

2015 Dallas Fort-Worth
International Airport
Originating Passenger Survey

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Appendix A – Dallas Fort-Worth Survey Questionnaire

I. Survey Methodology

I.1 Project Overview

The North Central Texas Council of Governments (NCTCOG) commissioned Unison Consulting, Inc. (Unison) to conduct the 2015 North Central Texas Departing Airline Passenger Surveys at Dallas Fort-Worth International Airport (DFW) and Dallas Love Field Airport (DAL). The main purpose of these surveys is to provide updated originating information regarding departing passengers' travel patterns and trip-making behavior after the lifting of the Wright Amendment's flight restrictions at DAL in October 2014. The last airline passenger surveys were performed in 2001 for DFW and 2014 for DAL. This report describes the survey methodology and summary-level findings at DFW.

I.2 Sampling Design

The sampling approach at DFW is based on daily scheduled seats by airline, destination zone, and time period for the survey. To ensure the sample is representative of the airport population, we first used a stratified sampling method based on the distribution of scheduled seats by zone. For example, to determine the market share per zone, we summed up the total number of scheduled seats by zone during the survey period from the Official Aviation Guide (OAG) database. For example, according to the OAG database, 30 percent of scheduled seats for the initial survey period are destined for the Eastern zone. Considering a total sample target of 7,000 originating (O&D) surveys we estimated approximately 2,121 surveys would need to be collected for this zone (Table I-1A).

TABLE I-1A – EXAMPLE OF SAMPLING TARGETS BY DESTINATION ZONE - DFW

Destination Zone	Scheduled Seats	Market Share	Sample Target
Eastern	2,003,517	30%	2,121
Central	1,328,772	20%	1,406
Pacific	1,030,069	16%	1,090
Texas	784,766	12%	831
International	817,258	12%	865
Mountain	608,362	9%	644
Hawaii	40,984	1%	43
Total	6,613,728		7,000

Table I-1B shows the sampling targets based on time period. Considering departing flights during the 12am time period only account for one percent of total flights, the sample target was 56 O&D surveys.

TABLE I-1B – EXAMPLE OF SAMPLING TARGETS BY TIME PERIOD - DFW

Time Period	Scheduled Seats	Market Share	Sample Target
12am	53,072	1%	56
6am	967,161	15%	1,024
9am	1,368,258	21%	1,448
12pm	1,171,230	18%	1,240
3pm	1,309,005	20%	1,385
6pm	1,312,278	20%	1,389
9pm	432,724	7%	458
Total	6,613,728		7,000

Table I-1C shows the sampling targets based on airline. According to OAG data, American Airlines flights account for 85 percent of the market share. Thus, the sample target for O&D passengers traveling with American Airlines was 5,948 surveys.

TABLE I-1C – EXAMPLE OF SAMPLING TARGETS BY AIRLINE - DFW

Airline	Scheduled Seats	Market Share	Sample Target
Aeromexico	11,880	0%	13
Air Canada	13,140	0%	14
Alaska Airlines	36,049	1%	38
American Airlines	5,620,112	85%	5,948
Avianca	4,608	0%	5
Boutique Air	2,565	0%	3
British Airways	20,529	0%	22
Delta Air Lines	256,930	4%	272
Emirates	32,184	0%	34
Etihad Airways	7,826	0%	8
Frontier	32,712	0%	35
Japan Airlines	3,906	0%	4
JetBlue	17,350	0%	18
KLM-Royal Dutch	972	0%	1
Korean Air	10,671	0%	11
Lufthansa	11,025	0%	12
PublicCharters.com	418	0%	0
Qantas Airways	26,784	0%	28
Qatar Airways	17,685	0%	19
Spirit Airlines	248,970	4%	264
Sun Country Airlines	7,416	0%	8
United Airlines	213,157	3%	226
US Airways	12,613	0%	13
Volaris	4,226	0%	4
Total	6,613,728		7,000

1.3 Sampling Instrument

NCTCOG provided a list of information that was required to be collected on a survey, in order for the survey to be considered usable. The required information was the following:

- Geo-codable trip origin
- Destination airport or country
- Trip purpose
- Access mode to the airport
- Parking preference (if parked)
- Transportation cost reimbursement
- Airline
- Flight number

-
- Time of survey
 - Home Information - Zip code or identifiable location for Texas residents; US State/Zip Code or International Country, otherwise.

In addition, NCTCOG specified the following additional information to be collected from each respondent.

- Origin Type
- Travel Time to the Airport
- Size of Travel Party to the Airport (Persons, Vehicles)
- Size of Trip Travel Party
- Trip Duration
- Gender
- Age
- Employment Status
- Ethnicity
- Number of Household Vehicles
- Household Size
- Household Income

At the beginning of each survey, the respondent was asked if he or she was originating from DFW. Respondents who were originating from Dallas Fort-Worth would be offered the full survey. Respondents connecting through DFW would have their survey terminate after that question, but the survey would be recorded and used to calculate the percentage of originating passengers on each flight.

Using the 2014 DAL survey questionnaire as a baseline, Unison developed two separate survey instruments to collect passenger information at DAL and DFW, which mainly differed by airport-specific responses to questions and City of Dallas Aviation Department question additions to the DAL survey. Unison worked closely with NCTCOG to ensure each question was clear, concise, and easy to understand. Draft questionnaires were provided to NCTCOG for review and comment.

Once approved, the questionnaires were loaded onto hand-held computer tablets. Questions were programmed with skip logic and conditional branching to ensure that respondents were asked only those questions relevant to them. For example, only passengers who came to the airport via private vehicle were asked questions about parking, whereas all other passengers skipped parking questions. When the programming was complete, two tablets were shipped to NCTCOG for testing and approval.

On September 1, 2015, a pilot test of the survey questionnaire was conducted at DFW. A total of 88 surveys were collected during the pilot test. The results of the pilot tests were reviewed and analyzed. About half of the responses were from originating passengers (46 surveys) and would qualify for the study. Unison reviewed the raw survey data and recoded and cleaned, as appropriate, to better classify passenger responses and determine usability of surveys. A total of 36 surveys (77 percent of originating surveys) included valid data in the required fields and, therefore, met the criteria for usability.

Based on the pilot test, modifications to the questionnaire were needed to explain how trip purpose, home address, and origin address were obtained. To help improve the quality of origin data collected, passengers were presented with a series of questions and options to extract detailed origination information.

Since more detailed information was needed from counties within NCTCOG's metropolitan planning area, an initial

question to define the general location of the origin was asked. “*Is your starting location within the Dallas Fort Worth Metroplex area? Within 100 miles of airport.*” If the respondent answered yes, the surveyor then would ask what information they could provide about the origin with the following question:

“*What can you provide:*

- 1) *Address*
- 2) *Cross Streets and City*
- 3) *Name of Landmark/Business/ Hotel and City*”

Passengers who chose “1) Address” or “2) Cross Streets and City” were presented with a comprehensive list of streets and cities in the Dallas Fort Worth Metroplex. Passengers who chose “3) Name of Landmark/ Business / Hotel and City” were asked to provide as much information as possible regarding the landmark.

If the respondents did not originate from the Dallas-Fort Worth Metroplex area, the surveyors asked them to provide any information about their origin – street, cross streets, landmarks, and/or zip codes; a valid city or zip code would be considered sufficient to locate an origin outside the Dallas-Fort Worth Metroplex.

Because origination information is critical to the study, surveys without sufficient information would not be considered usable; thus, Unison added a quality check question for interviewer’s use: “Is information complete?” At this point, if origin information was incomplete, the survey would be terminated. Passengers who provided complete origination information would continue with the remaining questions of the survey.

The survey questionnaire was updated, and then finalized after discussion and review by NCTCOG. The final DFW survey questionnaire (attached as Appendix A) consisted of 27 questions presented through 74 total tablet screens.

1.4 Survey Administration

Survey administration at DFW was a team effort between Unison and its two local subcontractors, National Service Research (“NSR”) and Consumer & Market Insights (“CMI”). NSR and CMI led hiring and managed the data collection; Unison communicated with the Aviation Department and provided training and project oversight. To ensure a successful survey process, Unison provided a comprehensive training session so that all interviewers understood the objectives of the project, each question being asked, use of the tablets, general rules and regulations of the airport, and performance expectations.

To conduct surveys in the airline holdrooms, all interviewers were required to obtain proper security identification badges. The NSR team already had proper security badges so were able to start work immediately. Only a few CMI employees had security badges and the others were required to complete badging applications and undergo background checks and fingerprinting. CMI staff coordinated this process with the DFW’s Aviation Planning Department who signed off on the badging applications then worked with the badging office to ensure all of the TSA requirements were met.

On every survey day, each interviewer was assigned to specific gates to conduct surveys and provided a list of scheduled flights. Interviewers randomly approached passengers waiting at the airline gate hold rooms for an assigned flight, reviewed flight information with each passenger respondent, and then administered surveys via electronic tablet. At the end of the day, the team reconvened to discuss tips on how to improve response rates and overcome challenges with the process. Electronic tablets were uploaded at the end of the shifts onto a secure remote server for Unison’s review. Unison provided daily reports to supervisors and weekly updates to

NCTCOG to stay abreast of survey progress, and to ensure the survey objectives were being met.

Survey administration at DFW lasted for 56 weekdays from October 13, 2015 to February 3, 2016. The response rate for the survey was approximately 80 percent: 4 out of 5 of all passengers (originating and connecting) approached by an interviewer agreed to participate in the survey.

1.5 Data Processing

Unison used Microsoft Excel for initial processing and data cleaning of survey results. First, Unison performed a quality check of the survey results to ensure the data provided all the necessary information required for the project. According to the project specifications, a survey is considered usable if it includes the following information:

- Geo-codable trip origin
- Destination airport or country
- Access mode to the airport
- Trip purpose
- Parking preference (if parked)
- Transportation cost reimbursement
- Airline
- Flight number
- Time of survey
- Home information

Surveys marked usable were then geocoded by Unison’s subcontractor, Maroon Society, which led the geocoding tasks. The process of geo-coding includes matching a location to its corresponding latitude and longitude coordinates. Maroon Society used Texas A&M Geoservices (Geoservices) to geocode the origin locations. Trip origination data was geocoded based on address, cross streets, or other information provided by the passenger.

Approximately 4,000 origination locations – business, hotels, and landmarks – were manually researched for street addresses to be geocoded. In several instances, the Geoservices software did not provide a matching centroid (center) for certain, although valid, cross streets (North/South and East/West); in these cases, additional manual research was required to locate appropriate latitude and longitude coordinates. In some cases, ZIP codes, identified by NCTCOG, were used for the purpose of conducting the geospatial analysis.

In terms of home information, Unison geocoded information for passengers residing in Texas. Unison geocoded locations within the Dallas Fort Worth Metroplex by address or cross streets. For home locations outside the Metroplex but within Texas, addresses, cross streets, or ZIP code centroids were geocoded. Home state and/or country was provided for passengers who reside outside of Texas.

Further, Unison geocoded airport destinations identified in the survey. Airports were geocoded to FAA latitude and longitude coordinates and provided to NCTCOG in a separate file.

Approximately 16 percent of collected origination surveys were not considered usable due to incomplete data, including non-geocodeable locations, after the extensive review by Unison and NCTCOG. Eight-four percent (8,379) of the 9,942 originating surveys collected qualified as usable and, therefore, were able to be used in the weighting process to expand the dataset.

1.6 Data Weighting

The process to weight data considers several factors including scheduled seats during the dates of the surveys, load factors by month and airline, and the proportion of originating and connecting passengers for each designated data sets, known as sample “strata.” In addition, the expansion needed to be done by airline, destination (Texas, US Eastern Time Zone, US Central Time Zone, US Mountain Time Zone, and US Western Time Zone, Hawaii/Alaska, and International) and time period (6am: 6-8:59 am; 9am: 9-11:59am; 12pm: 12-2:59pm; 3pm: 3-5:59pm; 6pm: 6-8:59pm; and 9pm: 9-11:59pm). The weighting methodology for DFW is described below.

