	Alphanum	W1GEOADD	Geocoded Primary Employer Address	Text	Text

Order	Type	Variable Name	Variable Label	Response Category	Response Category Description
40A	Alphanum	W1GEOCTY	Geocoded Primary Employer City	Text	Text
40B	Alphanum	W1GEOSTA	Geocoded Primary Employer State	Text	Text
40C	Numeric	W1GEOZIP	Geocoded Primary Employer Zip	Text	Text
40D	Alphanum	W1GEOXST	Geocoded Prim Emp Nearest Cross Streets	Text	Text
42A	Numeric	W1SCOR	Primay Employer Geocoding Score	(0-100)	Range
42B	Alphanum	W1STAT	Primary Geocoding Status	Text	Text (M, T, U)
42C	Numeric	W1LOCN	Primary Employer Location	1	KingAddr
42C				2	KingStr
42C				3	KitsapAddr
42C				4	KitsapStr
42C				5	PierceAddr
42C				6	Pierce Str
42C				7	SnohomishAddr
42C				8	SnohomishStr
42C				97	None (If Geododing is >2 will be None)
42D	Alphanum	W1ARCS	Primary Employer Arc Street	Text	Text
42E	Alphanum	W1STAD	Primary Employer standard address	Text	Text
42F	Alphanum	W1GEOSS	Primary Employer side of the street	Text	Text (L,R)
42G	Alphanum	W1ZONE	Primary Employer TAZ	Text	Text
42G				88888888	Unknown Zone
43	Alphanum	W1XVALUE	Primary Employer X value	Value	Value (13.6)
43				0000000.000000	Unknown X
44	Alphanum	W1YVALUE	Primary Employer Y value	Value	Value (12.6)
44				000000.000000	Unknown Y
45	Numeric	W1IND	Primary job employer's industry	1	Agriculture, Forestry, Fishing and Hunting
45				2	Mining
45				3	Utilities
45				4	Construction
45				5	Manufacturing
45				6	Wholesale Trade
45				7	Retail Trade
45				8	Transportation and Warehousing
45				9	Information
45				10	Finance and Insurance
45				11	Real Estate, Rental/Leasing
45				12	Professional, Scientific and Technical Services
45				13	Management of Companies and Enterprises
45				14	Administrative and Support and Waste Management and Remediation Services
45				15	Educational Services
45				16	Health Care and Social Services
45				17	Arts, Entertainment, and Recreation

Order	Type	Variable Name	Variable Label	Response Category	Response Category Description
45				18	Accommodation and Food Services
45				19	Public Administration/Government
45				20	Other Services
45				21	Military
45				22	Automotive
45				23	Child Care/Daycare/Adult Foster Care
45				24	Repair and Maintenance Services
45				25	Lumber/Lumber Mill
45				26	Church
45				27	Marketing/Advertising
45				28	Charity/Charitable Organizations
45				29	Self-Employed/Owns Business
45				30	Gaming/Gambling
45				31	Media/Publishing
45				32	Aerospace
45				33	Computers/Internet/Software
45				34	Consulting
45				35	Cleaning service
45				36	Law/Legal
45				37	Travel/Airlines
45				38	Telecommunications
45				39	Non-Profit (unspec.)
45				40	Contractors
45				41	Equestrian
45				42	Landscaping
45				43	Beauty/Hair salon/Nail/Tanning
45				44	Security services
45				45	Temp Agency
45				46	Commercial Services (Shipping/Packaging/Printing)
45				96	All other miscellaneous responses/ Other Services
45				97	None/Nothing
45				98	Don't Know
45				99	Refused
46	Numeric	W1EVES	Primary job includes Evenings	1	Yes
46				2	No
46				98	Don't Know
46				99	Refused
47	Numeric	W1ONITE	Primary job includes overnight shifts	1	Yes
47				2	No
47				98	Don't Know
47				99	Refused
48	Numeric	W1HRS	Primary job hours per week	(1-120)	Range
48				998	Don't Know

Order	Type	Variable Name	Variable Label	Response Category	Response Category Description
48				999	Refused
49	Numeric	W1FLEX	Primary job flexibility	1	No Flexibility
49				2	Some Flexibility
49				3	Complete Flexibility
49				98	Don't Know
49				99	Refused
50	Numeric	W1COMP	Primary job offer compressed work week	1	Yes
50				2	No
50				98	Don't Know
50				99	Refused
51	Numeric	W1YEARS	Primary job length of time employed	1	Less than a year
51				2	Between 1 and 2 years
51				3	Between 2 and 3 years
51				4	Between 3 and 5 years
51				5	Between 5 and 10 years
51				6	Between 10 and 20 years
51				7	More than 20 years
52	Numeric	W1FREQ	Primary job days worked per week	(1-7)	Range
53	Numeric	W1MODE1	Car, driving alone	(1-10)	Range
54	Numeric	W1MODE2	Car, sharing a ride with others	(1-10)	Range
55	Numeric	W1MODE3	Bus or train using park and ride	(1-10)	Range
56	Numeric	W1MODE4	Other bus or train	(1-10)	Range
57	Numeric	W1MODE5	Bicycle	(1-10)	Range
58	Numeric	W1MODE6	Walking the entire way	(1-10)	Range
59	Numeric	W1MODE7	Ferry with car	(1-10)	Range
60	Numeric	W1MODE8	Other Ferry	(1-10)	Range
61	Numeric	W1ARR1	Before 6 am	(1-10)	Range
62	Numeric	W1ARR2	Between 6 and 6:30 am	(1-10)	Range
63	Numeric	W1ARR3	Between 6:30 and 7 am	(1-10)	Range
64	Numeric	W1ARR4	Between 7 and 7:30 am	(1-10)	Range
65	Numeric	W1ARR5	Between 7:30 and 8 am	(1-10)	Range
66	Numeric	W1ARR6	Between 8 and 8:30 am	(1-10)	Range
67	Numeric	W1ARR7	Between 8:30 and 9 am	(1-10)	Range
68	Numeric	W1ARR8	After 9 am	(1-10)	Range
69	Numeric	W1LEAVE1	Before 3:30 pm	(1-10)	Range
70	Numeric	W1LEAVE2	Between 3:30 and 4 pm	(1-10)	Range
71	Numeric	W1LEAVE3	Between 4 and 4:30 pm	(1-10)	Range
72	Numeric	W1LEAVE4	Between 4:30 and 5 pm	(1-10)	Range
73	Numeric	W1LEAVE5	Between 5 and 5:30 pm	(1-10)	Range
74	Numeric	W1LEAVE6	Between 5:30 and 6 pm	(1-10)	Range
75	Numeric	W1LEAVE7	Between 6 and 6:30 pm	(1-10)	Range
76	Numeric	W1LEAVE8	After 6:30 pm	(1-10)	Range
77	Numeric	W1CONGT	Choose travel times to avoid traffic	1	No

Order	Type	Variable Name	Variable Label	Response Category	Response Category Description
77				2	Yes, occassionally
77				3	Yes, usually
78	Numeric	PREVWCTY	Previous job county	1	King (city of Seattle)
78				2	King (outside of Seattle)
78				3	Kitsap
78				4	Pierce
78				5	Snohomish
78				6	Other Washington State location
78				7	Other state
78				98	Don't Know
78				99	Refused
79	Alphanum	PREVWADD	Previous job street address	Text	Text
80	Alphanum	PREWCITY	Previous job city	Text	Text
81	Numeric	PREVWZIP	Previous job zip code	Text	Text
81				99998	Don't Know
81				99999	Refused
82	Numeric	PWMOVE1	Primary reason moved work address	1	Changed job
82				2	Transferred
82				3	Employer moved
82				4	Other
83	Alphanum	PWMWHY1	Reason changed jobs	1	Better job/opportunity/Disliked old job
83				2	Better pay
83				3	Better hours
83				4	Got laid off/fired
83				5	Better location/Moved
83				6	Career change/Become self employed
83				7	Graduated from college/Completed training
83				8	Promoted
83				9	Transferred
83				10	Retired
83				11	Maternity leave/Take care of family
83				12	Better benefits/insurance
83				13	Was a temp job/contract work
83				14	Business closed/Sold
83				15	To go to school
83				16	Flexibility/Didn't fit schedule
83				17	Wanted to
83				18	Personal/Illness/Disabled
83				19	Lack of work
83				20	For stability
83				21	Just for a change/Always changes jobs
83				96	All other miscellaneous responses
83				97	None/Nothing

Order	Type	Variable Name	Variable Label	Response Category	Response Category Description
83				98	Don't Know
83				99	Refused/No response
84	Alphanum	W2NAME	Secondary job name of employer	Text	Text
85	Alphanum	W2TYPE	Secondary type of business	1	Residential
85				2	Automotive Dealer/Repair
85				3	Bank/Financial Institution (Unknown)
85				4	Barber/Beauty/Nail Salon (Unknown)
85				5	Bookstore/Library/Newsstand (Unknown)
85				6	Construction Site
85				7	Convenience/Drug Store (Unknown)
85				8	Daycare Facility/Preschool/Nursery School
85				9	Gas Station
85				10	Government/Municipal/City Offices/Library/Fire Station/ Post Office/Dump/Recycling Center
85				11	Grocery
85				12	Hotel/Motel/Other Lodging Facility
85				13	Indoor Recreation - gym/health club, skating rink (unknown)
85				14	Industrial Site/Manufacturing Plant
85				15	Medical Facility/Hospital
85				16	Movie Theater/Theatre/Concert Venue/Sports Arena (Unknown)
85				17	Museum/Zoo/Historic Site
85				18	Office Building
85				19	Outdoor Recreation - Park, Athletic Field, Beach
85				20	Religious - Church/Synagogue/Houses of Worship
85				21	Restaurant/Fast Food/Bar & Grill (Unknown)
85				22	School - K-12
85				23	School - College/University/Technical/Vocational
85				24	Shopping Mall/Department Store (Unknown)
85				25	Transportation Station, Stop, Terminal (airport, train, bus)/Park and Ride lot
85				26	Bank/Financial Institution (Enclosed Mall)
85				27	Bank/Financial Institution (Standalone or Strip Mall)
85				28	Barber/Beauty/Nail Salon (Enclosed Mall)
85				29	Barber/Beauty/Nail Salon (Standalone or Strip Mall)
85				30	Bookstore/Library/Newsstand (Enclosed Mall)
85				31	Bookstore/Library/Newsstand (Standalone or Strip Mall)
85				32	Convenience/Drug Store (Enclosed Mall)
85				33	Convenience/Drug Store (Standalone or Strip Mall)
85				34	Indoor Recreation (Enclosed Mall)
85				35	Indoor Recreation (Standalone or Strip Mall)
85				36	Movie Theater/Theatre/Concert Venue/Sports Arena (Enclosed Mall)

Order	Type	Variable Name	Variable Label	Response Category	Response Category Description
85				37	Movie Theater/Theatre/Concert Venue/Sports Arena (Standalone or Strip Mall)
85				38	Restaurant/Fast Food/Bar & Grill (Enclosed Mall)
85				39	Restaurant/Fast Food/Bar & Grill (Standalone or Strip Mall)
85				40	Shopping Mall/Department Store (Enclosed Mall)
85				41	Shopping Mall/Department Store (Standalone or Strip Mall)
85				42	Senior Care (Assisted Living/Retirement Communities/Nursing Homes etc.)
85				43	Retail (Retail Shops/Unspecified Sales)
85				44	Agriculture (Farms/Dairy, Egg Production etc.)
85				45	Other Academic (Unspecified Teaching/School Administration/Dance Classes/Karate Classes etc.)
85				46	Animal Care/Control (Veterinary/Boarding/Grooming/Supplies etc.)
85				47	Military
85				48	Non-Profit
85				49	Cemeteries
85				50	Utilities (Gas/Electric/Water/Waste Disposal etc.)
85				51	Indoor Work (Non-Industrial Labor/Small Production)
85				52	Commercial Services (Shipping/Packaging/Plumbing/Tailoring etc.)
85				53	Art gallery/studio
85				54	Car wash
85				55	Casino
85				56	Community center/Meeting hall/Convention center
85				57	Marina/Yacht Club
85				58	Photo studio
85				59	Storage facility
85				60	Taking a walk/Street/Intersection (unspec.)
85				61	Warehouse/Wholesaler
85				62	Video store
85				63	Work related/Job site
85				64	Resort/Vacation
85				65	Nursery/Garden
85				66	Rental facility
85				67	Lumber yard/Store
85				68	Clubs/County Club/Social club
85				69	Tattoo parlor
85				70	Downtown area
85				71	Bakery
85				72	Music store/Shop
85				73	Public market/Outdoor market/Fruit stand
85				74	Home Improvement/Builder's store
85				75	Tanning Salon
85				76	Winery