1.6.1 Develop a Universe of the Number of Available Seats in Each Strata

The OAG data on scheduled seats for DFW departures were used as an estimate of the potential universe of departures. The OAG data includes scheduled seats departing by airline, destination, departure time, and flight number for each day surveys were conducted at DFW (October 13, 2015 to February 3, 2016). This summary was first developed for each day and then for the sum of sample days for each destination strata (Texas, domestic in each of four time zones, Alaska/Hawaii, and International) and scheduled time period of departure.

1.6.2 Estimate the Percent of Total Seats that Are Filled

The percentage of the seats that are filled was calculated for each airline, using load factors from the U.S. Department of Transportation, Bureau of Transportation Statistics website¹. Load factors (passenger-miles as a proportion of available seat-miles) for October, November, and December 2015 as well as January and February 2016 for DFW were used since they represent the data collection period at DFW. The airlines’ load factors are shown in Table I-2. Because of the differences by airline, these were applied for each airline separately.

TABLE I-2 – LOAD FACTORS BY AIRLINE, DFW (% OF AVAILABLE SEATS)

Load Factors by Airline	Oct-15	Nov-15	Dec-15	Jan-16	Feb-16
American	87.33	83.34	84.88	82.68	82.99
Alaska	83.56	89.13	89.06	88.31	84.25
Delta	86.66	89.60	84.24	78.48	73.74
Frontier	86.66	89.26	87.10	85.86	86.79
JetBlue	90.45	88.91	79.86	73.83	74.61
Spirit	85.26	83.45	81.71	75.01	80.37
United	86.55	86.06	87.98	74.88	75.05
US and Foreign Carriers	84.61	82.43	83.86	81.08	81.73

¹ <http://www.transtats.bts.gov>

1.6.3 Examine Originating Flight Patterns and Calculate Originating Flight Rate

As part of the weighting process, the originating flight patterns were calculated as the number of originating passenger surveys versus the total number of originating and connecting passenger surveys collected. For the purpose of this calculation, all surveys with airline, flight, time, and destination were considered regardless of completeness of required fields or geocodable origin. Tables considering origination flight rate by airline, origination flight rate by time of day period, and origination flight rate by destination zone were analyzed by all parties to make the final decision on how to best use the originating flight data. Since the originating flight patterns varied so much by carrier, it was agreed to apply originating flight percentage by airline first, then time period and destination.

There were too few samples in some of the stratum to make robust estimates. In those cases, cells were combined by destination then time. The final origination percentages used are shown in Table I-3.

TABLE I-3– FINAL ORIGINATING FLIGHT ESTIMATES BY SAMPLE STRATA FOR EXPANSION

Airline	Zone	Time Period	Originating @ DFW (n)		Total	Originating @ DFW (%)	
			Yes	No		Yes	No
Aeromexico, Air Canada, Avianca, British Airways, Emirates, Etihad, Korean, Lufthansa, Quantas, Qatar, Volaris	International	6am+9am	91	23	114	79.8%	20.2%
		12pm	66	16	82	80.5%	19.5%
		3pm	79	32	111	71.2%	28.8%
		6pm+9pm	85	108	193	44.0%	56.0%
Subtotal International Only			321	179	500	64.2%	35.8%
Alaska Airlines	Pacific	6am+12pm	34	6	40	85.0%	15.0%
		3pm	27	21	48	56.3%	43.8%
		6pm	22	10	32	68.8%	31.3%
US Airways, Frontier, Boutique, Jet Blue	Eastern	All Times	87	25	112	77.7%	22.3%
	Mountain	All Time Zones	53	8	61	86.9%	13.1%
Sun Country and Spirit Airlines Domestic	Central. Mountain, Pacific	6am+9am	43	5	48	89.6%	10.4%
		12pm	24	2	26	92.3%	7.7%
		3pm	86	6	92	93.5%	6.5%
		6pm+9pm	38	34	72	52.8%	47.2%
	Eastern	6am	61	9	70	87.1%	12.9%
		9am	24	1	25	96.0%	4.0%
		12pm	63	2	65	96.9%	3.1%
		3pm	73	4	77	94.8%	5.2%
		6pm	48	19	67	71.6%	28.4%
Subtotal			683	152	835	81.8%	18.2%
American and Sun Country International	International	6am	62	17	79	78.5%	21.5%
		9am	140	176	316	44.3%	55.7%
		12pm	71	101	172	41.3%	58.7%
		3pm	161	180	341	47.2%	52.8%
		6pm	138	56	194	71.1%	28.9%
		9pm	151	72	223	67.7%	32.3%
Subtotal American and Sun Country International			723	602	1325	54.6%	45.4%

TABLE I-3– FINAL ORIGINATING FLIGHT ESTIMATES BY SAMPLE STRATA FOR EXPANSION (CONTINUED)

Airline	Zone	Time Period	Originating @ DFW (n)		Total	Originating @ DFW (%)	
			Yes	No		Yes	No
American Airlines	Central	6am	154	23	177	87.0%	13.0%
		9am	420	247	667	63.0%	37.0%
		12pm	238	191	429	55.5%	44.5%
		3pm	280	166	446	62.8%	37.2%
		6pm	212	134	346	61.3%	38.7%
		9pm	32	71	103	31.1%	68.9%
	Eastern	6am	386	98	484	79.8%	20.2%
		9am	900	441	1341	67.1%	32.9%
		12pm	662	442	1104	60.0%	40.0%
		3pm	427	259	686	62.2%	37.8%
		6pm + 9pm	376	259	635	59.2%	40.8%
	Hawaii	9am	80	40	120	66.7%	33.3%
	Mountain	6am	84	14	98	85.7%	14.3%
		9am	235	98	333	70.6%	29.4%
		12pm	198	225	423	46.8%	53.2%
		3pm	58	26	84	69.0%	31.0%
		6pm	67	71	138	48.6%	51.4%
		9pm	48	68	116	41.4%	58.6%
	Pacific	6am	235	106	341	68.9%	31.1%
		9am	304	249	553	55.0%	45.0%
		12pm	174	137	311	55.9%	44.1%
		3pm	213	182	395	53.9%	46.1%
		6pm	85	61	146	58.2%	41.8%
		9pm	40	48	88	45.5%	54.5%
	Texas	6am	107	10	117	91.5%	8.5%
		9am	171	171	342	50.0%	50.0%
		12pm	150	137	287	52.3%	47.7%
		3pm	267	243	510	52.4%	47.6%
		6pm	218	166	384	56.8%	43.2%
		9pm	72	264	336	21.4%	78.6%
	Central, Eastern, Mountain	12am	37	2	39	94.9%	5.1%
Subtotal American Domestic			6930	4649	11579	59.8%	40.2%

TABLE I-3– FINAL ORIGINATING FLIGHT ESTIMATES BY SAMPLE STRATA FOR EXPANSION (CONTINUED)

Airline	Zone	Time Period	Originating @ DFW (n)		Total	Originating @ DFW (%)	
			Yes	No		Yes	No
United	Eastern, Central, Mountain, Pacific	6am/9am	31	27	58	53.4%	46.6%
	Texas	6am/9am	29	1	30	96.7%	3.3%
	Central	12pm	154	12	166	92.8%	7.2%
	Eastern	12pm	76	2	78	97.4%	2.6%
	Mountain	12pm	64	0	64	100.0%	0.0%
	Texas	12pm	69	5	74	93.2%	6.8%
	Eastern	3pm, 6pm	33	4	37	89.2%	10.8%
	Central	3pm, 6pm	45	12	57	78.9%	21.1%
	Mountain	3pm/6pm/12am	38	16	54	70.4%	29.6%
	Pacific	3pm, 6pm	28	8	36	77.8%	22.2%
	Texas	3pm/6pm/12am	37	26	63	58.7%	41.3%
Subtotal United			604	113	717	84.2%	15.8%
Delta Air Lines	Eastern	6am	31	0	31	0.0%	100.0%
	Eastern	9am	96	16	112	12.5%	87.5%
	Eastern	12pm	171	20	191	9.5%	90.5%
	Eastern	3pm	117	21	138	13.2%	86.8%
	Central/Mountain	6am	45	2	47	4.1%	95.9%
	Central/Pacific	9am	27	5	32	13.5%	86.5%
	Central	12pm	31	3	34	8.1%	91.9%
	Mountain/Pacific	12pm	33	4	37	9.8%	90.2%
	Central	3pm	24	3	27	10.0%	90.0%
	Eastern, Central, Mountain, Pacific	6pm+12am	36	55	91	37.7%	62.3%
Subtotal Delta			611	129	740	82.6%	17.4%
Total All Airlines	All Destinations	All Times	9,872	5,824	15,696	62.9%	37.1%

1.6.4 Code Passenger Surveys into Sample Strata and Weight Surveys
 The originating passenger surveys were coded by airline, time period, and destination. The completed surveys were then summed by each sample stratum (as shown in Table I-3).

The actual weight is simply the reciprocal of the total completed surveys by originating passengers in each stratum to the total estimate of Originating Seats within each stratum. The calculation of the survey is shown below.

Available Seats (AVAIL_WGT): $AVAIL_WGT = (\text{Total Seats} * \text{Load Factors})$

Total Seats - the total of all seats is estimated from the OAG data.

Originating Seats (ORIG_WGT): $ORIG_WGT = AVAIL_WGT * \text{Origination Factor}$

Origination Factor – the calculation of Origination Factor is discussed in Section 1.6.3 and its value for each stratum is shown in Table I-3.

Estimate of Daily Travel (DAY_WGT): $DAY_WGT = ORIG_WGT / 56$

To get daily weight, divide the weights into 56 sample days.

The results of the calculations are shown in Table I-4.

TABLE I-4 – FINAL CALCULATED WEIGHTS BY STRATUM²

Airline	Destination	Time	STRATA	AVAIL_SEATS	ORIG_SEATS	SAMPLES	ORIG_WGT	DAY_WGT
All				5,460,253	3,292,318	8,380	436.55	7.80
Delta Air Lines	Eastern	6am	1	29,267	29,267	28	1,045.26	18.67
	Eastern	9am	2	34,256	4,282	78	54.90	0.98
	Eastern	12pm	3	30,101	2,860	154	18.57	0.33
	Eastern	3pm	4	29,889	3,945	111	35.54	0.63
	Central/ Mountain	6am	5	15,130	620.31	39	15.91	0.28
	Central/ Pacific	9am	6	6,522	880.44	21	41.93	0.75
	Central	12pm	7	6,077	492.21	27	18.23	0.33
	Mountain/ Pacific	12pm	8	13,073	1,281	22	58.23	1.04
	Central	3pm	9	3,752	375.24	23	16.31	0.29
	Eastern, Central, Mountain, Pacific	6pm+12am	10	10,735	4,047	10	404.72	7.23
United	Eastern, Central, Mountain, Pacific	6am/9am	11	55,498	34,908	30	1,163.60	20.78
	Texas	6am/9am	12	13,415	8,438	28	301.37	5.38
	Central	12pm	13	11,778	7,408	142	52.17	0.93
	Eastern	12pm	14	12,990	8,171	72	113.48	2.03
	Mountain	12pm	15	5,212	3,278	58	56.53	1.01
	Texas	12pm	16	7,386	4,646	63	73.74	1.32
	Eastern	3pm, 6pm	17	10,597	6,665	26	256.36	4.58
	Central	3pm, 6pm	18	13,432	8,449	37	228.34	4.08
	Mountain	3pm/6pm/12am	19	13,995	8,803	37	237.91	4.25
	Pacific	3pm, 6pm	20	11,897	7,483	26	287.81	5.14
	Texas	3pm/6pm/12am	21	18,112	11,392	26	438.16	7.82

² Table I-4 includes surveys qualified as usable by NCTCOG

TABLE I-4 – FINAL CALCULATED WEIGHTS BY STRATUM (CONTINUED)³

Airline	Destination	Time	STRATA	AVAIL_SEATS	ORIG_SEATS	SAMPLES	ORIG_WGT	DAY_WGT	
	All			5,460,253	3,292,318	8,380	436.55	7.80	
American Airlines	Central	6am	22	118,378	102,989	141	730.42	13.04	
		9am	23	177,888	112,069	360	311.30	5.56	
		12pm	24	190,764	105,874	201	526.74	9.41	
		3pm	25	200,521	125,927	243	518.22	9.25	
		6pm	26	231,683	142,021	192	739.70	13.21	
		9pm	27	65,807	20,466	27	758.00	13.54	
	Eastern	6am	28	217,099	173,245	324	534.71	9.55	
		9am	29	251,181	168,542	770	218.89	3.91	
		12pm	30	271,103	162,662	569	285.87	5.10	
		3pm	31	227,881	141,742	354	400.40	7.15	
		6pm + 9pm	32	354,892	210,096	323	650.45	11.62	
	Hawaii	9am	33	33,825	22,561	67	336.73	6.01	
	Mountain	6am	34	57,921	49,638	71	699.13	12.48	
		9am	35	80,482	56,821	210	270.57	4.83	
		12pm	36	86,885	40,662	171	237.79	4.25	
		3pm	37	63,826	44,040	42	1,048.58	18.72	
		6pm	38	63,145	30,689	42	730.68	13.05	
		9pm	39	47,154	19,522	41	476.14	8.50	
	Pacific	6am	40	93,980	64,752	191	339.02	6.05	
		9am	41	162,794	89,537	264	339.15	6.06	
		12pm	42	110,103	61,547	134	459.31	8.20	
		3pm	43	171,546	92,463	164	563.80	10.07	
		6pm	44	125,836	73,237	62	1,181.24	21.09	
		9pm	45	63,853	29,053	36	807.03	14.41	
	Texas	6am	46	81,200	74,298	89	834.81	14.91	
		9am	47	97,784	48,892	153	319.56	5.71	
		12pm	48	109,156	57,089	136	419.77	7.50	
		3pm	49	130,119	68,182	228	299.04	5.34	
		6pm	50	102,234	58,069	180	322.61	5.76	
		9pm	51	88,329	18,902	55	343.68	6.14	
		Central, Eastern, Mountain	12am	52	29,392	27,893	32	871.66	15.57
	Alaska Airlines	Pacific	6am+12pm	53	12,511	10,634	29	366.69	6.55
3pm			54	7,905	4,451	23	193.50	3.46	
6pm			55	9,411	6,456	19	339.77	6.07	
US Airways, Frontier, Boutique, Jet Blue	Eastern	All Times	56	21,032	16,342	56	291.82	5.21	
	Mountain	All Time Zones	57	3,961	3,442	2	1,720.88	30.73	
American and Sun Country International	International	6am	58	40,127	31,500	46	684.78	12.23	
		9am	59	175,031	77,539	117	662.72	11.83	
		12pm	60	64,015	26,438	59	448.10	8.00	
		3pm	61	107,077	50,540	133	380.00	6.79	
		6pm	62	67,384	47,910	116	413.02	7.38	
		9pm	63	67,518	45,710	114	400.96	7.16	

³ Table I-4 includes surveys qualified as usable by NCTCOG

TABLE I-4 – FINAL CALCULATED WEIGHTS BY STRATUM (CONTINUED)⁴

Airline	Destination	Time	STRATA	AVAIL_SEATS	ORIG_SEATS	SAMPLES	ORIG_WGT	DAY_WGT	
All				5,460,253	3,292,318	8,380	436.55	7.80	
Sun Country and Spirit Airlines Domestic	Central, Mountain, Pacific	6am+9am	64	49,223	44,104	34	1,297.18	23.16	
		12pm	65	7,539	6,958	17	409.31	7.31	
		3pm	66	25,397	23,747	68	349.21	6.24	
		6pm+9pm	67	21,880	11,552	34	339.78	6.07	
	Eastern	6am	68	45,682	39,789	49	812.03	14.50	
		9am	69	7,689	7,382	19	388.52	6.94	
		12pm	70	14,944	14,481	55	263.29	4.70	
		3pm	71	25,495	24,169	60	402.82	7.19	
			6pm	72	8,701	6,230	45	138.45	2.47
	Aeromexico, Air Canada, Avianca, British Airways, Emirates, Etihad, Korean, Lufthansa, Quanta's, Qatar, Volaris	International	6am+9am	73	34,675	27,671	81	341.61	6.10
12pm			74	13,014	10,477	55	190.48	3.40	
3pm			75	31,038	22,099	70	315.70	5.64	
6pm+9pm			76	31,682	13,940	42	331.91	5.93	
All Unassigned	All	All	77	107,446	67,583	106	637.58	11.39	

⁴ Table I-4 includes surveys qualified as usable by NCTCOG

1.7 Data Analysis

Unison used SPSS, Statistical Package for the Social Sciences, for survey analysis. Unison analyzed the survey data using standard statistical methods such as frequency and cross tabulation analysis. It is important to note in the analysis below, the figures and tables depict weighted data by “DAY_WGT” unless otherwise specified.

1.8 Lessons Learned

One of the challenges of conducting surveys at DFW is the time and resources required to obtain security badges. In order to conduct surveys in the airline gate rooms all interviewers must have proper security identification badges or be escorted. For several weeks, we were unclear about how many badges could be signed-off for the project, which delayed staff recruitment and the overall project schedule. It was our initial understanding that each interviewer could apply for a badge, which was the basis for our work plan and critical to our sampling plan. However, we were later informed only five badges could be issued for this project and the remaining interviewers must be escorted during survey administration. This change would result in a new sampling plan and a work strategy. After a few discussions between NCTCOG and DFW management staff, a decision was made that our team could obtain as many badges that would be required to execute the initial plan.

To help keep the project on track, CMI, who was our original subcontractor, had some interviewers on-staff that had DFW security badges through existing survey projects at DFW. These interviewers were able to start conducting surveys while we waited for the others to obtain badges. The badging process took several additional weeks and multiple trips to the airport: each interviewer was required to fill out an application, obtain an authorized signature, make an appointment to submit fingerprints, and another appointment to pick up the badge. Meanwhile, the initial group of CMI interviewers who were conducting the NCTCOG surveys was asked to perform other DFW marketing surveys and was no longer available for this project. In November 2015, Unison enlisted the help of another local market research firm, National Service Research, to assist in survey administration.

Between November and December 2015, CMI and NSR simultaneously conducted surveys at DFW. Unison managed two sets of schedules as well as coordinated sharing electronic survey tablets between the firms. Survey administration lasted 56 days, from September 2015 to February 2016, excluding weekends and the holiday season due to high employee turnover. Further, it had come to our attention that CMI’s DBE certification expired in January 2016, Unison decided to proceed with NSR as the sole subcontractor.

An important lesson learned is that collecting a sample, which was stratified by three different targets – by destination zone, time period, and airline – posed some challenges with respect to weighting and survey administration. For example, some sample sizes were too small (i.e. the margin of error was beyond acceptable statistical standards) and thus these samples were combined to make the data more meaningful.

In terms of survey administration, collecting a sample according to various targets required significant resources and time. Survey interviewers targeted specific flights to ensure sampling targets were achieved, which resulted in oversampling certain targets. Because of the various sample targets, data collection took 56 total days to be completed, which also required close coordination between the NCTCOG project team and DFW’s marketing department to ensure NCTCOG surveys did not impede survey efforts conducted directly by DFW Airport. For future surveys, it is recommended that the sampling plan be based on the required analysis rather than three different targets.

In development of the questionnaire, there was some questions that did not capture the information as originally intended. One case of this was asking for trying to determine the number of people and number of vehicles on

each trip to the airport. To capture this information, it was suggested to use the term well-wishers, which will encompass those friends and family who may bring you to the airport, but may not encompass others in the car in the case of a shuttle, or ride-share service. In future surveys, better attention should be paid to the wording of this question. Another case was the travel time to the airport. This question was designed to give an idea of the estimated travel time to the airport and a way to compare about travel times calculated in the regional travel mode from zone to zone. Only 26 surveys included a response to this question. In future surveys, this should be listed as a required question to define whether a survey is complete.

II. Data Collected

At DFW, the survey team collected a total of 15,775 surveys of which 63 percent (9,872) are from originating passengers and 37 percent (5,824) from connecting passengers as shown in Table II-1. Of the 9,872 originating surveys collected, approximately 84 percent (8,379) are qualified as usable after review by Unison and NCTCOG. The discussion in this chapter describes notable findings regarding the origin vs connecting surveys, and the origin of the trip to DFW.

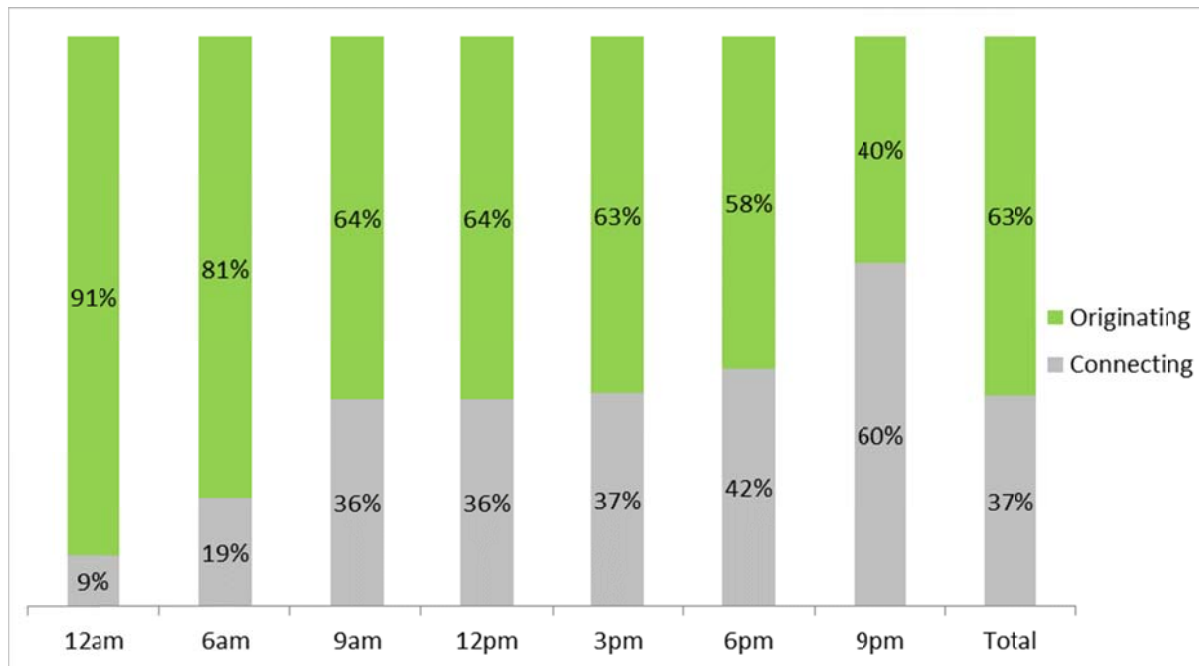
TABLE II-1- SURVEYS COLLECTED

Survey Collected	Frequency	Count
Originating	63%	9,872
Connecting	37%	5,824
Total		15,696

II.1 Originating versus Connecting by Time of Day (Unweighted Data)

The relationship of originating passengers versus connecting passenger surveyed by time of day is displayed in Figure II-1. Of the total surveys collected, the time period with the largest proportion of connections is 9:00 p.m. or later: 60 percent of all passengers departing DFW during this time period are connecting and 40 percent are originating. A large majority of passengers (between 81 to 91 percent) scheduled to depart before 9:00 am are originating at DFW. Between 63 to 64 percent of passengers scheduled to depart between the 9:00 a.m. to 6:00 p.m. are originating. Further, passengers scheduled to depart during the 6:00 p.m. time-period are primarily originating at DFW: 58 percent compared to 42 percent who are connecting at DFW.