Order	Type	Variable Name	Variable Label	Response Category	Response Category Description
85				77	Computers/Software
85				78	Manufacturers Rep
85				79	Self-Employed
85				80	Aerospace
85				81	Airline/Air craft/Aviation
85				82	Architecture
85				83	Insurance/Health insurance
85				84	Marketing/Market Research/Public Relations/Advertising
85				85	Consulting services
85				86	Engineering
85				87	Entertainment
85				88	Legal/Law
85				89	Real Estate/Property Management
85				90	Contractor
85				91	Travel
85				92	Counseling
85				93	Design/Clothing/Graphics/Arts/Crafts/Pottery
85				94	Accounting/Bookkeeping/CPA
85				95	Newspaper/Media/Publishing/Writer/Editor
85				96	Professional Services
85				97	Communications
85				98	Distribution/Distributor
85				99	Library
85				100	Technology/Electronics
85				101	Telecommunication/Phone
85				102	Mangement
85				103	Research
85				104	Collections/Collection Agency
85				105	Trucking
85				106	Technical
85				107	Union
85				996	All other miscellaneous responses
85				997	None/Nothing
85				998	Don't Know
85				999	Refused/No response
86	Numeric	W2ADDR	Secondary job work at home or at work	1	Workplace
86				2	Works only at home
86				3	No fixed workplace
87	Alphanum	W2STR	Secondary job street address	Text	Text
88	Alphanum	W2CITY	Secondary job city	Text	Text
89	Alphanum	W2STATE	Secondary job state	Text	Text
90	Numeric	W2ZIP	Secondary job zip code	Text	Text
90				99998	Don't Know

Order	Type	Variable Name	Variable Label	Response Category	Response Category Description
90				99999	Refused
91	Alphanum	W2XSTS	Secondary job cross streets	Text	Text
92	Alphanum	W2GEOADD	Geocoded Secondary Employer Address	Text	Text
92A	Alphanum	W2GEOCTY	Geocoded Secondary Employer City	Text	Text
92B	Alphanum	W2GEOSTA	Geocoded Secondary Employer State	Text	Text
92C	Numeric	W2GEOZIP	Geocoded Secondary Employer Zip	Text	Text
92D	Alphanum	W2GEOXST	Geocoded Sec Emp Nearest Cross Streets	Text	Text
94A	Numeric	W2SCOR	Secondary Employer Geocoding Score	(0-100)	Range
94B	Alphanum	W2STAT	Secondary Geocoding Status	Text	Text (M, T, U)
94C	Numeric	W2LOCN	Secondary Employer Location	1	KingAddr
94C				2	KingStr
94C				3	KitsapAddr
94C				4	KitsapStr
94C				5	PierceAddr
94C				6	Pierce Str
94C				7	SnohomishAddr
94C				8	SnohomishStr
94C				97	None (If Geododing is >2 will be None)
94D	Alphanum	W2ARCS	Secondary Employer Arc Street	Text	Text
94E	Alphanum	W2STAD	Secondary Employer standard address	Text	Text
94F	Alphanum	W2GEOSS	Secondary Employer side of the street	Text	Text (L,R)
94G	Alphanum	W2ZONE	Secondary Employer TAZ	Text	Text
94G				88888888	Unknown Zone
95	Alphanum	W2XVALUE	Secondary Employer X value	Value	Value (13.6)
95				0000000.000000	Unknown X
96	Alphanum	W2YVALUE	Secondary Employer Y value	Value	Value (12.6)
96				000000.000000	Unknown Y
97	Numeric	W2IND	Secondary job employer's industry	1	Agriculture, Forestry, Fishing and Hunting
97				2	Mining
97				3	Utilities
97				4	Construction
97				5	Manufacturing
97				6	Wholesale Trade
97				7	Retail Trade
97				8	Transportation and Warehousing
97				9	Information
97				10	Finance and Insurance
97				11	Real Estate, Rental/Leasing
97				12	Professional, Scientific and Technical Services
97				13	Management of Companies and Enterprises
97				14	Administrative and Support and Waste Management and Remediation Services
97				15	Educational Services

Order	Type	Variable Name	Variable Label	Response Category	Response Category Description
97				16	Health Care and Social Services
97				17	Arts, Entertainment, and Recreation
97				18	Accommodation and Food Services
97				19	Public Administration/Government
97				20	Other Services
97				21	Military
97				22	Automotive
97				23	Child Care/Daycare/Adult Foster Care
97				24	Repair and Maintenance Services
97				25	Lumber/Lumber Mill
97				26	Church
97				27	Marketing/Advertising
97				28	Charity/Charitable Organizations
97				29	Self-Employed/Owns Business
97				30	Gaming/Gambling
97				31	Media/Publishing
97				32	Aerospace
97				33	Computers/Internet/Software
97				34	Consulting
97				35	Cleaning service
97				36	Law/Legal
97				37	Travel/Airlines
97				38	Telecommunications
97				39	Non-Profit (unspec.)
97				40	Contractors
97				41	Equestrian
97				42	Landscaping
97				43	Beauty/Hair salon/Nail/Tanning
97				44	Security services
97				45	Temp Agency
97				46	Commercial Services (Shipping/Packaging/Printing)
97				96	All other miscellaneous responses/ Other Services
97				97	None/Nothing
97				98	Don't Know
97				99	Refused
98	Numeric	W2EVES	Secondary job includes Evenings	1	Yes
98				2	No
98				98	Don't Know
98				99	Refused
99	Numeric	W2ONITE	Secondary job includes overnight shifts	1	Yes
99				2	No
99				98	Don't Know
99				99	Refused

Order	Type	Variable Name	Variable Label	Response Category	Response Category Description
100	Numeric	W2HRS	Secondary job hours per week	(1-120)	Range
100				998	Don't Know
100				999	Refused
101	Numeric	W2FLEX	Secondary job flexibility	1	No Flexibility
101				2	Some Flexibility
101				3	Complete Flexibility
101				98	Don't Know
101				99	Refused
102	Numeric	W2COMP	Secondary job offer compressed work week	1	Yes
102				2	No
102				98	Don't Know
102				99	Refused
103	Numeric	TRANSIT	Used Transit in last 30 days	1	Yes
103				2	No
103				98	Don't Know
103				99	Refused
104	Numeric	TPASS	Have a bus or transit pass	1	Yes
104				2	No
104				98	Don't Know
104				99	Refused
105	Numeric	PTYPE1	Type of bus or transit pass - 1st mention	1	Puget Pass
105	Numeric	PTYPE2	Type of bus or transit pass - 2nd mention	2	Metro Transit Ticketbooks
105	Numeric	PTYPE3	Type of bus or transit pass - 3rd mention	3	Van/Pool Transit Pass (Metro)
105				4	Reduced Fare Sticker (Metro)
105				5	Ship to Shore PugetPass
105				6	ACCESS Pass (Metro)
105				7	Visitor Pass (Metro)
105				8	Kitsap Transit Regular Routed Monthly Bus Pass
105				9	Kitsap Transit *ACCESS and **Reduced Fare Monthly Bus Pass
105				10	Bus-Ferry Pass (Auto-Ferry for walk-on passengers)
105				11	Puget Pass (Auto-Ferry for walk-on passengers)
105				12	Kitsap Transit Worker/Driver 40-Ride Punch Ticket
105				13	Kitsap Transit Worker/Driver Monthly Pass
105				14	Transit Ticketbooks (Pierce Transit or Sound Transit)
105				15	U-Pass
105				16	EdPass
105				17	FlexPass
105				18	ET Passes (Everett Transit)
105				19	Ferry Only Passes (Washington State Ferries)
105				20	Ticket Vending Machine Tickets (Sound Transit)
105				21	Community Transit
105				22	King County Metro pass
105				23	Metro (unspec.)

Order	Type	Variable Name	Variable Label	Response Category	Response Category Description
105				24	Metro bus
105				25	Pierce Transit (unspec.)
105				26	Reduced fare/ Senior Citizen (unspec.)
105				27	Regional reduced fare permit
105				28	Disabled/ Handicapped pass
105				29	Employee Transit Pass, Community, Sound
105				30	Bus Pass/ School
105				31	Student Pass (Metro)
105				32	Go Pass
105				33	TIP Tass (Transporation Incentive Program)
105				96	All other miscellaneous responses
105				98	Don't Know
105				99	Refused
106	Numeric	FVALUE1	Face value of transit pass 1	0.01 to 9000.99	Range
106	Numeric	FVALUE2	Face value of transit pass 2	0.01 to 9000.99	Range
106	Numeric	FVALUE3	Face value of transit pass 3	0.01 to 9000.99	Range
107	Numeric	FVALUE1C	Face value rate pass 1	1	Weekly
107		FVALUE2C	Face value rate pass 2	2	Monthly
107		FVALUE3C	Face value rate pass 3	3	Annually
107				4	One time/Only when you use it/Per trip
107				5	For 20 tickets
107				6	Every 3 months/Quarterly
107				7	Every 6 months
107				8	For life/Does not expire/Senior pass
107				9	Free pass (unspec.)
107				10	Daily
107				11	Reduced fare per ride
107				12	Booklet/Ticket book
107				13	Twenty-five cents a ride
107				14	Employee benefit
107				15	Ticket (unspec.)
107				16	Every 2 weeks/Bi-monthly
107				17	10 tickets
107				18	Bi-weekly
107				19	Per school year
107				96	All other miscellaneous responses
107				97	None/Nothing
107				98	Don't Know
107				99	Refused
108	Numeric	PCOST1	Personal cost for transit pass 1	0.01 to 9000.99	Range
108	Numeric	PCOST2	Personal cost for transit pass 2	0.01 to 9000.99	Range
108	Numeric	PCOST3	Personal cost for transit pass 3	0.01 to 9000.99	Range
109	Numeric	COST1C	Personal cost rate pass 1	1	Weekly

Order	Type	Variable Name	Variable Label	Response Category	Response Category Description
109		COST2C	Personal cost rate pass 2	2	Monthly
109		COST3C	Personal cost rate pass 3	3	Annually
109				4	One time/Only when you use it/Per trip
109				5	For 20 tickets
109				6	Every 3 months/Quarterly
109				7	Every 6 months
109				8	For life/Does not expire/Senior pass
109				9	Free pass (unspec.)
109				10	Daily
109				11	Reduced fare per ride
109				12	Booklet/Ticket book
109				13	Twenty-five cents a ride
109				14	Employee benefit
109				15	Ticket (unspec.)
109				16	Every 2 weeks/Bi-monthly
109				17	10 tickets
109				18	Bi-weekly
109				19	Per school year
109				96	All other miscellaneous responses
109				97	None/Nothing
109				98	Don't Know
109				99	Refused
110	Numeric	DISABL	Disability that makes it difficult to travel	1	Yes
110				2	No
110				98	Don't Know
110				99	Refused
111	Numeric	HOMEACT1	Shopped on Internet or by phone	1	Yes
111		HOMEACT2	Banked on Internet or by phone	2	No
111		HOMEACT3	Other personal buss/svcs on the Internet		
111		HOMEACT4	Watched a DVD		
112	Numeric	ATTD1A	Transit viable option to work/school	1	Strongly disagree
112		ATTD1B	Don't mind delays	2	
112		ATTD1C	Roads and bridges maintained before build	3	
112		ATTD1D	Transpotation system support many ways	4	
112		ATTD1E	State/local government adequate funds	5	
112		ATTD1F	Concentrate future growth in developed areas	6	
112		ATTD1G	Supporting freight movement and economy	7	
112		ATTD1H	City or neighborhood has a good mix	8	
112		ATTD1I	Don't mind paying toll	9	
112		ATTD1J	Concerned about increasing truck traffic	10	Strongly agree
113	Numeric	ATTD2A	Predictable travel	1	Not important
113		ATTD2B	Affordable cost	2	
113		ATTD2C	Comfort	3	

Order	Type	Variable Name	Variable Label	Response Category	Response Category Description
113		ATTD2D	Privacy	4	
113		ATTD2E	Flexibility	5	
113		ATTD2F	Quickest travel time	6	
113				7	
113				8	
113				9	
113				10	Very important
114	Numeric	ATTD3	Days experience limited traffic delays	(0-7)	Range
114				98	Don't Know
115	Numeric	ACCEPT	PSRC Accept	0	Not Acceptable
115				1	Acceptable
116	Numeric	ASSURE	NON-GPS Household	1	Yes
117	Numeric	GPS	GPS Household	1	Yes
118	Numeric	FUTURE	Willing to Participate in the Future	1	Yes
118				2	No
118				98	Don't Know
119	Numeric	DELIV	Interim Delivery	1653	1653 Household Delivery (as of 5/24/06)
119				4504	4504 Household Delivery (as of 6/30/06)
119				4746	4746 Household Delivery (September)
120	Numeric	SPSRECV	Received Stated Preference Survey	1	Yes
121	Numeric	SPSCOMPL	Completed Stated Preference Survey	1	Complete
121				2	Partial Complete
121				3	Not Complete
121				4	Terminate
121				5	Do Not Qualify

Please use the following codes for any Variables that are missing response codes for Other, Don't Know, and Refused:

6, 96, 996, 9996, 99996, etc. = Other/Other Specify

8, 98, 998, 9998, 99998, etc. = Don't Know

9, 99, 999, 9999, 99999, etc. = Refused

Order	Type	Variable Name	Variable Label	Response Category	Response Category Description
1	Numeric	RECTYP	Record Type	3	Trip Record
2	Numeric	QNO	Sample Number	Value	Value
3	Numeric	PERNUM	Person Number	1	Person 1
3				2	Person 2
3				3	Person 3
3				4	Person 4
3				5	Person 5
3				6	Person 6
3				7	Person 7
3				8	Person 8
3				9	Person 9
3				10	Person 10
3				11	Person 11
3				12	Person 12
3				13	Person 13
3				14	Person 14
3				15	Person 15
4	Numeric	TRIPNUM	Trip Number	0-99	Valid Range
4A	Numeric	SAMPTYP	Sample Type	1	RDD
4A				2	Transit Access Area
4A				3	Ferry
4A				4	Park and Ride
5	Numeric	START	Location at start of travel	1	Traveling
5				2	At a location
5				3	Out of town
5A	Numeric	OWHERE	Location (SLOCATE_# and LOCATE_#)	1	Home
5A				2	New location
5A				3	Previously reported location
5A				4	Primary workplace
5A				5	Secondary workplace
5A				6	School
6	Alphanum	ORIGIN	Origin of Trip (LOCINFO_1, LOCINFO_#, and SLOCINFO)	Text	Text
7	Alphanum	OOADDR	Original Origin Address	Text	Text
8	Alphanum	OCITY	Origin City	Text	Text
9	Alphanum	OSTATE	Origin State	Text	Text (50 States)
9				1	Washington
9				2	California
9				3	Texas
9				4	Arizona
9				6	Canada

Order	Type	Variable Name	Variable Label	Response Category	Response Category Description
9				7	Florida
9				8	New York
9				9	Nevada
9				10	Out of town
9				11	Mexico
9				12	Colorado
9				13	Idaho
9				14	Alaska
9				97	None/Nothing
9				98	Don't Know
9				99	Refused/No response
10	Alphanum	OZIP	Origin Zip Code	Text	Text
10				99998	Don't Know
10				99999	Refused
11	Alphanum	OXSTS	Origin Cross Streets	Text	Text
12	Alphanum	OADDR	Geocoded Origin Address	Text	Text
14	Numeric	ORIGSCOR	Origin Score	(0-100)	Range
15	Alphanum	ORIGSTAT	Origin Status	Text	Text (M, T, U)
16	Numeric	ORIGLOCN	Origin Location Name	1	KingAddr
16				2	KingStr
16				3	KitsapAddr
16				4	KitsapStr
16				5	PierceAddr
16				6	Pierce Str
16				7	SnohomishAddr
16				8	SnohomishStr
16				97	None (If Geododing is >2 will be None)
17	Alphanum	ORIGARCS	Origin Arc Street	Text	Text
18	Alphanum	ORIGSTAD	Origin standard address	Text	Text
19	Alphanum	ORIGSS	Origin side of the street	Text	Text (L,R)
20	Alphanum	OZONE	Origin TAZ	Text	Text
20				88888888	Unknown Zone
21	Alphanum	ORIGX	Origin X	Value	Value (13.6)
21				0000000.000000	Unknown X
22	Alphanum	ORIGY	Origin Y	Value	Value (12.6)
22				000000.000000	Unknown Y
23	Numeric	OTYPE	Origin Type of Location	1	Residential
23				2	Automotive Dealer/Repair
23				3	Bank/Financial Institution (Unknown)
23				4	Barber/Beauty/Nail Salon (Unknown)
23				5	Bookstore/Library/Newsstand (Unknown)

Order	Type	Variable Name	Variable Label	Response Category	Response Category Description
23				6	Construction Site
23				7	Convenience/Drug Store (Unknown)
23				8	Daycare Facility/Preschool/Nursery School
23				9	Gas Station
23				10	Government/Municipal/City Offices/Library/Fire Station/ Post Office/Dump/Recycling Center
23				11	Grocery
23				12	Hotel/Motel/Other Lodging Facility
23				13	Indoor Recreation - gym/health club, skating rink (unknown)
23				14	Industrial Site/Manufacturing Plant
23				15	Medical Facility/Hospital
23				16	Movie Theater/Theatre/Concert Venue/Sports Arena (Unknown)
23				17	Museum/Zoo/Historic Site
23				18	Office Building
23				19	Outdoor Recreation - Park, Athletic Field, Beach
23				20	Religious - Church/Synagogue/Houses of Worship
23				21	Restaurant/Fast Food/Bar & Grill (Unknown)
23				22	School - K-12
23				23	School - College/University/Technical/Vocational
23				24	Shopping Mall/Department Store (Unknown)
23				25	Transportation Station, Stop, Terminal (airport, train, bus)/Park and Ride lot
23				26	Bank/Financial Institution (Enclosed Mall)
23				27	Bank/Financial Institution (Standalone or Strip Mall)
23				28	Barber/Beauty/Nail Salon (Enclosed Mall)
23				29	Barber/Beauty/Nail Salon (Standalone or Strip Mall)
23				30	Bookstore/Library/Newsstand (Enclosed Mall)
23				31	Bookstore/Library/Newsstand (Standalone or Strip Mall)
23				32	Convenience/Drug Store (Enclosed Mall)
23				33	Convenience/Drug Store (Standalone or Strip Mall)
23				34	Indoor Recreation (Enclosed Mall)
23				35	Indoor Recreation (Standalone or Strip Mall)
23				36	Movie Theater/Theatre/Concert Venue/Sports Arena (Enclosed Mall)
23				37	Movie Theater/Theatre/Concert Venue/Sports Arena (Standalone or Strip Mall)
23				38	Restaurant/Fast Food/Bar & Grill (Enclosed Mall)
23				39	Restaurant/Fast Food/Bar & Grill (Standalone or Strip Mall)
23				40	Shopping Mall/Department Store (Enclosed Mall)
23				41	Shopping Mall/Department Store (Standalone or Strip Mall)

Order	Type	Variable Name	Variable Label	Response Category	Response Category Description
23				42	Senior Care (Assisted Living/Retirement Communities/Nursing Homes etc.)
23				43	Retail (Retail Shops/Unspecified Sales)
23				44	Agriculture (Farms/Dairy, Egg Production etc.)
23				45	Other Academic (Unspecified Teaching/School Administration/Dance Classes/Karate Classes etc.)
23				46	Animal Care/Control (Veterinary/Boarding/Grooming/Supplies etc.)
23				47	Military
23				48	Non-Profit
23				49	Cemeteries
23				50	Utilities (Gas/Electric/Water/Waste Disposal etc.)
23				51	Indoor Work (Non-Industrial Labor/Small Production)
23				52	Commercial Services (Shipping/Packaging/Plumbing/Tailoring etc.)
23				53	Art gallery/studio
23				54	Car wash
23				55	Casino
23				56	Community center/Meeting hall/Convention center
23				57	Marina/Yacht Club
23				58	Photo studio
23				59	Storage facility
23				60	Taking a walk/Street/Intersection (unspec.)
23				61	Warehouse/Wholesaler
23				62	Video store
23				63	Work related/Job site
23				64	Resort/Vacation
23				65	Nursery/Garden
23				66	Rental facility
23				67	Lumber yard/Store
23				68	Clubs/County Club/Social club
23				69	Tattoo parlor
23				70	Downtown area
23				71	Bakery
23				72	Music store/Shop
23				73	Public market/Outdoor market/Fruit stand
23				74	Home Improvement/Builder's store
23				75	Tanning Salon
23				76	Winery
23				77	Computers/Software
23				78	Manufacturers Rep

Order	Type	Variable Name	Variable Label	Response Category	Response Category Description
23				79	Self-Employed
23				80	Aerospace
23				81	Airline/Air craft/Aviation
23				82	Architecture
23				83	Insurance/Health insurance
23				84	Marketing/Market Research/Public Relations/Advertising
23				85	Consulting services
23				86	Engineering
23				87	Entertainment
23				88	Legal/Law
23				89	Real Estate/Property Management
23				90	Contractor
23				91	Travel
23				92	Counseling
23				93	Design/Clothing/Graphics/Arts/Crafts/Pottery
23				94	Accounting/Bookkeeping/CPA
23				95	Newspaper/Media/Publishing/Writer/Editor
23				96	Professional Services
23				97	Communications
23				98	Distribution/Distributor
23				99	Library
23				100	Technology/Electronics
23				101	Telecommunication/Phone
23				102	Mangement
23				103	Research
23				104	Collections/Collection Agency
23				105	Trucking
23				106	Technical
23				107	Union
23				996	All other miscellaneous responses
23				997	None/Nothing
23				998	Don't Know
23				999	Refused/No response
25	Numeric	OLCFREQ	How often do you visit location	1	Never before
25				2	Very rarely
25				3	1-10 times per year
25				4	1-3 times per month
25				5	Once per week or more
26	Numeric	OLCMD1	Used other modes of travel	1	No
26		OLCMD2		2	Yes, by car
26		OLCMD3		3	Yes, by transit

Order	Type	Variable Name	Variable Label	Response Category	Response Category Description
26		OLCMD4		4	Yes, by bicycle
26				5	Yes, by foot
27	Numeric	OLCMR	Main reason you did not use mode of travel	1	Did not have time
27				2	Was not convenient
27				3	Car was not available
27				5	Someone gave me a ride
27				6	Too expensive
27				7	Already in the car/Already had the car
27				8	Had things to carry
27				9	Get some exercise/Felt like walking
27				10	It was on my way
27				11	Too far/Health problems
27				12	Weather
27				13	It was close
27				14	More convenient
27				15	Picking up/Dropping off people
27				16	Had other things to do/Errands to run
27				17	Don't drive/Don't have a car
27				18	Tired
27				19	Not necessary/Didn't feel like it/Transportation provided
27				20	Carpool
27				21	Transportation was not available/Not working
27				22	Was late in the day
27				23	Took car in for repairs
27				24	Had other passengers
27				25	Saving gas/Gas prices
27				96	All other miscellaneous responses
27				97	None/Nothing
27				98	Don't Know
27				99	Refused
29	Numeric	DTIME	Time of Departure - Hour/Minute	Value	Value
30	Numeric	DDAY	Time of Departure - Day 1/Day 2	1	Day 1
30				2	Day 2
30				3	Day 3
31	Numeric	OACT1	Primary Activity at Origin Location	1	Home - Paid Work
31	Numeric	OACT2	2nd Activity at Origin Location	2	Home - Other
31	Numeric	OACT3	3rd Activity at Origin Location	3	Work
31	Numeric	OACT4	4th Activity at Origin Location	4	Attend Childcare
31				5	Attend School
31				6	Attend College
31				7	Eat Out