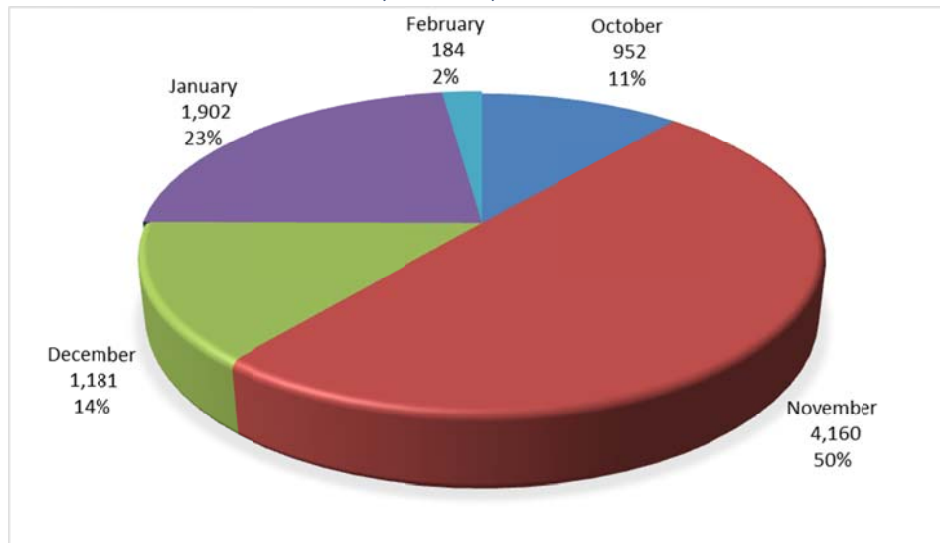
FIGURE II-1– ORIGINATING VERSUS CONNECTING PASSENGERS BY TIME OF DAY (N=15,696)



II.2 Originating Records Collected by Month (Unweighted Data)

Usable originating surveys collected by month are displayed in Figure II-2. The majority of surveys were collected in November (50 percent). Eleven percent was collected in October and 14 percent in December. Twenty-three percent was collected in January and another two percent in February.

FIGURE II-2– SURVEYS BY MONTH (N=8,379)



II.3 Originating Passengers - Records by Time of Day (Unweighted Data)

Scheduled flights were grouped into seven time of day periods. Table II-2 shows the unweighted time groupings of the usable originating passenger surveys.

TABLE II-2– SURVEYS BY TIME OF DAY (N=8,379)

Time of Day Period	Time of Day	Frequency	Count
12am	12:00-5:59 am	1%	42
6am	6:00-8:59 am	12%	1,028
9am	9:00-11:59 am	27%	2,267
12pm	12:00-2:59 pm	23%	1,969
3pm	3:00-5:59 pm	20%	1,653
6pm	6:00-8:59 pm	13%	1,121
9pm	9:00-11:59 pm	4%	299

II.4 Originating Passengers By Airline (Unweighted Data)

Table II-3 shows the number of usable surveys completed by originating passengers for the 10 airlines with the largest market share at DFW. The majority of surveys are completed by passengers traveling with American Airlines (77 percent). United Airlines passengers represent seven percent and Delta Airlines passengers represent six percent of the sample. Spirit Airlines represents the fourth largest market share with four percent of passengers. The remaining airlines – Alaska, Emirates, Aeromexico, JetBlue, Frontier, and British Airways - each account for one percent or less of the total sample of originating passengers.

TABLE II-3– SURVEYS BY TOP 10 AIRLINES (N=8,379)

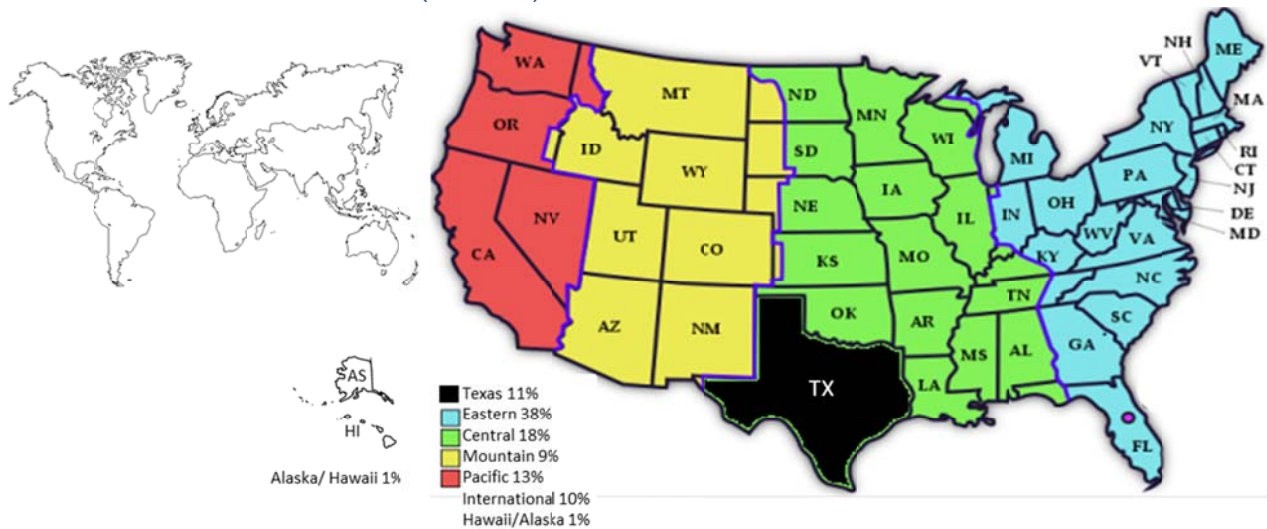
Airline	Frequency
American Airlines	77%
United Airlines	7%
Delta Air Lines	6%
Spirit Airlines	4%
Alaska Airlines	1%
Emirates	1%
Aeromexico	1%
JetBlue Airways Corporation	1%
Frontier Airlines Inc.	0.5%
British Airways	0.4%

II.5 Destination Map (Unweighted Data)

Figure II-3 shows the destination zones defined for flights departing DFW. There are seven destination zones: Texas, Eastern, Central, Mountain, Pacific, Hawaii/Alaska, and International.

The majority of flights are destined for the Eastern zone (38 percent), 18 percent to the Central zone, and 13 percent to the Pacific zone. Further, the sample of data collected shows a fairly even split among originating passengers headed to Texas, Mountain and International destination zones: 9 to 11 percent. One percent of flights are headed to Hawaii/Alaska. It is important to note, American Airlines is the only airline that serves all seven destination zones.

FIGURE II-3- DESTINATION ZONE MAP (N=8,379)



II.6 Originating Passengers - Records by Destination Zone (Unweighted Data)

Table II-4 shows unweighted data for the top four airlines, in terms of market share, and destination zone. American Airlines has a sample from each of the possible destination zones. The top four destination zones for American Airline passengers are Eastern, Central, Pacific, and Texas. The majority of Delta Airlines flights are headed to the Eastern zone (73 percent), followed by the Central, Mountain, and Pacific zones. Spirit Airlines offers flights to four U.S. zones (Central, Eastern, Mountain, and Pacific) and the International zone. United Airlines travels to five U.S. zones including Central, Texas, Eastern, Mountain, and Pacific.

TABLE II-4 – SURVEYS FOR TOP 4 AIRLINES AND DESTINATION ZONE (N=7,907)

Zone By Airline	
American Airlines:	n=6,455
Central	18%
Eastern	36%
Hawaii	1%
International	9%
Mountain	9%
Pacific	13%
Texas	13%
Delta Airlines:	n=532
Central	18%
Eastern	73%
Mountain	7%
Pacific	2%
Spirit Airlines:	n=375
Central	11%
Eastern	61%
International	1%
Mountain	5%
Pacific	23%
United Airlines:	n=545
Central	34%
Eastern	19%
Mountain	19%
Pacific	6%
Texas	21%

II.7 Originating Passengers - Records by Top Destination (Unweighted Data)

The top 10 destinations are shown in Table II-5. Chicago O’Hare International Airport is the top destination, followed by Atlanta-Hartsfield International Airport. The next three destinations that account for three percent of originating passengers are Denver International, Charlotte-Douglas International Airport, and Boston Logan Airport. The last four destinations that account for two percent are Philadelphia International Airport, New York La Guardia Airport, Houston George Bush Intercontinental Airport, and Phoenix Sky-Harbor International Airport.

TABLE II-5– TOP 10 DESTINATIONS (N=8,379)

Destination	Frequency
Chicago O'Hare International Airport	6%
Atlanta Hartsfield International Airport	5%
Los Angeles International Airport	4%
Denver International Airport	3%
Charlotte-Douglas International Airport	3%
Boston Logan International Airport	3%
Philadelphia International Airport	2%
New York La Guardia Airport	2%
Houston George Bush Intercontinental	2%
Phoenix Sky-Harbor International Airport	2%

II.8 Area of Origination

To determine origination, surveyors asked passengers several questions about the starting location of their trip to the airport for the current flight. First, the surveyor asked “Is the location in the Dallas Fort Worth Metroplex? Within 100 miles from the airport.” If a respondent answered “Yes,” the surveyor asked him or her to provide the address of his or her origin, cross streets, or the name of a landmark, business, or hotel near the point of origination and corresponding city and zip code. Passengers who responded “No” or “Don’t know” were asked to provide any information available about their trip origin such as address, cross streets, and/or landmarks. These efforts collected thousands of verbatim responses, which were each researched to find matching addresses. Then all valid addresses or cross streets were geocoded into latitude and longitude coordinates.

Figure II-4 shows weighted data regarding the location of the trip origin. The majority of passengers (93 percent) traveled to the airport from a location inside the Dallas Fort Worth (“DFW”) Metroplex. The Metroplex was defined as the 12 county area of North Central Texas which includes the counties of Collin, Dallas, Denton, Ellis, Hood, Hunt, Johnson, Kaufman, Parker, Rockwall, Tarrant, and Wise. Five percent originated from another area in Texas but outside the Metroplex, and two percent originated outside of Texas.

FIGURE II-4– LOCATION OF TRIP ORIGIN (N=8,302)

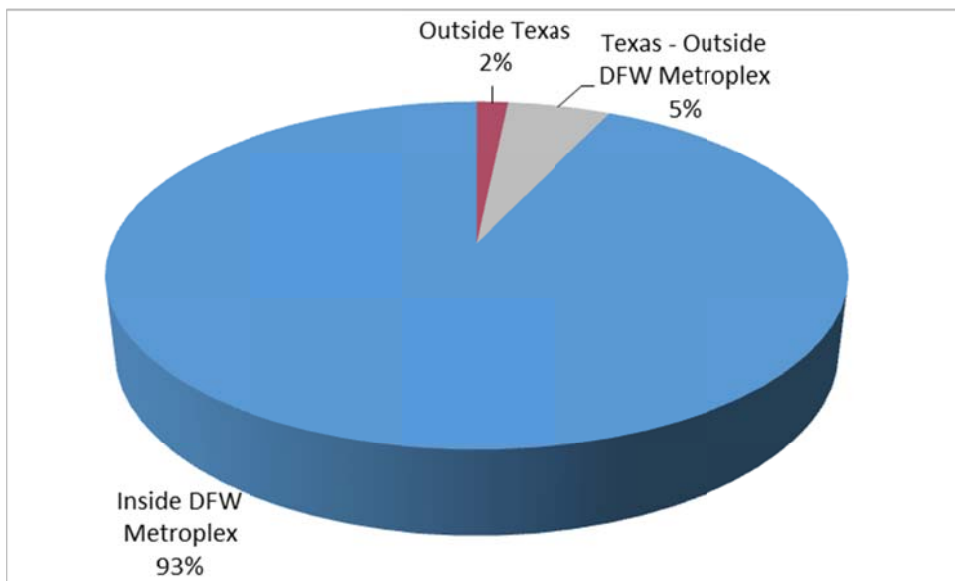


Figure II-5 shows a map of the weighted origination data by zip code, which only includes passengers who traveled directly to DFW from the 12-county area. Table II-6 display the Origination by County.