Order	Type	Variable Name	Variable Label	Response Category	Response Category Description
31				8	Personal Business
31				9	Everyday Shopping
31				10	Major Shopping
31				11	Religious/Community
31				12	Social
31				13	Recreation - Participate
31				14	Recreation - Watch
31				15	Accompany Another Person
31				16	Pick-Up/Drop-Off Passenger
31				17	Turn Around
34	Numeric	OLCWHY	Reason went to location at time	1	I had an appointment for that time
34				2	I usually go there at that time
34				3	It was the most convenient time to go
34				4	I stopped off on my way to somewhere else
34				5	Personal Business/Errand
34				6	Wante to/Was hungry
34				7	An event/Class was scheduled at that time
34				8	Dropping off/Picking up people
34				9	Vacation/Spring break
34				10	Walking/Exercise
34				11	Convenient place
34				12	With another person
34				13	Transportation schedule/Bus/Ferry
34				14	Someone else chose it
34				15	Emergency
34				16	Need to go there/Had what I needed
34				17	I live there
34				96	All other miscellaneous responses
34				97	None/Nothing
34				98	Don't Know
34				99	Refused
36	Numeric	TRSTYPA	1st Type of Transportation Used	1	Car, Van, Truck
36		TRSTYPB	2nd Type of Transportation Used	2	Motorcycle
36		TRSTYPC	3rd Type of Transportation Used	3	Bicycle/Moped
36		TRSTYPD	4th Type of Transportation Used	4	Walk
36		TRSTYPE	5th Type of Transportation Used	5	School Bus
36				6	Taxi/Shuttle
36				7	Dial-A-Ride
36				8	Train
36				9	Public Bus
36				10	Ferry

Order	Type	Variable Name	Variable Label	Response Category	Response Category Description
36				11	Private Bus
36				12	Boat/Ferry Boat/Kayak
36				13	Skateboard/Scooter
36				14	Airplane
36				15	Tractor
36				16	Golf Cart
36				17	Ambulance
36				18	ATV
36				19	Funeral Home Limousine
36				20	Rollerblades/Rollerskates
36				21	Baby Stroller/Stroller
36				22	Wheel Chair/Power Chair
36				23	Snowmobile
36				24	Jogging/Running
36				25	Flexcar
36				26	Paratransit
36				27	Picked up/Got a ride (unspec.)
36				28	Light Rail
36				96	All other miscellaneous responses
36				97	None/Nothing
36				98	Don't Know
36				99	Refused/No response
38	Numeric	DARA	1st Type of Dial-A-Ride Provider Used	1-99	See BUS1 - BUS3
38	Numeric	DARB	2nd Type of Dial-A-Ride Provider Used	1-99	See BUS1 - BUS3
38	Numeric	DARC	3rd Type of Dial-A-Ride Provider Used	1-99	See BUS1 - BUS3
38	Numeric	DARD	4th Type of Dial-A-Ride Provider Used	1-99	See BUS1 - BUS3
38	Numeric	DARE	5th Type of Dial-A-Ride Provider Used	1-99	See BUS1 - BUS3
44	Numeric	BUS1A	1st Type of Bus Provider Used	1	King County Metro
44		BUS2A	2nd Type of Bus Provider Used	2	Kitsap Transit
44		BUS3A	3rd Type of Bus Provider Used	3	Pierce Transit
44				4	Sound Transit
44				5	Community Transit
44				6	Everett Transit
45	Numeric	BUS1B	1st Type of Bus Provider Used	7	Washington State Ferries
45		BUS2B	2nd Type of Bus Provider Used	8	University of Washington U-Pass
45		BUS3B	3rd Type of Bus Provider Used	9	Kitsap Shipyard Transit
45				10	Metro (unspec.)
45				11	Metro Bus
45				12	Seattle Metro
46	Numeric	BUS1C	1st Type of Bus Provider Used	13	Dart/Dart Bus
46		BUS2C	2nd Type of Bus Provider Used	14	Snohomish/Snohomish Bus

Order	Type	Variable Name	Variable Label	Response Category	Response Category Description
46		BUS3C	3rd Type of Bus Provider Used	15	Dial-A-Ride providers (Other Specify)
46				96	All other miscellaneous responses
46				97	None/Nothing
46				98	Don't Know
47	Numeric	BUS1D	1st Type of Bus Provider Used	99	Refused
47		BUS2D	2nd Type of Bus Provider Used		
47		BUS3D	3rd Type of Bus Provider Used		
47					
47					
47					
48	Numeric	BUS1E	1st Type of Bus Provider Used		
48		BUS2E	2nd Type of Bus Provider Used		
48		BUS3E	3rd Type of Bus Provider Used		
48					
48					
48					
50	Numeric	BUSRTE1-5A	Bus Route Used	Code list	Use code list
50		BUSRTE1-5B			
50		BUSRTE1-5C			
50		BUSRTE1-5D			
50		BUSRTE1-5E			
51	Numeric	BUSTRS1-5A	Computed Transfer Time	Value	Value
51		BUSTRS1-5B			
51		BUSTRS1-5C			
51		BUSTRS1-5D			
51		BUSTRS1-5E			
52	Numeric	PYTAXI6A	Pay for Taxi/Shuttle	1	Yes
52		PYTAXI6B		2	No
52		PYTAXI6C		98	Don't Know
52		PYTAXI6D		99	Refused
52		PYTAXI6E			
53	Alphanum	PAY6AMTA	Amount Paid for Taxi/Shuttle	0.01-9000.99	Valid Range
53		PAY6AMTB			
53		PAY6AMTC			
53		PAY6AMTD			
53		PAY6AMTE			
54	Numeric	PAYDAR7A	Pay for Dial-A-Ride	1	Yes
54		PAYDAR7B		2	No
54		PAYDAR7C		3	Used Transit Pass
54		PAYDAR7D		98	Don't Know
54		PAYDAR7E		99	Refused

Order	Type	Variable Name	Variable Label	Response Category	Response Category Description
55	Alphanum	PAY7AMTA	Amount Paid for Dial-A-Ride	0.01-9000.99	Valid Range
55		PAY7AMTB			
55		PAY7AMTC			
55		PAY7AMTD			
55		PAY7AMTE			
56	Numeric	PAYTR8A	Pay for Train	1	Yes
56		PAYTR8B		2	No
56		PAYTR8C		98	Don't Know
56		PAYTR8D		99	Refused
56		PAYTR8E			
57	Alphanum	PAY8AMTA	Amount Paid for Train	0.01-9000.99	Valid Range
57		PAY8AMTB			
57		PAY8AMTC			
57		PAY8AMTD			
57		PAY8AMTE			
58	Numeric	PAYBUS9A	Pay for Public Bus	1	Yes
58		PAYBUS9B		2	No
58		PAYBUS9C		3	Used Bus or Transit Pass
58		PAYBUS9D		98	Don't Know
58		PAYBUS9E		99	Refused
59	Alphanum	PAY9AMTA	Amount Paid for Public Bus	0.01-9000.99	Valid Range
59		PAY9AMTB			
59		PAY9AMTC			
59		PAY9AMTD			
59		PAY9AMTE			
60	Numeric	PAYFY10A	Pay for Ferry	1	Yes
60		PAYFY10B		2	No
60		PAYFY10C		3	Used Bus or Transit Pass
60		PAYFY10D		98	Don't Know
60		PAYFY10E		99	Refused
61	Alphanum	PAY10AMA	Amount Paid for Ferry	0.01-9000.99	Valid Range
61		PAY10AMB			
61		PAY10AMC			
61		PAY10AMD			
61		PAY10AME			
62	Numeric	FYRTE1A	Ferry route	1	Bainbridge
62		FYRTE1B		2	Bremerton
62		FYRTE1C		3	Fauntleroy
62		FYRTE1D		4	Fauntleroy / Vashon / Southworth
62		FYRTE1E		5	Fauntleroy / Southworth
62				6	Southworth / Vashon

Order	Type	Variable Name	Variable Label	Response Category	Response Category Description
62				7	Vashon Passenger Only
62				8	Kingston / Edmonds
62				9	Pt. Defiance / Tahlequah
62				10	Mukilteo / Clinton
62				11	Steilacoom / Anderson Island
62				12	Bremerton Passenger Only
62				13	Bremerton / Port Orchard Foot Ferry
62				14	Bremerton / Annapolis Foot Ferry
62				15	Keytron Island / Anderson Island
62				16	Keytron Island / Steilacoom
62				17	Anacortes / Sidney B.C. (Victoria)
62				18	Anacortes / San Juan Islands
62				19	Port Townsend / Keystone
62				20	Port Angeles / Victoria, B.C.
62				21	Seattle / Victoria, B.C.
62				22	Seattle / San Juan Islands
62				23	Guemes Island-Anacortes Ferry
62				24	Lummi Island Ferry
63	Numeric	HHMWTRA	Number of household members with you	(1-15)	Range
63		HHMWTRB	(BUS, TRAIN, FERRY, WALK, BICYCLE)	97	None/Zero
63		HHMWTRC			
63		HHMWTRD			
63		HHMWTRE			
64	Numeric	TRSDPA	Driver or Passenger	1	Driver
64		TRSDPB		2	Passenger
64		TRSDPC		98	Don't Know
64		TRSDPD		99	Refused
64		TRSDPE			
65	Numeric	VTNUMA	Number of Additional People in Vehicle	97	0 - Alone
65		VTNUMB		1	1 person
65		VTNUMC		2	2 people
65		VTNUMD		3	3 people
65		VTNUME		4	4 people
65				5	5 people
65				6	6 or more people
65				98	Don't Know
65				99	Refused
66	Numeric	VHNUMA	Number of Household Members in Vehicle	97	0 - None
66		VHNUMB		1	1 household member
66		VHNUMC		2	2 household members
66		VHNUMD		3	3 household members

Order	Type	Variable Name	Variable Label	Response Category	Response Category Description
66		VHNUME		4	4 household members
66				5	5 household members
66				6	6 or more household members
66				98	Don't Know
66				99	Refused
67	Numeric	WHOACC1A	1st Household Member in Vehicle	1	Person 1
67		WHOACC1B			
67		WHOACC1C			
67		WHOACC1D			
67		WHOACC1E			
68	Numeric	WHOACC2A	2nd Household Member in Vehicle	2	Person 2
68		WHOACC2B			
68		WHOACC2C			
68		WHOACC2D			
68		WHOACC2E			
69	Numeric	WHOACC3A	3rd Household Member in Vehicle	3	Person 3
69		WHOACC3B			
69		WHOACC3C			
69		WHOACC3D			
69		WHOACC3E			
70	Numeric	WHOACC4A	4th Household Member in Vehicle	4	Person 4
70		WHOACC4B			
70		WHOACC4C			
70		WHOACC4D			
70		WHOACC4E			
71	Numeric	WHOACC5A	5th Household Member in Vehicle	5	Person 5
71		WHOACC5B			
71		WHOACC5C			
71		WHOACC5D			
71		WHOACC5E			
72	Numeric	WHOACC6A	6th Household Member in Vehicle	6	Person 6
72		WHOACC6B			
72		WHOACC6C			
72		WHOACC6D			
72		WHOACC6E			
73	Numeric	WHOACC7A	7th Household Member in Vehicle	7	Person 7
73		WHOACC7B			
73		WHOACC7C			
73		WHOACC7D			
73		WHOACC7E			
74	Numeric	WHOACC8A	8th Household Member in Vehicle	8	Person 8

Order	Type	Variable Name	Variable Label	Response Category	Response Category Description
74		WHOACC8B			
74		WHOACC8C			
74		WHOACC8D			
74		WHOACC8E			
75	Numeric	WHOACC9A	9th Household Member in Vehicle	9	Person 9
75		WHOACC9B			
75		WHOACC9C			
75		WHOACC9D			
75		WHOACC9E			
76	Numeric	WHOAC10A	10th Household Member in Vehicle	10	Person 10
76		WHOAC10B			
76		WHOAC10C			
76		WHOAC10D			
76		WHOAC10E			
77	Numeric	WHOAC11A	11th Household Member in Vehicle	11	Person 11
77		WHOAC11B			
77		WHOAC11C			
77		WHOAC11D			
77		WHOAC11E			
78	Numeric	WHOAC12A	12th Household Member in Vehicle	12	Person 12
78		WHOAC12B			
78		WHOAC12C			
78		WHOAC12D			
78		WHOAC12E			
79	Numeric	WHOAC13A	13th Household Member in Vehicle	13	Person 13
79		WHOAC13B			
79		WHOAC13C			
79		WHOAC13D			
79		WHOAC13E			
80	Numeric	WHOAC14A	14th Household Member in Vehicle	14	Person 14
80		WHOAC14B			
80		WHOAC14C			
80		WHOAC14D			
80		WHOAC14E			
81	Numeric	WHOAC15A	15th Household Member in Vehicle	15	Person 15
81		WHOAC15B			
81		WHOAC15C			
81		WHOAC15D			
81		WHOAC15E			
82	Numeric	HHVA	Household Vehicle Used for Trip	1	Yes
82		HHVB		2	No

Order	Type	Variable Name	Variable Label	Response Category	Response Category Description
82		HHVC		98	Don't Know
82		HHVD		99	Refused
82		HHVE			
83	Numeric	HHVWHA	Household Vehicle make and model	Code List	See attached code list
83		HHVWHB		98	Don't Know
83		HHVWHC			
83		HHVWHD			
83		HHVWHE			
84A	Numeric	TRACT1-3A	Activities did for 15 minutes	1	Work
84B		TRACT1-3B		2	Eating, Sleeping, or Personal Grooming
84C		TRACT1-3C		3	Recreation, Entertainment, or Visiting
84D		TRACT1-3D		4	None of these activities
84E		TRACT1-3E		99	Refused
85	Numeric	STOP	Stop anywhere	1	Yes
85				2	No
86	Numeric	STOPOTH	Stop anywhere else	1	Yes
86				2	No
87	Numeric	PARKA	Parking location	1	In a parking lot
87		PARKB		2	In a parking structure/parking garage
87		PARKC		3	On the street
87		PARKD		4	In a driveway or garage
87		PARKE		5	Alley
87				6	At gas pump
87				7	On the car ferry
87				8	Carport
87				9	Did not park/Drove through/Dropped off/Picked up
87				10	In the woods/At a park/job site/Off road
87				11	Doing a turn around
87				12	Waiting area
87				13	Assigned parking space
87				14	Service area/Bay/Load zone
87				15	Ferry terminal/Dock
87				16	Inside a building
87				17	On the grass/Yard
87				18	Ferry
87				96	All other miscellaneous responses
87				97	None/Nothing
87				98	Don't Know
87				99	Refused
89	Numeric	PARKLOTA	Used a park and ride lot	1	Yes
89		PARKLOTB		2	No

Order	Type	Variable Name	Variable Label	Response Category	Response Category Description
89		PARKLOTC			
89		PARKLOTD			
89		PARKLOTE			
90	Numeric	PARKWHA	Park and ride lot used	(1-250)	Use code list
90		PARKWHB			
90		PARKWHC			
90		PARKWHD			
90		PARKWHE			
91	Numeric	PPAYA	Pay for Parking	1	Yes
91		PPAYB		2	Nothing
91		PPAYC		98	Don't Know
91		PPAYD		99	Refused
91		PPAYE			
92	Alphanum	PARKAMTA	Amount Paid for Parking	0.01-9000.99	Valid Range
92		PARKAMTB			
92		PARKAMTC			
92		PARKAMTD			
92		PARKAMTE			
93	Numeric	PARKRATA	Parking Rate	1	Hourly
93		PARKRATB		2	Daily
93		PARKRATC		3	Monthly
93		PARKRATD		4	Annually
93		PARKRATE		5	Bi-Weekly
93				6	Per Semester
93				7	One-Time Rate
93				8	Quarterly
93				9	Meter
93				96	All other miscellaneous responses
93				97	None/Nothing
93				98	Don't Know
93				99	Refused
95	Numeric	ATIME	Time of Arrival - Hour/Minute	Value	Value
96	Numeric	ADAY	Time of Arrival - Day 1/Day 2	1	Day 1
96				2	Day 2
97	Numeric	HOURCHK	Trip took over 1 hour	1	Yes
97				2	No
97				98	Don't Know
97				99	Refused
97B	Numeric	DWHERE	Location (SLOCATE_# and LOCATE_#)	1	Home
97B				2	Primary workplace
97B				3	Secondary workplace

Order	Type	Variable Name	Variable Label	Response Category	Response Category Description
97B				4	School
97B				5	Previously reported location
97B				6	New location
97B				10	Out of town
98	Alphanum	DEST	Destination of Trip	Text	Text
99	Alphanum	ODADDR	Original Destination Address	Text	Text
100	Alphanum	DCITY	Destination City	Text	Text
101	Alphanum	DSTATE	Destination State	Text	Text (50 States)
101				1	Washington
101				2	California
101				3	Texas
101				4	Arizona
101				6	Canada
101				7	Florida
101				8	New York
101				9	Nevada
101				10	Out of town
101				11	Mexico
101				12	Colorado
101				13	Idaho
101				14	Alaska
101				97	None/Nothing
101				98	Don't Know
101				99	Refused/No response
102	Alphanum	DZIP	Destination Zip Code	Text	Text
102				99998	Don't Know
102				99999	Refused
103	Alphanum	DXSTS	Destination Cross Streets	Text	Text
103A	Alphanum	DADDR	Geocoded Destination Address	Text	Text
105	Numeric	DESTSCOR	Destination Score	(0-100)	Range
106	Alphanum	DESTSTAT	Destination Status	Text	Text (M, T, U)
107	Numeric	DESTLOCN	Destination Location Name	1	KingAddr
107				2	KingStr
107				3	KitsapAddr
107				4	KitsapStr
107				5	PierceAddr
107				6	Pierce Str
107				7	SnohomishAddr
107				8	SnohomishStr
107				97	None (If Geododing is >2 will be None)
108	Alphanum	DESTARCS	Destination Arc Street	Text	Text

Order	Type	Variable Name	Variable Label	Response Category	Response Category Description
109	Alphanum	DESTSTAD	Destination standard address	Text	Text
110	Alphanum	DESTSS	Destination side of the street	Text	Text (L,R)
111	Alphanum	DZONE	Destination TAZ	Text	Text
111				88888888	Unknown Zone
112	Alphanum	DESTX	Destination X	Value	Value (13.6)
112				0000000.000000	Unknown X
113	Alphanum	DESTY	Destination Y	Value	Value (12.6)
113				000000.000000	Unknown Y
114	Numeric	DTYPE	Destination Type of Location	1	Residential
114				2	Automotive Dealer/Repair
114				3	Bank/Financial Institution (Unknown)
114				4	Barber/Beauty/Nail Salon (Unknown)
114				5	Bookstore/Library/Newsstand (Unknown)
114				6	Construction Site
114				7	Convenience/Drug Store (Unknown)
114				8	Daycare Facility/Preschool/Nursery School
114				9	Gas Station
114				10	Government/Municipal/City Offices/Library/Fire Station/ Post Office/Dump/Recycling Center
114				11	Grocery
114				12	Hotel/Motel/Other Lodging Facility
114				13	Indoor Recreation - gym/health club, skating rink (unknown)
114				14	Industrial Site/Manufacturing Plant
114				15	Medical Facility/Hospital
114				16	Movie Theater/Theatre/Concert Venue/Sports Arena (Unknown)
114				17	Museum/Zoo/Historic Site
114				18	Office Building
114				19	Outdoor Recreation - Park, Athletic Field, Beach
114				20	Religious - Church/Synagogue/Houses of Worship
114				21	Restaurant/Fast Food/Bar & Grill (Unknown)
114				22	School - K-12
114				23	School - College/University/Technical/Vocational
114				24	Shopping Mall/Department Store (Unknown)
114				25	Transportation Station, Stop, Terminal (airport, train, bus)/Park and Ride lot
114				26	Bank/Financial Institution (Enclosed Mall)
114				27	Bank/Financial Institution (Standalone or Strip Mall)
114				28	Barber/Beauty/Nail Salon (Enclosed Mall)
114				29	Barber/Beauty/Nail Salon (Standalone or Strip Mall)
114				30	Bookstore/Library/Newsstand (Enclosed Mall)

Order	Type	Variable Name	Variable Label	Response Category	Response Category Description
114				31	Bookstore/Library/Newsstand (Standalone or Strip Mall)
114				32	Convenience/Drug Store (Enclosed Mall)
114				33	Convenience/Drug Store (Standalone or Strip Mall)
114				34	Indoor Recreation (Enclosed Mall)
114				35	Indoor Recreation (Standalone or Strip Mall)
114				36	Movie Theater/Theatre/Concert Venue/Sports Arena (Enclosed Mall)
114				37	Movie Theater/Theatre/Concert Venue/Sports Arena (Standalone or Strip Mall)
114				38	Restaurant/Fast Food/Bar & Grill (Enclosed Mall)
114				39	Restaurant/Fast Food/Bar & Grill (Standalone or Strip Mall)
114				40	Shopping Mall/Department Store (Enclosed Mall)
114				41	Shopping Mall/Department Store (Standalone or Strip Mall)
114				42	Senior Care (Assisted Living/Retirement Communities/Nursing Homes etc.)
114				43	Retail (Retail Shops/Unspecified Sales)
114				44	Agriculture (Farms/Dairy, Egg Production etc.)
114				45	Other Academic (Unspecified Teaching/School Administration/Dance Classes/Karate Classes etc.)
114				46	Animal Care/Control (Veterinary/Boarding/Grooming/Supplies etc.)
114				47	Military
114				48	Non-Profit
114				49	Cemeteries
114				50	Utilities (Gas/Electric/Water/Waste Disposal etc.)
114				51	Indoor Work (Non-Industrial Labor/Small Production)
114				52	Commercial Services (Shipping/Packaging/Plumbing/Tailoring etc.)
114				53	Art gallery/studio
114				54	Car wash
114				55	Casino
114				56	Community center/Meeting hall/Convention center
114				57	Marina/Yacht Club
114				58	Photo studio
114				59	Storage facility
114				60	Taking a walk/Street/Intersection (unspec.)
114				61	Warehouse/Wholesaler
114				62	Video store
114				63	Work related/Job site
114				64	Resort/Vacation
114				65	Nursery/Garden

Order	Type	Variable Name	Variable Label	Response Category	Response Category Description
114				66	Rental facility
114				67	Lumber yard/Store
114				68	Clubs/County Club/Social club
114				69	Tattoo parlor
114				70	Downtown area
114				71	Bakery
114				72	Music store/Shop
114				73	Public market/Outdoor market/Fruit stand
114				74	Home Improvement/Builder's store
114				75	Tanning Salon
114				76	Winery
114				77	Computers/Software
114				78	Manufacturers Rep
114				79	Self-Employed
114				80	Aerospace
114				81	Airline/Air craft/Aviation
114				82	Architecture
114				83	Insurance/Health insurance
114				84	Marketing/Market Research/Public Relations/Advertising
114				85	Consulting services
114				86	Engineering
114				87	Entertainment
114				88	Legal/Law
114				89	Real Estate/Property Management
114				90	Contractor
114				91	Travel
114				92	Counseling
114				93	Design/Clothing/Graphics/Arts/Crafts/Pottery
114				94	Accounting/Bookkeeping/CPA
114				95	Newspaper/Media/Publishing/Writer/Editor
114				96	Professional Services
114				97	Communications
114				98	Distribution/Distributor
114				99	Library
114				100	Technology/Electronics
114				101	Telecommunication/Phone
114				102	Mangement
114				103	Research
114				104	Collections/Collection Agency
114				105	Trucking
114				106	Technical