FIGURE II-5– ORIENTATION BY ZIP CODE (N=8,302)

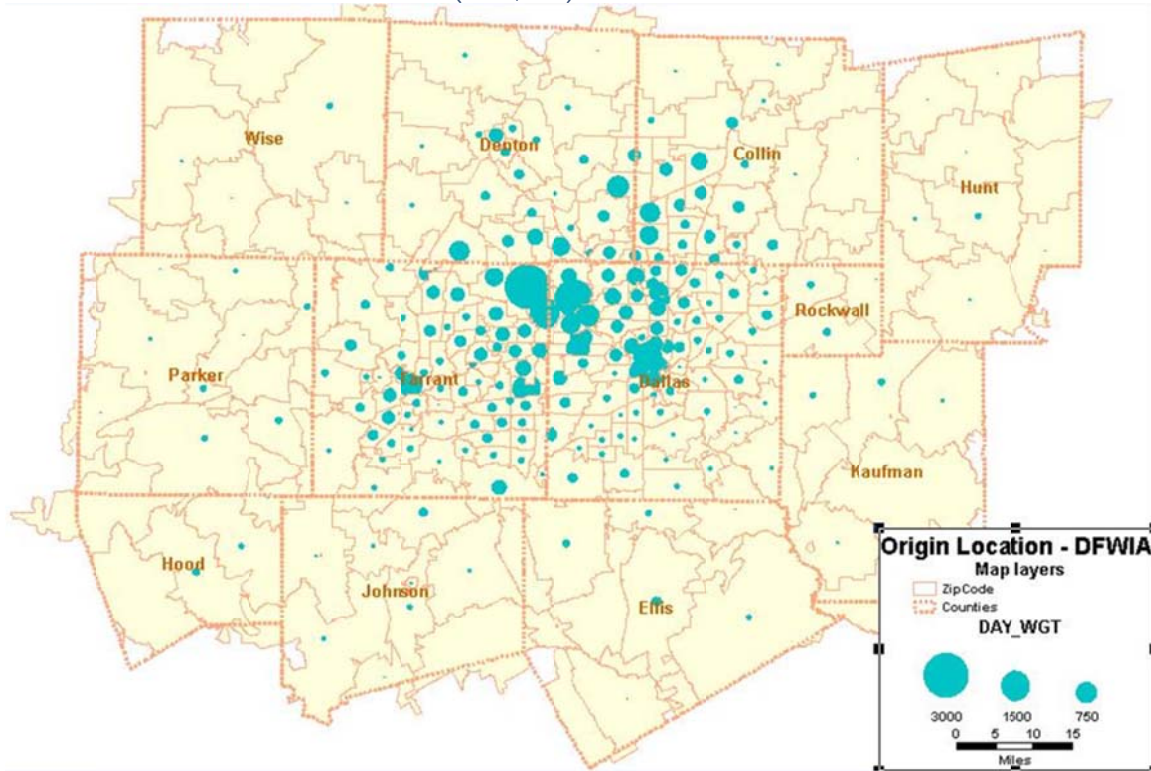


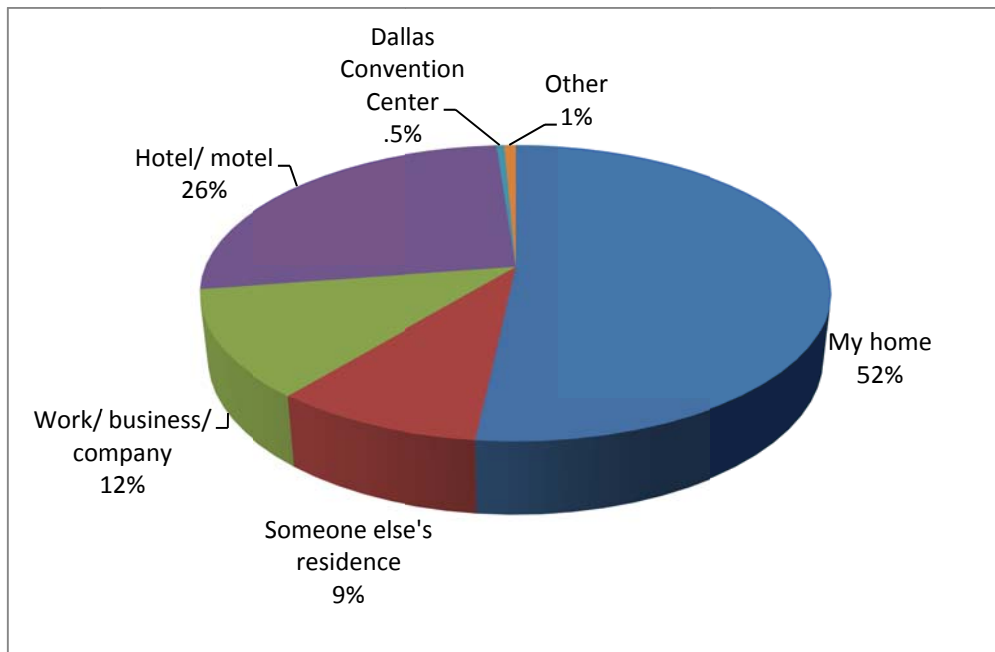
TABLE II-6– ORIENTATION BY COUNTY

Origin County	Frequency
Collin	10.0%
Dallas	38.7%
Denton	9.0%
Ellis	0.7%
Hood	0.3%
Hunt	0.2%
Johnson	0.5%
Kaufman	0.5%
Parker	0.7%
Rockwall	0.4%
Tarrant	31.7%
Wise	0.2%
Other County (Texas)	5.4%
Other County (Outside Texas)	1.6%

II.9 Origination Location Type

Figure II-6 shows weighted data for origination location type. The largest subgroup of passengers originates from their home (52 percent). Another 26 percent originate from a hotel/motel and 12 percent from work, a business, or a company. Nine percent originate from someone else's residence and less than 2 percent from the Dallas Convention Center or another location.

FIGURE II-6– WHERE DID YOU COME FROM PRIOR TO ARRIVING AT THE AIRPORT TODAY? (N=8,379)



III. Trip Characteristics

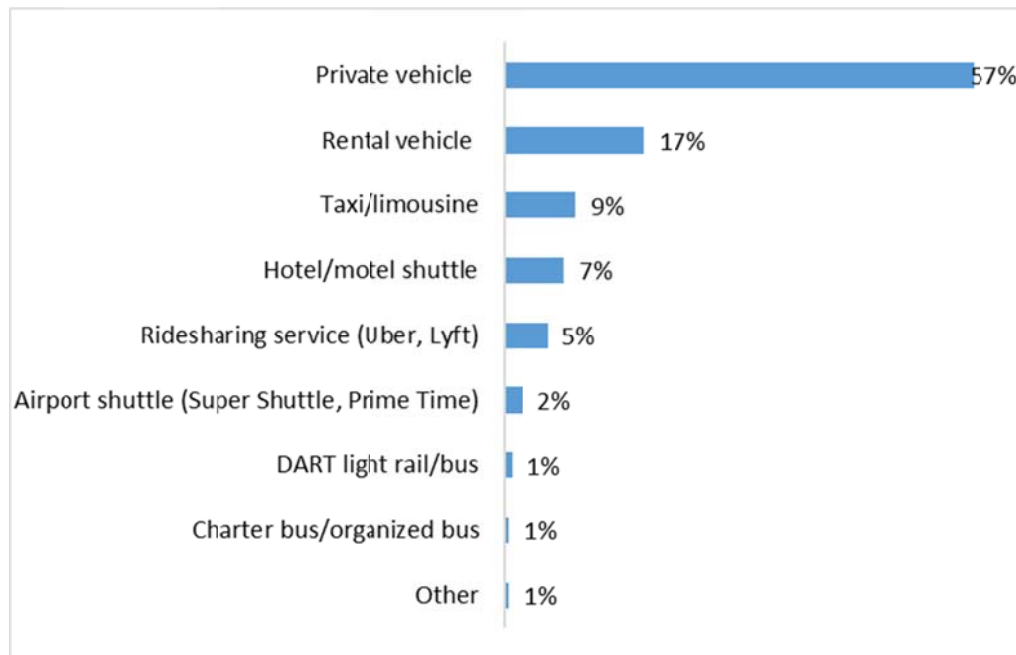
In this section, responses to trip characteristics survey are presented. Trip characteristics describe the travel behavior of passengers, including details about the trip to the airport, parking, details of the airline trip, passenger demographics, and household demographics.

III.1 Trip to the Airport

III.1.1 Mode of Transportation

Figure III-1 displays the primary mode of transportation to the airport for originating passengers. Fifty-seven percent of originating passengers used a private vehicle as their mode of transportation to DFW. Seventeen percent used a rental vehicle and nine percent used a taxi/limousine. Seven percent used a hotel/motel shuttle and five percent used a ridesharing service such as Uber or Lyft. Two percent each used an airport shuttle (e.g. Super Shuttle or Prime Time). One percent each used the DART light rail/bus, a charter bus or organized bus, or other mode of transportation to travel to DFW.

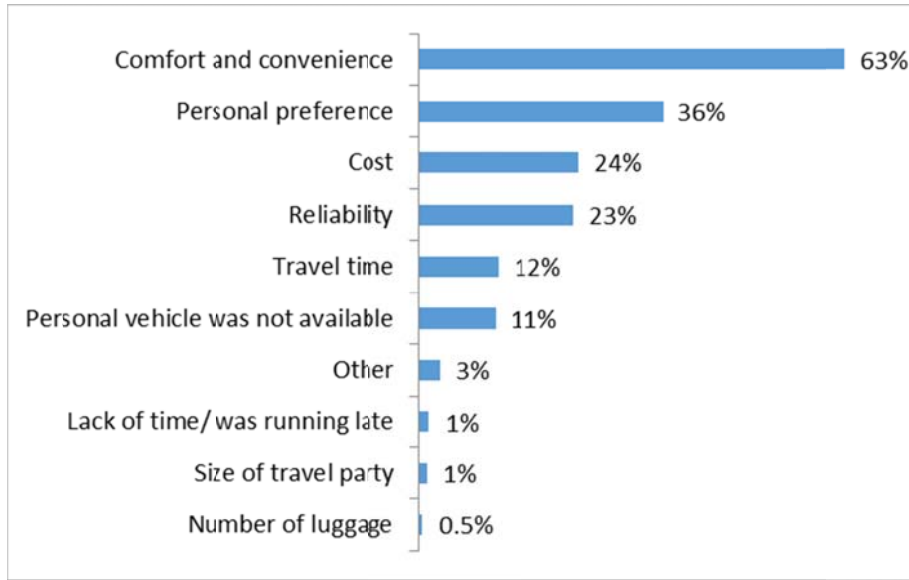
FIGURE III-1– WHAT WAS YOUR PRIMARY MODE OF TRANSPORTATION TO THE AIRPORT? (N=8,379)



III.1.2 Reason for Transportation Choice

For passengers who used a private vehicle but did not park as well as passengers using other modes of transportation, we asked “Why did you choose this mode of transportation?” They were allowed to select 1 or more answers to this question. Their responses are displayed in Figure III-2. The largest subgroup of non-parkers chose comfort and convenience (63 percent). Personal preference was chosen by 36 percent of possible respondents. Cost and reliability were each specified between 23 and 24 percent. Almost an equal percentage of non-parkers chose travel time (12 percent) or personal vehicle was not available (11 percent) as the reason for choosing their mode of transportation to DFW. Another one percent each chose lack of time/ was running late or size of travel party as reasons for their mode of transportation. And almost two percent indicate number of luggage or another reason as to why they selected their mode of transportation.