Order	Type	Variable Name	Variable Label	Response Category	Response Category Description
114				107	Union
114				996	All other miscellaneous responses
114				997	None/Nothing
114				998	Don't Know
114				999	Refused/No response
115	Numeric	DLCFREQ	How often do you visit location	1	Never before
115				2	Very rarely
115				3	1-10 times per year
115				4	1-3 times per month
115				5	Once per week or more
115b	Numeric	DLCMD1	Used other modes of travel	1	No
115b		DLCMD2		2	Yes, by car
115b		DLCMD3		3	Yes, by transit
115b		DLCMD4		4	Yes, by bicycle
115b				5	Yes, by foot
115c	Numeric	DLCMR	Main reason you did not use mode of travel	1	Did not have time
115c				2	Was not convenient
115c				3	Car was not available
115c				5	Someone gave me a ride
115c				6	Too expensive
115c				7	Already in the car/Already had the car
115c				8	Had things to carry
115c				9	Get some exercise/Felt like walking
115c				10	It was on my way
115c				11	Too far/Health problems
115c				12	Weather
115c				13	It was close
115c				14	More convenient
115c				15	Picking up/Dropping off people
115c				16	Had other things to do/Errands to run
115c				17	Don't drive/Don't have a car
115c				18	Tired
115c				19	Not necessary/Didn't feel like it/Transportation provided
115c				20	Carpool
115c				21	Transportation was not available/Not working
115c				22	Was late in the day
115c				23	Took car in for repairs
115c				24	Had other passengers
115c				25	Saving gas/Gas prices
115c				96	All other miscellaneous responses
115c				97	None/Nothing

Order	Type	Variable Name	Variable Label	Response Category	Response Category Description
115c				98	Don't Know
115c				99	Refused
116	Numeric	DACT1	Primary Activity at Destination	1	Home - Paid Work
116	Numeric	DACT2	2nd Activity at Destination	2	Home - Other
116	Numeric	DACT3	3rd Activity at Destination	3	Work
116	Numeric	DACT4	4th Activity at Destination	4	Attend Childcare
116				5	Attend School
116				6	Attend College
116				7	Eat Out
116				8	Personal Business
116				9	Everyday Shopping
116				10	Major Shopping
116				11	Religious/Community
116				12	Social
116				13	Recreation - Participate
116				14	Recreation - Watch
116				15	Accompany Another Person
116				16	Pick-Up/Drop-Off Passenger
116				17	Turn Around
116c	Numeric	DLCWHY	Reason went to location at time	1	I had an appointment for that time
116c				2	I usually go there at that time
116c				3	It was the most convenient time to go
116c				4	I stopped off on my way to somewhere else
116c				5	Personal Business/Errand
116c				6	Wante to/Was hungry
116c				7	An event/Class was scheduled at that time
116c				8	Dropping off/Picking up people
116c				9	Vacation/Spring break
116c				10	Walking/Exercise
116c				11	Convenient place
116c				12	With another person
116c				13	Transportation schedule/Bus/Ferry
116c				14	Someone else chose it
116c				15	Emergency
116c				16	Need to go there/Had what I needed
116c				17	I live there
116c				96	All other miscellaneous responses
116c				97	None/Nothing
116c				98	Don't Know
116c				99	Refused
117	Numeric	LONGTRIP	Trip Length Longer than Usual	1	Yes

Order	Type	Variable Name	Variable Label	Response Category	Response Category Description
117				2	No
117				98	Don't Know
117				99	Refused
118	Numeric	REASLT	Reason longer trip than usual	1	Weather (rain or snow)
118				2	Construction
118				3	An accident
118				4	Traffic congestion
118				96	Other
118				98	Don't Know
118				99	Refused
119	Numeric	TRAV1	Did Respondent Leave Location Day 1	1	Yes - Traveled From Origin Location
119				2	No - Stayed at Origin Location til End of 48-hours
120	Numeric	NOTRAV1	Did you stay at the same place on day 1	1	Yes
120				2	No
121	Numeric	WHYNO1	Reason for No Travel Day 1	1	Sick/Ill/Surgery
121				2	Other household member sick/ill
121				3	Worked at home
121				4	Vacation
121				5	Social
121				6	Just stayed home/Did not need to go out
121				7	Away at school
121				8	Baby/Child/Babysitting/Relative
121				9	Out of town for work/funeral
121				10	Retired
121				11	Family emergency
121				12	Car not available/Not working
121				13	Visiting relative
121				14	Unemployed
121				15	Disabled
121				16	Because of gas prices
121				17	Bad weather
121				18	Home schooled
121				19	Worked
121				20	Military service
121				21	Death in family
121				22	Stayed home, financial reasons
121				96	All other miscellaneous responses
121				97	None/Nothing
121				98	Don't Know
121				99	Refused
123	Numeric	TRAV2	Did Respondent Leave Location Day 2	1	Yes - Traveled From Origin Location

Order	Type	Variable Name	Variable Label	Response Category	Response Category Description
123				2	No - Stayed at Origin Location til End of 48-hours
124	Numeric	NOTRAV2	Did you stay at the same place on day 2	1	Yes
124				2	No
125	Numeric	WHYNO2	Reason for No Travel Day 2	1	Sick/Ill/Surgery
125				2	Other household member sick/ill
125				3	Worked at home
125				4	Vacation
125				5	Social
125				6	Just stayed home/Did not need to go out
125				7	Away at school
125				8	Baby/Child/Babysitting/Relative
125				9	Out of town for work/funeral
125				10	Retired
125				11	Family emergency
125				12	Car not available/Not working
125				13	Visiting relative
125				14	Unemployed
125				15	Disabled
125				16	Because of gas prices
125				17	Bad weather
125				18	Home schooled
125				19	Worked
125				20	Military service
125				21	Death in family
125				22	Stayed home, financial reasons
125				96	All other miscellaneous responses
125				97	None/Nothing
125				98	Don't Know
125				99	Refused
127	Alphanum	WKHMS1	Paid Work at Home Time Periods	Text	Text
127		WKHME1			
127		WKHMS2			
127		WKHME2			
128	Numeric	DDONE	Did not go anywhere else	1	Yes - No more travel
128				2	No - Continue recording travel
130	Numeric	DELIV	Interim Delivery	1653	1653 Household Delivery (as of 5/24/06)
130				4504	4504 Household Delivery (as of 6/30/06)
130				4746	4746 Household Delivery (September)
131	Numeric	STATUS	Geocoding HH status (internal variable)	1	Household removed, they are in data cells with quota closed
131				2	Household agreed upon to remove (no trips)
131				3	PSRC to remove

Order	Type	Variable Name	Variable Label	Response Category	Response Category Description
131				4	Household 20% or more non-geocodable
131				5	Household with 25% or less non-geocodable
131				6	4+ household incomplete
132	Numeric	ACCEPT	PSRC Accept (BLANK)	0	Not Acceptable
132				1	Acceptable
133	Numeric	ASSURE	NON-GPS Household	1	Yes
134	Numeric	GPS	GPS Household	1	Yes
135	Numeric	FUTURE	Willing to Participate in the Future	1	Yes
135				2	No
135				98	Don't Know

Please use the following codes for any Variables that are missing response codes for Other, Don't Know, and Refused:

6, 96, 996, 9996, 99996, etc. = Other/Other Specify

8, 98, 998, 9998, 99998, etc. = Don't Know

9, 99, 999, 9999, 99999, etc. = Refused

E. Expansion and Re-weighting of the PSRC Household Travel Survey

Report to Puget Sound Regional Council

Expansion and Re-weighting of the PSRC Household Survey Data

January 15, 2007

Mark Bradley Research and Consulting
Cambridge Systematics
MORPACE International

1. Introduction
This memo describes the method and results for expanding the 2006 Household survey data and then re-weighting the data to match Census target data along several key dimensions.

2. Preliminary expansion by sampling region and area type
The first round of expansion only takes account of sampling rates within the five sampling regions (the four counties, with King County split into City of Seattle and Rest of King), and whether or not a household was inside one of the ZIP+2 high transit access areas used for sample enrichment ("oversampling").

The numbers used for this expansion are shown in Table 1. The first section shows the estimated number of actual households located inside and outside the high transit access areas in each region. This was done by using a GIS overlay of ZIP+2 and Census Block boundaries and 2000 Census data to determine the fraction of households inside and outside the areas in each region in 2000, and then factoring up those numbers to match the actual number of households in 2005 from the 2005 American Community Survey (ACS) data—the most recent Census data available.

Next in Table 1, the survey households are broken down into this same 5 region x 2 area type classification, using the same GIS ZIP+2 overlay with the geocoded XY coordinates of each survey household. The numbers are shown separately for households that were contacted via random digit dialing (RDD sample) and households that were contacted via the ZIP+2 are dialing lists for selected high transit access areas. Note that out of the 699 oversample households, 25 are found to be located outside of the transit areas. This indicates that the ZIP+2 phone lists contained some slight inaccuracies, but were very successful overall in finding households in high transit access areas.

The first set of expansion factors in Table 1 were calculated for the RDD sample only, by dividing the first set of numbers by the second set. As one would expect from a randomly distributed sample, the computed factors are very similar inside and outside the transit areas. The

similarity between the numbers in the two rows gives us some confidence in the GIS method used to classify households in and out of the transit areas.

Table 1: Expansion by Sampling Region and Area Type

Sampling area	Seattle	Rest of King	Snohomish	Pierce	Kitsap	Total
2005 Census data						
1- Out of Transit Areas	6917	308692	194788	250733	91674	852805
2- In Transit Areas	254457	175978	59223	32244	2722	524623
Total	261374	484670	254011	282977	94396	1377428
RDD sample HH						
1- Out of Transit Areas	28	752	525	542	576	2423
2- In Transit Areas	915	332	155	65	15	1482
Transit oversample HH						
1- Out of Transit Areas	3	11	9	2	0	25
2- In Transit Areas	443	158	40	31	2	674
Total enriched sample HH						
1- Out of Transit Areas	31	763	534	544	576	2448
2- In Transit Areas	1358	490	195	96	17	2156
Expansion factors for RDD sample only						
1- Out of Transit Areas	247.04	410.49	371.03	462.61	159.16	351.96
2- In Transit Areas	278.10	530.05	382.08	496.06	181.47	354.00
Expansion factors for enriched sample						
1- Out of Transit Areas	223.13	404.58	364.77	460.91	159.16	348.37
2- In Transit Areas	187.38	359.14	303.71	335.88	160.12	243.33

The final rows in Table 1 show the expansion factors for the total enriched sample, calculated by dividing the numbers in the first rows by the number of HH in the total enriched sample. As one would expect, the expansion factors outside of the of the transit areas remain very similar to those for the RDD sample only, while the expansion factors for households inside the transit areas are much lower due to the fact that there are many more such households in the enriched sample.

Note that 142 survey households were not included in the expansion, and are given an expansion weight of 0 for any weighted analyses. The households are:
- 92 households that were recruited at park and ride lots
- 18 households that were recruited on-board ferries
- 32 RDD households whose addresses could not be geocoded

3. Re-weighting the data to match Census-based targets
Household travel surveys typically tend to obtain lower contact rates and/or response rates for certain types of households. The types of households that are typically under-represented in the data are:

- Households that only contain young adults
- Very low income households
- Households that do not own vehicles
- Very large households

To adjust for the possibility of such differences in contact and response rates, the survey households were re-weighted to simultaneously match Census-based target data for:

- Household size distribution
- Household vehicle ownership distribution
- Household number of workers distribution
- Household income distribution
- Household lifecycle distribution

The data used for these targets was provided by PSRC staff, and is shown in Table 2.

The survey households were classified into these same categories. The categorization for the number of persons, vehicles and workers is straightforward. For income, there were about 6% of the survey households whose income is only known within ranges of $50,000 (0-50K, 50K-100K, >100K) and a further 6% whose income is not known at all. For expansion purposes, those households were pseudo-randomly classified into one of the possible income categories based on the final digits in their serial ID number. The classification for lifecycle is based on the number of adults in the household, the age of the oldest adult, and the ages of any children under 18.

Table 3 shows the further percentage adjustment that is needed to match each of these targets when only the first-pass expansion factors are applied. By definition, the targets for total in each region and for inside and outside the transit oversample areas were matched exactly, as those targets were used to calculate the first-pass expansion. The table shows in bold type all cells that need to be adjusted by more than one third (33.3%).

The largest adjustment is need for the young adult households. Both lifecycle categories for young adult households with no children need to be adjusted upward by about 200% (in other words, the expansion factors need to be tripled). The largest underrepresentation is in Kitsap County, but it is true in all counties. Households with children also need to be adjusted upwards outside of King County. Low income households, households with 3+ workers, and households with no vehicles also need to be adjusted upwards in all regions.
Larger households need to be adjusted upwards outside of King County. There are very few cells that need downward adjustment by more than 33%.

Table 2: Targets for (Re)Weighting the Data, Based on 2005 ACS Data

	Seattle	Rest of King	Snohomish	Pierce	Kitsap	Total
Total	261374	484670	254011	282977	94396	1377428
Household size						
1- 1 person	114274	126065	64792	73690	24929	403750
2- 2 persons	84450	170541	88800	97849	32361	474001
3- 3 persons	28529	72929	37909	43138	14770	197275
4- 4+ persons	34121	115135	62510	68300	22336	302402
Car ownership						
1- No vehicles	42623	28966	12350	15728	2965	102632
2- 1 vehicle	110666	147334	70617	85901	29396	443914
3- 2 vehicles	77034	194314	97700	109717	35228	513993
4- 3+ vehicles	31051	114056	73344	71631	26807	316889
Workers in household						
1- No workers	60766	97030	54616	68234	24082	304728
2- 1 worker	111534	207104	95137	116738	36650	567163
3- 2 workers	78187	149909	87515	82368	28947	426926
4- 3+ workers	10887	30627	16743	15637	4717	78611
Household income						
1- Less than $10,000	24357	22120	15355	21851	5643	89326
2- $10,000 - 19,999	29314	39494	22101	26008	9643	126560
3- $20,000 - 29,999	25995	41784	23468	30856	9941	132044
4- $30,000 - 39,999	27606	43188	27757	33176	10011	141738
5- $40,000 - 49,999	24178	49631	29327	31340	8980	143456
6- $50,000 - 59,999	19483	34558	17863	29120	10669	111693
7- $60,000 - 69,999	18136	38336	21878	24061	8211	110622
8- $70,000 - 79,999	13990	30383	16261	18702	5658	84994
9- $80,000 - 89,999	11436	29230	17885	12643	5648	76842
10- $90,000 - 99,999	12002	26100	12997	10396	4609	66104
11- $100,000 or more	54877	129846	49119	44824	15383	294049
Household lifecycle						
1- Young children, 1-5	24874	63165	37787	45018	15882	186726
2- School children, 6-17	28774	104572	51192	59342	17118	260998
3- Young adult, 18-34	32331	22315	9886	14133	4603	83268
4- Mid - adult, 35-64	56661	73810	38283	37629	13558	219941
5- Older- adult, 65 +	25282	29940	16398	21928	6768	100316
6- Young 2+ adult, 18-34	30962	30472	17137	16059	5338	99968
7- Mid 2+ adult, 35-64	42761	108270	59894	59882	20148	290955
8- Older 2+ adult, 65 +	19729	52126	23434	28986	10981	135256

Table 3: Further percentage adjustment needed after first-pass expansion

	Seattle	Rest of King	Snohomish	Pierce	Kitsap	Total
Total	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Sampling area						
1- Out of Transit Area	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
2- In Transit Area	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Household size						
1- 1 person	6.6%	-7.5%	-16.8%	-10.7%	0.4%	-5.8%
2- 2 persons	0.6%	7.5%	-13.9%	-14.3%	-30.6%	-6.4%
3- 3 persons	-14.0%	-3.5%	**34.1%**	**39.7%**	25.4%	9.8%
4- 4+ persons	-8.1%	0.8%	**39.9%**	23.5%	**100.5%**	15.2%
Car ownership						
1- No vehicles	**89.6%**	**193.1%**	**160.5%**	**89.4%**	9.4%	**113.3%**
2- 1 vehicle	-1.9%	10.0%	-9.1%	2.4%	11.2%	2.1%
3- 2 vehicles	-18.9%	-7.0%	-6.0%	-13.7%	-7.4%	-10.3%
4- 3+ vehicles	0.1%	-13.5%	8.4%	12.5%	-1.5%	-1.4%
Workers in household						
1- No workers	-3.9%	-12.3%	-16.9%	-9.9%	-32.5%	-13.2%
2- 1 worker	2.0%	3.7%	-8.1%	-3.9%	14.0%	0.2%
3- 2 workers	-3.9%	1.7%	19.9%	6.9%	23.7%	6.2%
4- 3+ workers	**44.6%**	13.8%	**42.0%**	**79.4%**	**48.2%**	**35.2%**
Household income						
1- Less than $10,000	**176.6%**	**88.7%**	**145.2%**	**154.3%**	**61.0%**	**129.7%**
2- $10,000 - 19,999	**83.6%**	**104.4%**	33.2%	5.9%	**51.3%**	**52.8%**
3- $20,000 - 29,999	27.3%	**56.6%**	-4.0%	29.4%	**45.3%**	29.2%
4- $30,000 - 39,999	29.9%	**39.5%**	27.6%	10.7%	-3.2%	24.0%
5- $40,000 - 49,999	-3.8%	3.4%	-9.3%	-9.6%	-22.7%	-5.5%
6- $50,000 - 59,999	-23.5%	-33.3%	-26.7%	-16.3%	17.6%	-23.2%
7- $60,000 - 69,999	-18.4%	-29.4%	-7.7%	-7.7%	-9.5%	-18.3%
8- $70,000 - 79,999	-31.9%	-28.1%	-25.7%	**-34.9%**	-27.5%	-29.9%
9- $80,000 - 89,999	**-35.6%**	-6.1%	-2.9%	-13.3%	10.9%	-11.7%
10- $90,000 - 99,999	-23.2%	-29.0%	-33.2%	-24.6%	**-35.6%**	-28.8%
11- $100,000 or more	-19.5%	-1.5%	9.6%	3.3%	-12.1%	-3.8%
Household lifecycle						
1- Young children, 1-5	-15.0%	3.2%	**41.6%**	26.7%	**112.3%**	16.6%
2- School children, 6-17	-14.1%	6.5%	**35.6%**	**36.9%**	**36.1%**	15.8%
3- Young adult, 18-34	**238.3%**	**129.9%**	**212.7%**	**193.2%**	**621.5%**	**198.7%**
4- Mid - adult, 35-64	-17.5%	-12.8%	-21.1%	-31.7%	-11.3%	-19.2%
5- Older- adult, 65 +	-12.7%	-28.7%	**-37.5%**	-2.9%	-24.1%	-22.1%
6- Young 2+ adult, 18-34	**267.2%**	**334.7%**	**147.3%**	**150.4%**	**738.0%**	**239.8%**
7- Mid 2+ adult, 35-64	-23.4%	-4.2%	-16.4%	-17.1%	-30.8%	-14.9%
8- Older 2+ adult, 65 +	-27.5%	-24.4%	-29.1%	-32.5%	**-44.4%**	-29.5%

The procedure for matching all of these targets simultaneously was to use iterative proportional fitting (IPF), also commonly referred to as "Fratar". A program was written to cycle through the six sets of targets in Table 3, adjusting the sample expansion factors to match each target in each region. After 10 iterations through the targets, the summed expansion weights across the sample match all of the targets simultaneously (i.e. all of the cells in Table 3 become zero).

The final adjusted expansion factors wee provided to PSRC as variable EXPFAC2 in SPSS data file HHLDEXP.SAV.

F. Description of Travel Activity Files

Travel Activity Files for Tour and Trip Analysis

For the analysis of tours and trip-making, the consultants created three activity files from the 2006 Puget Sound Regional Travel Survey data. These are based on the trip, tour, and person-day.

File TRGEN01.SAV is an SPSS file with 21,032 person-day records. The records are sorted by QNO, PERNUM, and DAY. Any household and person variables can be attached using those IDs. The variables are as follows:

- qno   'household id'
- pernum   'person number in household'
- day   'diary day'
- perstype 'person type'
- ntrips   'number of trips in person day'
- begathom 'person day begins at home?'
- endathom 'person day ends at home?'
- hbtours   'number of home-based tours in person day'
- wbtours   'number of work-based subtours in person day'
- primtour 'sequence # of primary tour of day'
- primtype 'purpose type of primary tour of day'
- primstrs 'subtours as part of primary tour'
- primsbef 'trips on first half of primary tour'
- primsaft 'trips on second half of primary tour'
- worktrs   '# of home-based work tours in person day'
- schotrs   '# of home-based school tours in person day'
- escotrs   '# of home-based escort tours in person day'
- perbtrs   '# of home-based pers.business tours in person day'
- shoptrs   '# of home-based shopping tours in person day'
- mealtrs   '# of home-based meal tours in person day'
- socltrs   '# of home-based social tours in person day'
- recrtrs   '# of home-based recreation tours in person day'
- worksts   '# of extra work stops in person day'
- schosts   '# of extra school stops in person day'
- escosts   '# of extra escort stops in person day'
- perbsts   '# of extra pers.business stops in person day'
- shopsts   '# of extra shopping stops in person day'
- mealsts   '# of extra meal stops in person day'
- soclsts   '# of extra social stops in person day'
- recrsts   '# of extra recreation stops in person day'

- travdur   'min spent in travel in person day'
- workdur   'min in out-of-home work activities in person day'
- schodur   'min in out-of-home school activities in person day'
- escodur   'min in out-of-home escort activities in person day'
- perbdur   'min in out-of-home pers.business activities in person day'
- shopdur   'min in out-of-home shopping activities in person day'
- mealdur   'min in out-of-home meal activities in person day'
- socldur   'min in out-of-home social activities in person day'
- recrdur   'min in out-of-home recreation activities in person day'.

File TOURS01.SAV is an SPSS file with 26,761 tour records. The records are sorted by QNO, PERNUM, DAY and TOUR. Any household and person variables can be attached using those IDs. The variables are all the same as in TRGEN01.SAV, plus the following additional variables:

- tour   'tour sequence # in day'
- parent   'for subtours, sequence # of parent work tour'
- subtrs   'number of child work-based subtours'
- pdpurp   'purpose type at primary destination'
- pddura   'activity duration at primary destination'
- tlvorig   'trip # leaving tour origin'
- tardest   'trip # arriving primary destination'
- tlvdest   'trip # leaving primary destination'
- tarorig   'trip # arriving tour origin'
- lvorig   'time leaving tour origin'
- ardest   'time arriving primary destination'
- lvdest   'time leaving primary destination'
- arorig   'time arriving tour origin'
- toadtyp   'tour origin address type'
- tdadtyp   'tour destination address type'
- totaz   'tour origin taz'
- tdtaz   'tour destination taz'
- mainmode 'tour main mode'
- tripsh1   '# of trips in first half tour'
- tripsh2   '# of trips in second half tour'
- priority   'tour priority type'.

File TRSEG01.SAV is an SPSS file with 74,848 tour segment (trip) records. The records are sorted by QNO, PERNUM, DAY, TOUR, HALFT, and TSEQ. Any household and person variables can be attached using those IDs. Any trip-level variables can be attached using variable TRIPNUM. The variables are all the same as in TOURS01.SAV, plus the following additional variables:

- halft   'half tour #'
- tseq   'trip sequence # within half tour'
- tripnum   'trip # in raw data file'
- opurp   'purpose at trip origin'
- dpurp   'purpose at trip destination'
- oadtyp   'trip origin address type'
- dadtyp   'trip destination address type'
- otaz   'trip origin taz'
- dtaz   'trip destination taz'
- mode   'trip mode'
- deptime   'trip departure time'
- tripdur   'trip duration'
- actdur   'destination activity duration'.

Categorical variables in the three files are defined as follows:

- perstype
    1 'full-time worker'
    2 'part-time worker'
    3 'retired nonworker'
    4 'other nonworker'
    5 'adult student'
    6 'grade school 16+'
    7 'child age 5-15'
    8 'child age 0-4'

- begathom endathom
    0 'no'
    1 'yes'

- primtype pdpurp opurp dpurp
    0 'home' ('no tours' for primtype)
    1 'work'
    2 'school'
    3 'escort'

    4 'personal business'
    5 'shopping'
    6 'meal'
    7 'social'
    8 'recreation'

- toadtyp tdadtyp oadtyp dadtyp
    1 'home'
    2 'usual work'
    3 'usual school'
    4 'other'
    5 'missing'

- mainmode mode
    0 'others'
    1 'school bus'
    2 'drive to ferry'
    3 'drive to transit'
    4 'walk to ferry'
    5 'walk to transit'
    6 'shared ride 3+'
    7 'shared ride 2'
    8 'drive alone'
    9 'bike'
    10 'walk'

- priority
    1 'primary HB tour'
    2 'secondary HB tour'
    3 'work-based subtour'.