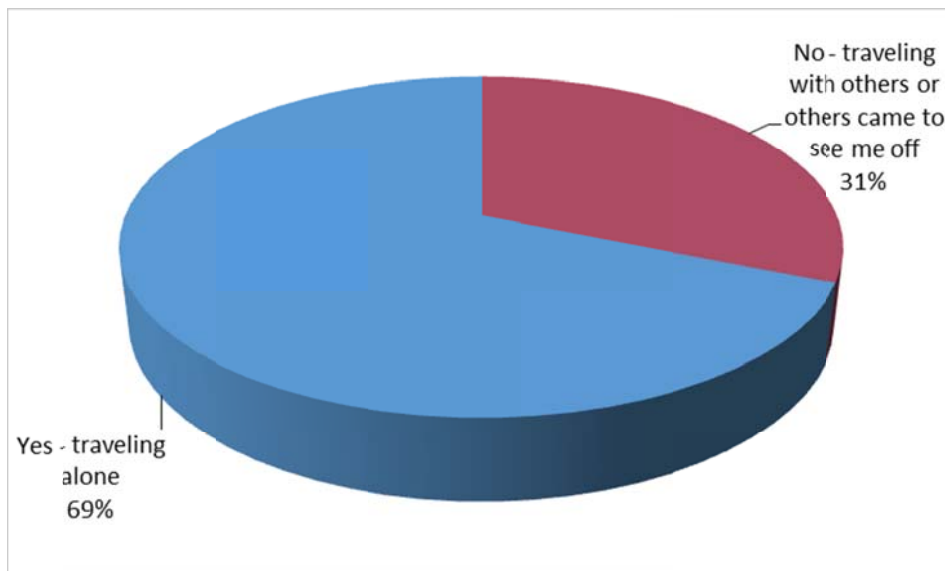
FIGURE III-2- WHY DID YOU SELECT THIS MODE OF TRANSPORTATION? SELECT ALL THAT APPLY. (N=6,196)



III.1.3 Number of Persons Traveling to the Airport

To learn about travel party size, the survey first asked passengers “Did you come to the airport alone?” A summary of their responses are shown in Figure III-3. The majority (69 percent) said “yes, they are traveling alone” and the remaining 31 percent said they are traveling with others or others came to see them off.

FIGURE III-3- DID YOU COME TO THE AIRPORT ALONE TODAY? (N=8,312)



To better determine the size of the travel party (number of passengers traveling), the survey asked all passengers “How many others are traveling with you? (including yourself).” Of total responses, 71 percent are traveling alone. Twenty percent have a travel party size of two people (respondent and another traveler). Five percent are traveling with two others (travel party size is three people), two percent with three other passengers (travel party size is four), and two percent are traveling with four or more other passengers (travel party size is five or more). The weighted average is 2.7 people and the weighted median is 2.0 people. A table of these results can be viewed in Table III-1.

TABLE III-1- HOW MANY PEOPLE ARE TRAVELING WITH YOU, INCLUDING YOURSELF? (N=8,310)

# of People (including self)	Frequency	Count
1	71%	6,015
2	20%	1,566
3	5%	400
4	2%	187
5+	2%	142

We asked passengers who came to the airport with others “How many people came to the airport to see you off today?” The majority of passengers did not have a well-wisher see them off at DFW (79 percent). Sixteen percent had one well-wisher see them off and three percent had two well-wishers accompany them to the airport. Another one percent of passengers had three or more people see them off at the airport. The weighted average is 0.3 well-wishers and weighted median is 0.0. The full results of this question is listed in Table III-2.

TABLE III-2- HOW MANY PEOPLE CAME TO THE AIRPORT TO SEE YOU OFF? (N=2,433)

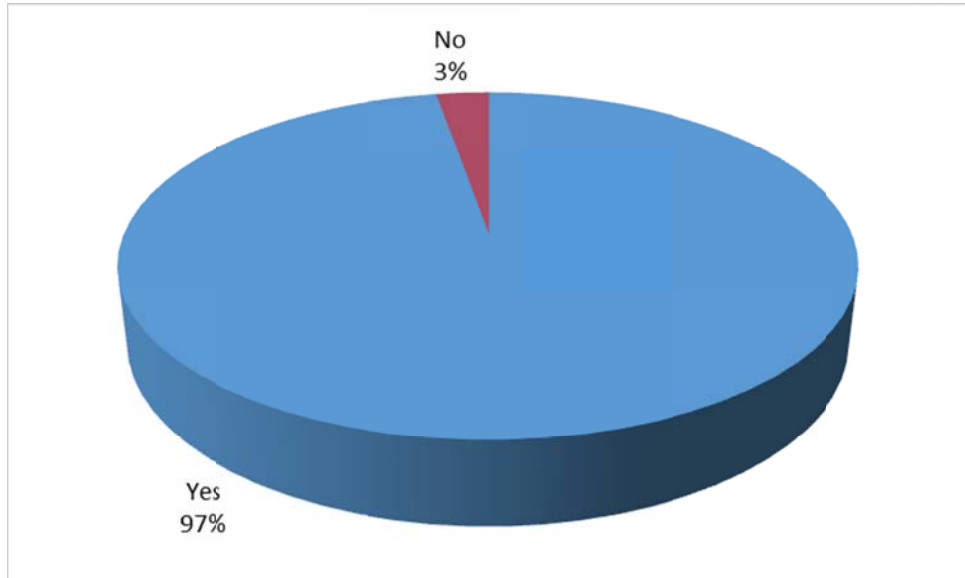
# of Well-Wishers	Frequency	Count
None	79%	1,933
1	16%	396
2	3%	85
3 or more	1%	20

III.1.4 Vehicles Traveling to the Airport

Passengers who came to the airport with others in a private vehicle were asked, “Did your party come to the airport in one vehicle?” Ninety-seven percent came in one vehicle, and only three percent came in more than one vehicle. The responses are displayed in Figure III-4.

The sample size of passengers who came to the airport in more than one vehicle is relatively small (n=73). Of this group, 84 percent came in two vehicles and 16 percent came to the airport in three or more vehicles.

FIGURE III-4- DID YOUR PARTY COME TO THE AIRPORT IN ONE VEHICLE (USERS OF PRIVATE VEHICLES) (N=2,432)



III.1.5 Occupancy by Time of Day – Number of People by Vehicle

Table III-3 below shows the average vehicle occupancy of the trip to the airport by time of day.

TABLE III-3- NUMBER OF PEOPLE IN VEHICLE BY TIME OF DAY (N=2,432)

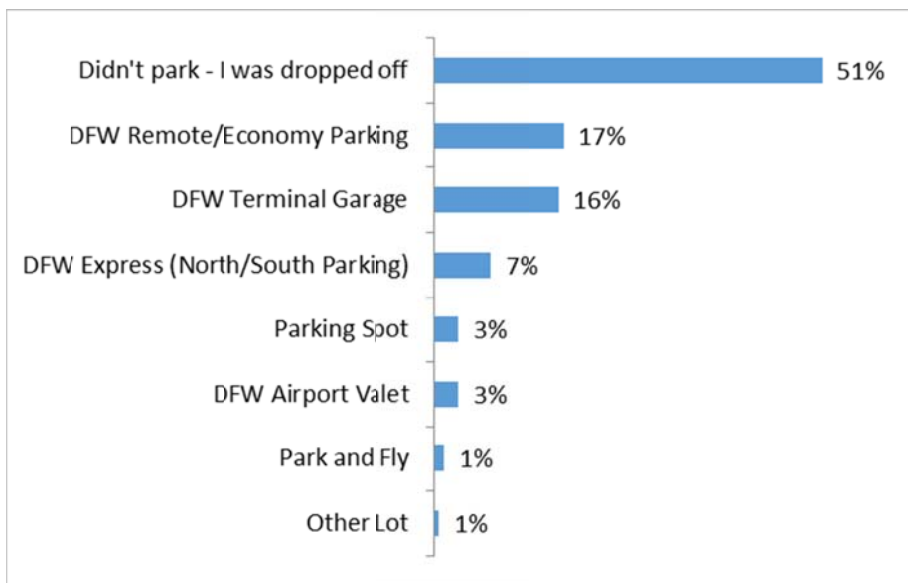
Time Period	Occupancy of Trip to the Airport
6am	2.3
9am	2.2
12pm	2.3
3pm	2.2
6pm	2.3
9pm	2.2
12am	2.4
Average	2.3

III.2 Parking Characteristics

III.2.1 Parking Location

The parking location of passengers who used a private vehicle are described in Figure III-5. Of the 4,662 passengers who used a private vehicle as their mode of transportation, 51 percent were dropped off at DFW and did not park. The remaining 49 percent parked their private vehicle. The most utilized parking lot is DFW Remote/Economy Parking, closely followed by the DFW's terminal parking garage. DFW Express accounted for seven percent of the private vehicles being parked. Three percent of passengers each utilized the Parking Spot and DFW Airport Valet. And another two percent of passengers who parked used Park and Fly or another lot. Overall, 90% of those who parked used a parking lot operated by DFW Airport.

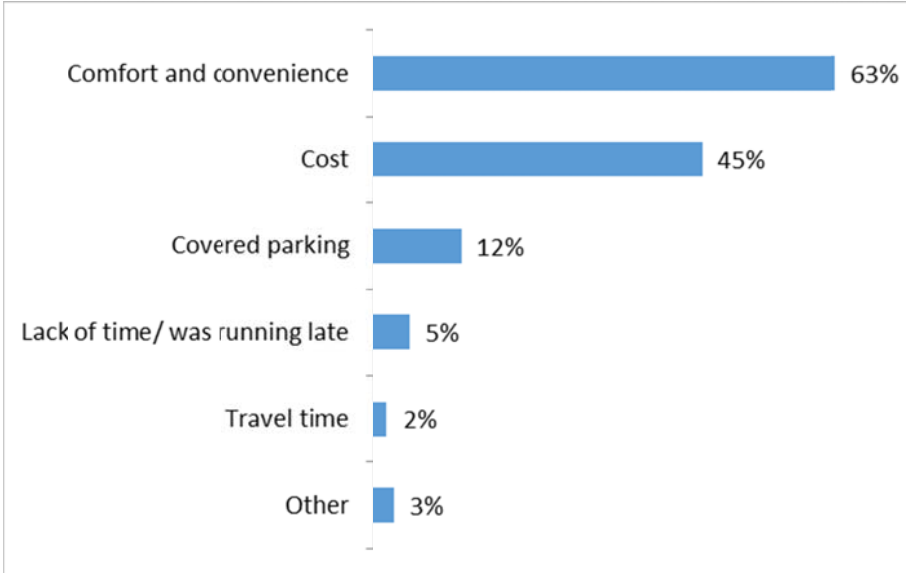
FIGURE III-5– WHERE IS THE CAR PARKED? (IF PRIVATE VEHICLE WAS USED) (N=4,662)



III.2.2 Reason for Parking Choice

The survey asked passengers who parked to select all of the reasons why they decided to park at that particular lot; their responses are displayed in Figure III-6. The passengers were allowed to select more than 1 response. The most common response was comfort and convenience, which was selected by 63 percent of passengers who parked. Cost, selected by 45 percent of the passengers who parked, was the second most common reason for selecting a specific parking lot. Covered parking was chosen by 12 percent of parkers, five percent said lack of time/ running late, and two percent indicate travel time as reasons for his/her parking choice. Three percent of passengers who parked indicate another reason for their parking choice. It is important to note that size of travel party or number of bags did not impact passengers' parking decision and account for less than 1 percent.

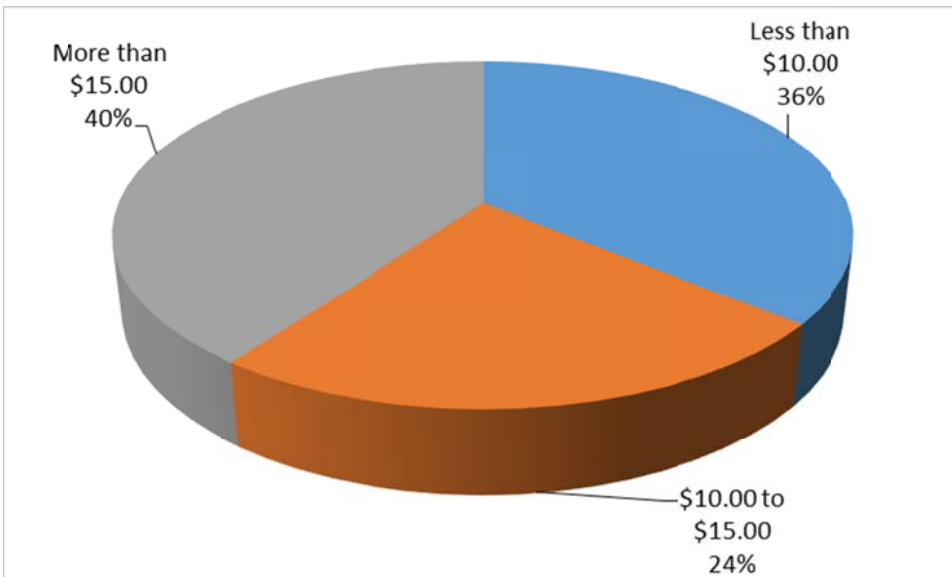
FIGURE III-6– IF YOU PARKED, WHY DID YOU PARK THERE? SELECT ALL THAT APPLY. (N=2,183)⁵



III.2.3 Cost of Parking

The survey asked passengers who parked to give us their best estimate regarding “How much will you pay for parking per day?” Their responses are shown in Figure III-7. Thirty-six percent said less than \$10.00, 24 percent reported between \$10.00 to \$15.00, and 40 percent report paying more than \$15.00 per day for parking. The average parking cost per day was approximately \$15.16.

FIGURE III-7– COST OF PARKING PER DAY (N=2,162)



⁵ Size of travel party and number of luggage account for less than one percent

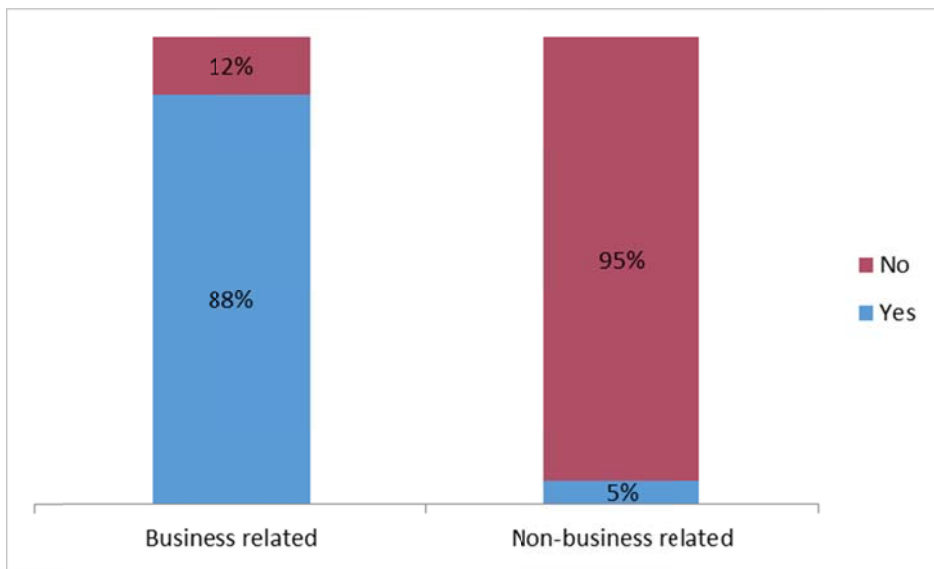
III.2.4 Reimbursement

The survey asked passengers about parking or transportation reimbursement for the trip to the airport. The majority (58 percent) will be reimbursed for parking or transportation. Further, over 98 percent of these passengers will get full reimbursement (100 percent) for transportation expenses. Considering about half of all originating passengers are traveling for business-related reasons, these results are not surprising.

III.2.5 Reimbursement by Trip Purpose

As shown in Figure III-8, cross tabulation analysis reveals that 88 percent of passengers traveling for business-related purposes will be reimbursed for transportation or parking. Meanwhile, only five percent of passengers traveling for all non-business related purposes, such as vacation or visiting family/ friends, will get reimbursed for transportation or parking.

FIGURE III-8– REIMBURSEMENT BY TRIP PURPOSE (N=5,183)

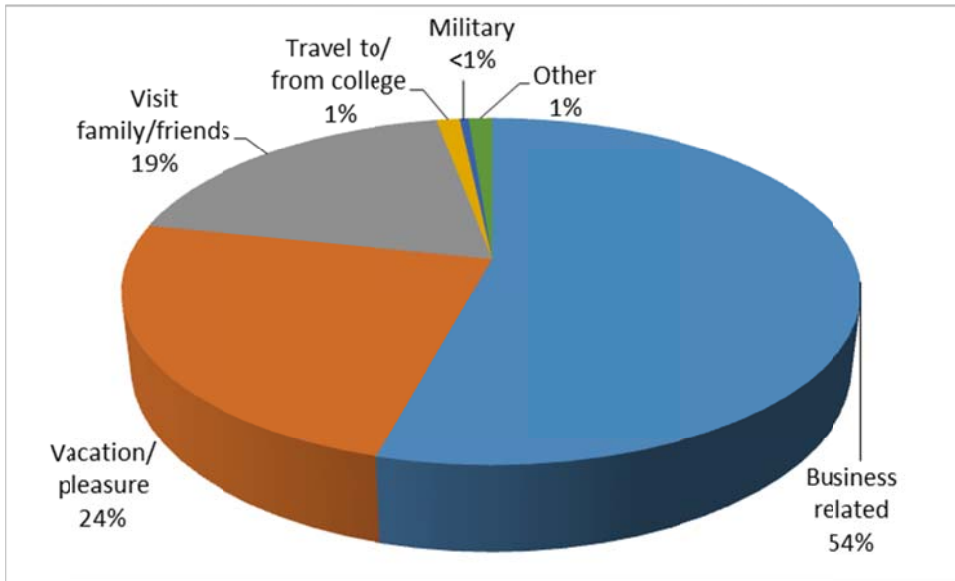


III.3 Airline Trip

III.3.1 Purpose of Travel

Figure III-9 displays the primary purpose of the airline trip for the originating passenger. Fifty-four percent of passengers are traveling for business-related purposes. Twenty-four percent are traveling for the vacation or pleasure and 19 percent are visiting friends or family. One percent of passengers each are traveling to/from college or for other purposes. Less than one percent are traveling for military reasons.

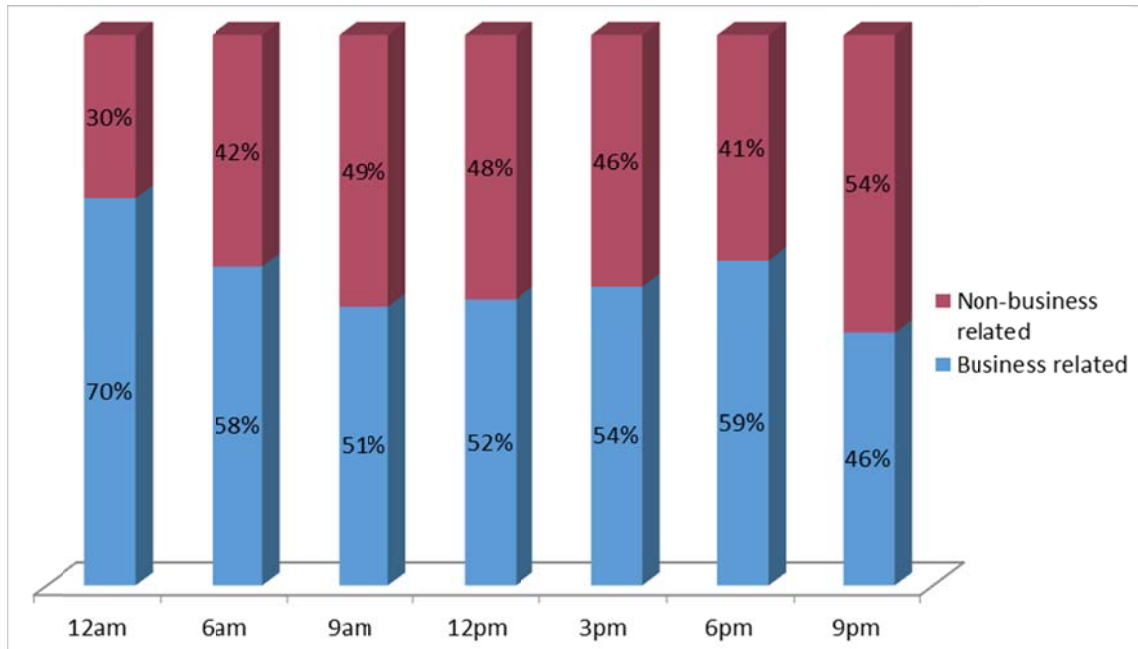
FIGURE III-9– WHAT IS THE PRIMARY PURPOSE OF YOUR TRIP? (N=8,379)



III.3.2 Purpose of Travel by Time of Day Period

Figure III-10 shows the Trip Purpose by Time of Day Period. A large majority of passengers traveling on early morning flights: 12:00 a.m. to 6:00 a.m. are business travelers. The 9:00 p.m. or later time period is the only one where a majority of passengers are non-business travelers.

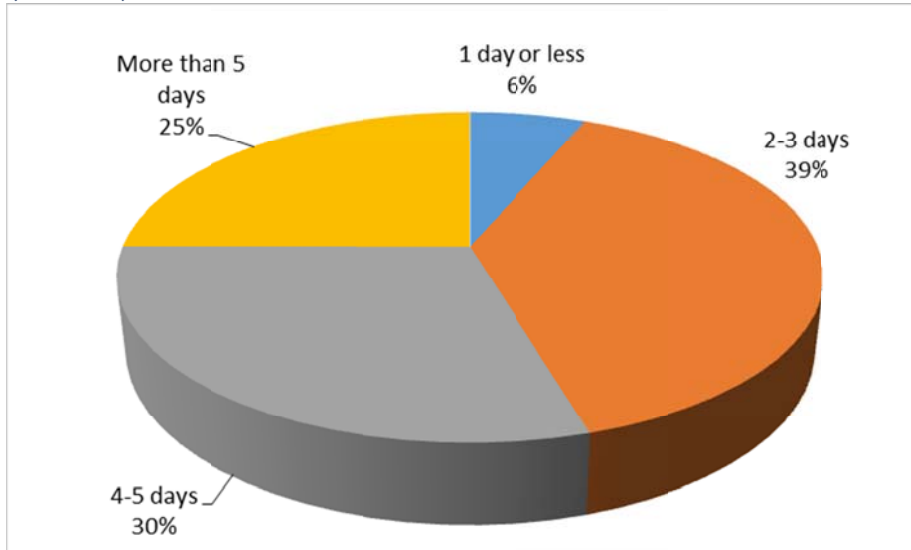
FIGURE III-10– TRIP PURPOSE AND TIME OF DAY(N=8,379)



III.3.3 Trip Duration

The survey asked passengers about trip duration: “How many days have you or will you be away from home on this trip?” Their responses are represented in Figure III-11. Only six percent of passengers have day trips of one day or less. The largest sub-group of passengers (39 percent) will be away from home for two to three days and 30 percent for four to five days. Twenty-five percent of passengers will be away from home for more than five days.

FIGURE III-11- HOW MANY DAYS HAVE YOU OR WILL YOU BE AWAY FROM HOME ON THIS TRIP?
(N=8,360)

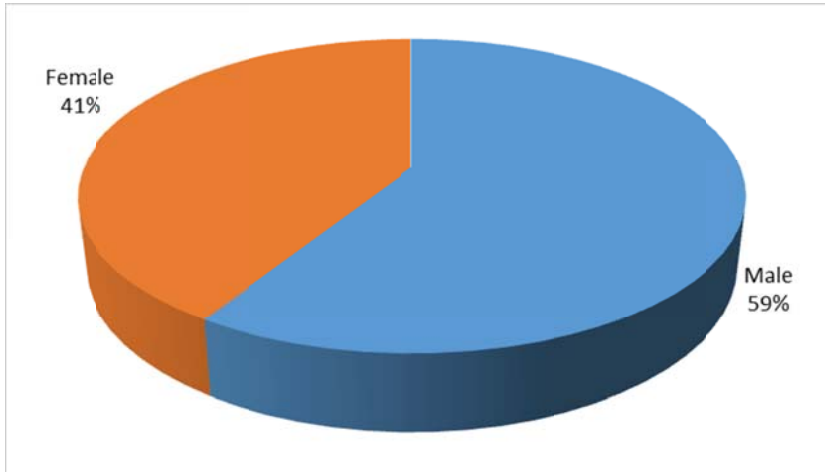


IV. Demographic Characteristics

IV.1 Gender

Figure IV-1 shows the gender of the survey respondents. There are more males (59 percent) than females (41 percent) among originating passengers.