G. Global Positioning System Travel Survey

2006 PSRC GPS-Assisted Household Activity and Stated Preference Survey

Technical Memorandum
GPS Travel Survey
12/21/06

Introduction

ECONorthwest (ECO) was subcontracted by MORPACE International Inc. (MORPACE) to conduct the GPS component of the Puget Sound Regional Council's 2006 GPS-Assisted Household Activity and Stated Preference Survey. The 12-week survey period began on 3/21/2006 and ended on 6/16/2006. During that time, ECO was responsible for programming the GPS devices and post-retrieval software to provide the GPS time stamping and travel measurement capabilities required of the study. Specifically, it was ECO's responsibility to:

- Collect GPS waypoints relevant to the survey time frame

- Identify trip starts and ends using algorithms that distinguish between periods of motion and periods of no recoded motion

- Match trips logged by the GPS devices with travel reported in the travel diaries using algorithmic and semi-manual methods.

This memorandum presents the methodology and findings from the GPS component of the household travel survey.

Methodology

ECO deployed a total of 150 GPS devices to 285 households with 518 different vehicles over the course of the 12-week survey. GPS data were collected, downloaded, and processed to compile a trip-level database. That database was used to match GPS trips to those reported by in the travel diaries. ECO provided a single Excel workbook that included the original trip-level GPS data, the original trip-level diary data, and several tables of matched trips.

GPS Data Logger

ECO identified a one-piece GPS data logger that can be easily installed by participants. The device can be powered by batteries or cigarette lighter. ECO elected not to include the cigarette lighter adapter for this study to reduce the risk of data loss resulting from mishandling or vehicle electrical problems. The hardware, GPS antenna, and batteries are encased in a single plastic container. The container used for this study measures approximately 4 x 2 x 1 inches in size. The device attaches to the vehicle's dashboard with special double-sided tape. The tape is easy to remove and will not damage surfaces it is affixes to.

Current GPS technology works by using radio frequency to communicate with satellites directly overhead. No GPS device will function without establishing an unobstructed line-of-sight to those satellites. Because this survey was conducted with dashboard-mounted devices, it was necessary to screen out vehicles with metallic or vertical windshields.

The GPS device is programmed with firmware that logs successive waypoints at a specified time interval. That interval was set to 10 seconds so the individual data points could be accurately translated to sets of continuous trips. Positions are only recorded when the vehicle is moving to manage memory and power constraints. Each position includes: date and time, speed, direction, latitude and longitude coordinates, and altitude.

Logistics

ECO and MORPACE conducted a pilot study to confirm data quality, device reliability, and the appropriate timeline for shipment and retrieval of the GPS devices. The findings from that study were combined with assumptions about device and data loss due to theft, mishandling, or malfunction to establish the total number of GPS households needed to successfully retrieve 230 with complete GPS data. It was assumed that five percent of households would never return the devices and 20 percent of households would return one or more devices with missing or corrupt data. Based on those loss rates, it was determined that a 300 GPS household deployment would be adequate to meet the survey's GPS quota.

The total number of GPS household deployments and survey timeline were analyzed to determine the appropriate deployment schedule and necessary inventory of GPS devices. The survey was set to take place over a 12-week period with four possible combinations of two-day travel periods or "waves" per week (Monday-Tuesday, Tuesday-Wednesday, Wednesday-Thursday, and Thursday-Friday). Four waves per week over the course of 12 weeks translates to a total of 48 waves. Therefore, slightly more than six households per wave are needed to deploy 300 households. Assuming that 25 percent of the devices are returned in one week, 50 percent are returned in two weeks, 20 percent are returned in three weeks, and five percent are never returned, the appropriate inventory is 100. Fifty additional devices were programmed and placed on standby in case return rates were slower than expected.

Packaging and Shipping

Each participant household was sent one package that included GPS devices, travel diaries, postage-paid return packaging, a thank you letter, and a single sheet of simple instructions. Those instructions were designed to be understandable for even the most technologically challenged users. The instructions explained device installation (affix tape to the dashboard), activation (pull the plastic tab), and removal (pull on the tape).

During the study, MORPACE periodically furnished electronic lists of new GPS participants. The devices were programmed, packaged, and shipped to those participants two days before their survey travel dates. A participant would generally receive the package one day prior to the first day of recorded travel. That provided enough time to read the instructions, install the device, and activate the power supply before beginning recorded travel. The participants were instructed to return materials after the survey by either dropping the package off to a FedEx location or contacting MORPACE so that a courier pickup could be arranged. The packages were sent to participants using FedEx's "Priority Overnight" shipping service and they were returned using FedEx's "Second-day Air."

MORPACE was forwarded a spreadsheet on a daily basis that tracked the survey's progress and the disposition of each unit and diary. That "GPS Status Update" contained a summary of all survey activities and device/vehicle-level information. MORPACE used that information to adjust the deployment schedule and follow up with delinquent households or households that failed to return a portion of the survey materials. The devices and travel diaries were returned to ECO in one return package and then ECO forwarded the diaries to MORPACE.

Data Processing

Each package was returned directly to ECO's Portland office. Upon receipt, packages were immediately opened and inspected to ensure that all GPS devices and travel diaries were accounted for. The GPS data were immediately downloaded and inspected to confirm completeness (i.e. data were not corrupt and movement was logged during the household's travel days). However, it was not uncommon for a household to retain the diaries. The instructions offered participants the option to verbally transmit all diary contents to a MORPACE representative via telephone instead of sending back their diaries. When travel diaries were returned with the GPS devices, ECO also visually confirmed that travel reported in the diaries seemed reasonably consistent with movement logged in the GPS devices. Once the data were successfully downloaded, the device's memory was cleared and the unit was programmed for redeployment.

Results

Completed Households

There are two definition of a completed household. The "all or nothing" definition stipulates that a household is completed only if data were successfully retrieved from the devices in every vehicle from that household. The "partial complete" definition applies to multi-vehicle households where data were retrieved from some, but not all of the household vehicles. A partial GPS account of a household's travel is still useful in trip-level travel modeling. This definition credits a percentage that's equal to the share of devices with complete data in a given household (i.e. if data were retrieved from one out of two devices in a household, that household would be considered 50 percent complete).

ECO deployed a total of 285 GPS households with the goal of retrieving complete data from 230 households, or approximately 400 vehicles (assuming an average of 1.75 vehicles per household). Travel data were ultimately retrieved from 415 vehicles. Under the "partial complete" definition of a retrieved household, the survey returned exactly 230 households. Under the "all or nothing" definition, the survey returned 218 households.

Obstacles

There are numerous potential failure-points in the process of deploying GPS devices for travel survey purposes. The devices, and ultimately the data, are in peril at virtually every step of the logging process. To account for those hazards, ECO assumed the aforementioned non-retrieval rate of 25 percent. The actual non-retrieval rate turned out to be very close to that assumption. Again, it was anticipated that five percent of households would never return the devices and 20 percent would return one or more units with missing or corrupt data. In the end, 5.3 percent of households never returned the devices and 18.6 percent of households returned one or more devices with bad data. The majority of those non-retrievals resulted from incorrect installation or non-participation.

It was initially assumed that 230 complete households could be confidently obtained by deploying a total of 300 households. With actual loss rates comfortably below expectation, the only problem came with the fact that many devices were staying in the field too long. Even after deploying all 50 of the backup GPS devices, the number of households in several waves had to be reduced because there were not enough devices on hand. Table 1 summarizes the expected and actual return rates of survey materials.

Table 1: Number of Weeks it Took Participant Households to Return Survey Materials

Duration	Expected % of Households	Actual % of Households
<1 Week	25%	9%
1-2 Weeks	50%	5%
2-3 Weeks	20%	70%
>3 Weeks	0%	11%
Never Returned	5%	5%
Total	100%	100%

Vehicles

A total of 518 GPS devices were shipped to the survey participants during this study and 415 were successfully retrieved. Of those shipped, the average number of vehicles per household was 1.82. The average number of vehicles per household in households where complete data were retrieved was 1.78. Nineteen percent of the partially complete households had two vehicles and three percent had three vehicles. Table 2 summarizes the distribution of this sample according to the number of vehicles in each household:

Table 2: Distribution of Sample by Number of Household Vehicles

Household Type	Total Shipped	Shipped % of Total	Total Retrieved	Retrieved % of Total
One Car	98	34%	81	37%
Two Car	141	49%	102	47%
Three Car	46	16%	35	16%
Total	285	100%	218	100%

Trips

Trips are compiled by collapsing the waypoint data around periods of non-movement. Two parameters are used to convert waypoint data into trips. The first parameter, which registers a trip's beginning by defining the distance that must be traveled before a waypoint is logged, was set to 110 feet. That parameter is known as "GPS wobble" and is necessary because disruptions in a satellite's signal (usually due to weather) can be incorrectly interpreted as movement. The second parameter, which registers a trip's end by defining the amount of time a device must be motionless before a trip is broken, was set to two minutes.

It is difficult, if not impossible, to draw inferences from trip-level GPS data. Travel behavior is very complicated and it does not necessarily correspond to the movement of an individual's car. In many cases, individuals did not even use the family vehicles during their survey period. Table 3 summarizes some descriptive statistics pertaining to the volume of trip-level data from the GPS devices. These data, however, do not begin telling a story until they are aligned with information from the travel diaries.

Table 3: Trip-Level Descriptive Statistics

	Households	Vehicles
Total	225	343
Total Trips	2,942	2,942
Average Trips Per	13.1	8.6
Maximum Trips Per	35	27
Minimum Trips Per	1	1

Trip Matching

ECO's final task was to match trips from the GPS data with the corresponding diary data. The first step in the matching process was algorithmic and the second step was semi-manual. Some households and vehicles could not be matched because of incompleteness in the diary data. Other households never traveled in their household vehicles, so there were no to match. When the GPS and diary data were aligned, 183 households were present in both datasets. Out of the 2,942 total GPS trips, 1,748 were matched algorithmically and 104 were matched semi-manually.

Matching the GPS and diary trips begins with a computer algorithm developed by ECO that analyzes the timing of each trip. The program's primary focus is on finding trips with similar duration among trips that start on or around the same time. The program loops through both datasets, each time permitting an increasingly lax difference between trip start-time and duration. It also matches across vehicles to find situations where the participant(s) misreported which household vehicle was used for a trip. The program is capable of complex matching such as chaining GPS or diary trips to find one-to-many and many-to-one relationships in the data. It does not, however, consider origin or destination locations, mostly because those are often missing from diary data.

Trips that could not be matched algorithmically were separated and, to the extent possible, matched semi-manually. The semi-manual matching is focused on finding trips in the diary data that do correspond to GPS trips, but were severely misreported and not picked up by the program. There are a number of ways trips can be misreported in a way that allows them to be easily matched through visual inspection. The most common is to either report a trip on the wrong day or to report a long trip but make one or more pronounced stops over the course of that trip. The focus of this semi-automated matching was not to force matches on data that are fundamentally different, but to find obvious reporting mistakes. The remaining trips from both datasets were separated and classified as unmatchable.

Conclusion

This GPS travel survey was conducted through a process of generating GPS travel data, arranging that data, and matching it with diary trips. That process was executed as planned and the expected outcome was strikingly similar to the actual survey results.

Lessons Learned

A small number of devices from the first waves suffered damage while in transit. Despite the use of heavily cushioned packages, something occurred during FedEx's shipping process that subjected packages to one or more severe physical shocks. It is impossible to determine exactly what happened to those packages, but shipping preparations in future efforts should account for this. Specifically, medium to large-sized FedEx boxes lined with layers of bubble wrap proved sufficient to keep the problem from persisting.

The process of prequalifying GPS survey candidates is very important because deploying this technology is quite costly. GPS survey participants must cooperate with the survey process so that devices are returned promptly with useful data. The opportunity cost of the time devices are in the field is consequential, especially if the household decides not to participate and no data are recovered. To any extent possible, future emphasis should be placed on stringent screening of these candidates to promote better results and mitigate unnecessary costs.

The only significant obstacle encountered over the course of this survey was the length of time that it took households to return the devices. On average, 86 percent of devices were still in the field two weeks after being deployed. ECO and MORPACE responded by increasing the frequency of post-survey follow-up calls. Those calls proved quite effective and return rates did ultimately improve. Future efforts should adhere to a strict schedule of following up with participant households from the very beginning.