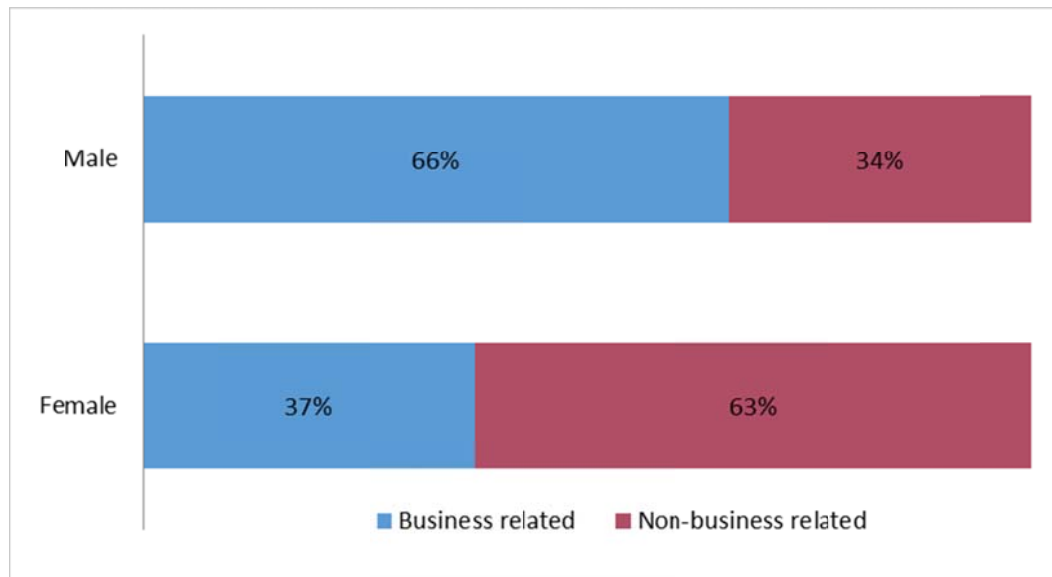
FIGURE IV-1- GENDER? (N=8,357)



IV.1.1 Gender by Purpose

The relationship between gender and trip purpose is provided in Figure IV-2. A larger percentage of males are traveling for business related purposes (66 percent) compared to females (37 percent). Meanwhile, a larger percentage of female passengers (63 percent) are traveling for non-business related travel – such as vacation/ pleasure, visiting family/ friends, traveling to/ from college, or other reasons compared to male passengers (34 percent).

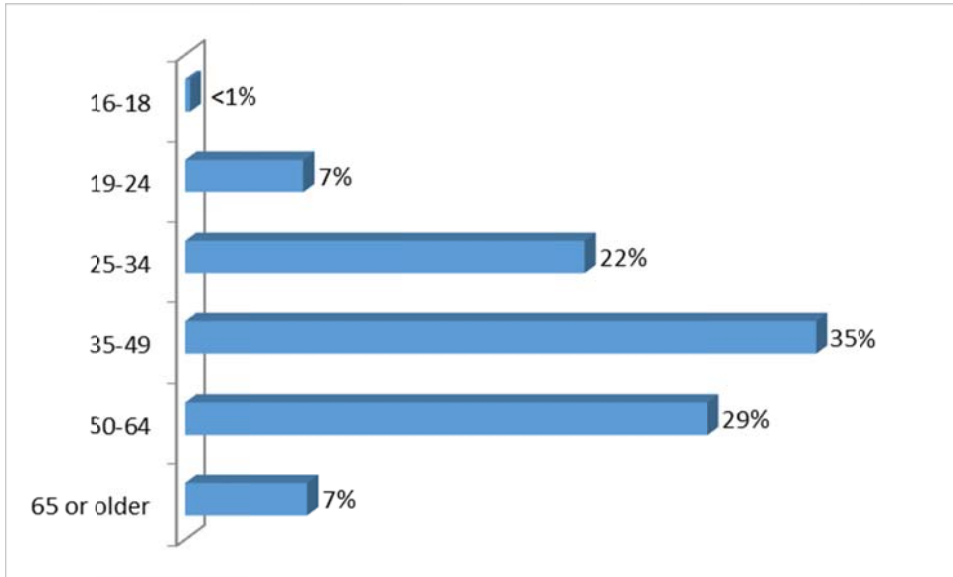
FIGURE IV-2- GENDER AND TRIP PURPOSE (N=8,357)



IV.2 Age

The age of originating passengers is displayed in Figure IV-3. The largest subgroups of passengers are between 35 to 64 years old; 35 percent are between the ages of 35 to 49 and 29 percent are between the ages of 50 to 64 years old. Seven percent are 65 or older. Nearly 30 percent are between 16 and 34 years old. The survey was only administered to people with a minimum age of 16.

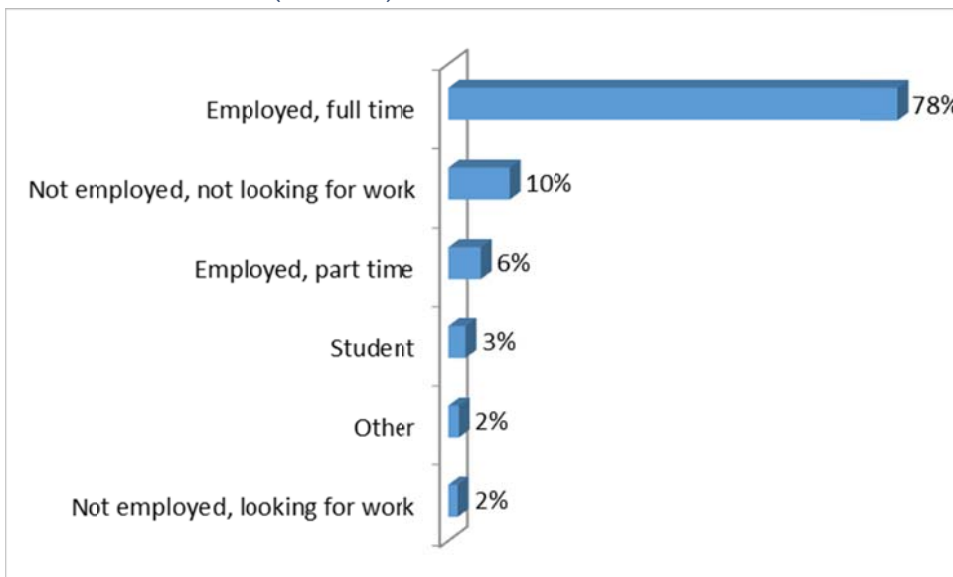
FIGURE IV-3- PLEASE SELECT YOUR AGE BRACKET. (N=8,234)



IV.3 Employment Status

Figure IV-4 shows a chart of the employment status of the originating passengers. The majority of passengers (78 percent) are employed full-time. Six percent of passengers are employed part-time. Ten percent are not employed and not looking for work; this category includes people who are unpaid caregivers or retired. The percentage of unemployed passengers – those looking for work – is low at two percent. Three percent are students and Two percent state “other” as their employment.

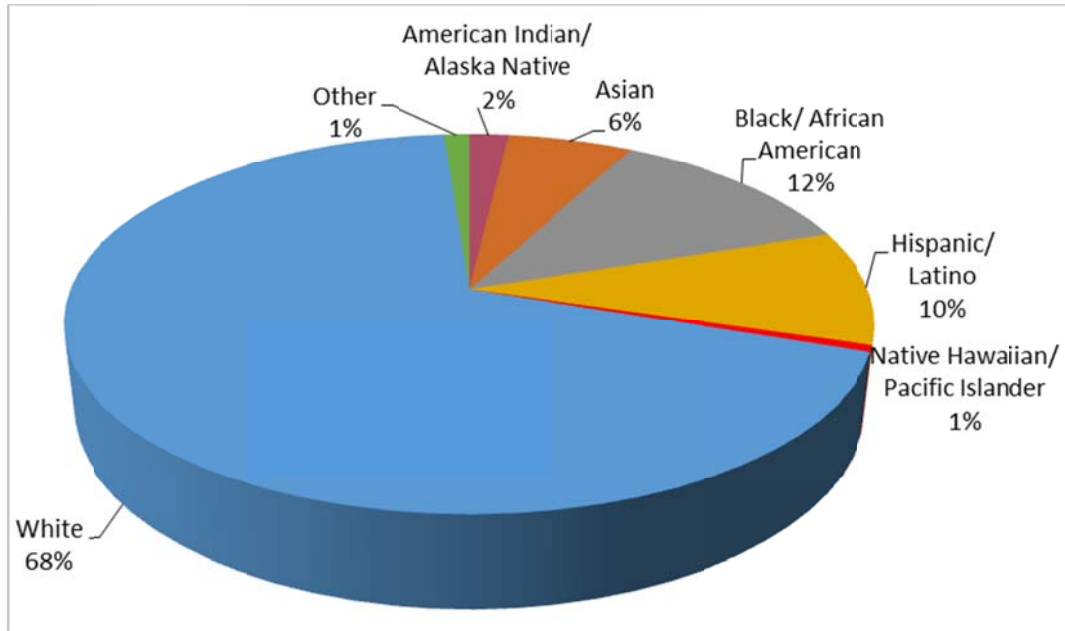
FIGURE IV-4- ARE YOU: (N=8,195)



IV.4 Ethnicity

The survey asked passengers their ethnicity; their responses are presented in Figure IV-5. Sixty-eight percent are White and the next largest subgroup is Black/ African American (12 percent). Hispanic/ Latino passengers make up 10 percent of the passengers surveyed, six percent are Asian, two percent American Indian/ Alaska Native, and Native Hawaiian/ Pacific Islander and “Other” make up one percent each of the passenger respondents.

FIGURE IV-5- ARE YOU: (N=8,218)



V. Household Demographics

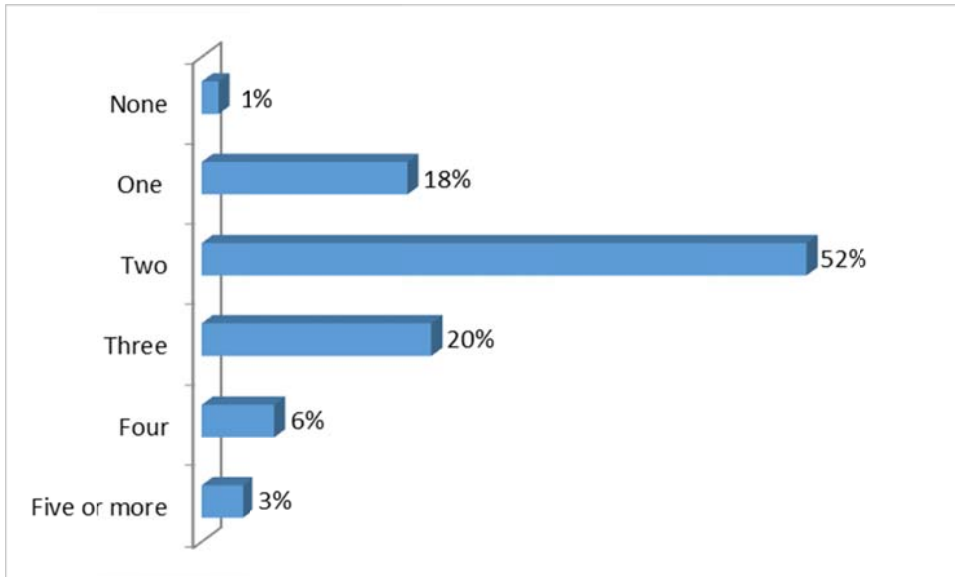
V.1 Household Vehicles

We asked passengers “How many vehicles are available in your household?” A presentation of the responses is provided in Table V-1 and Figure V-1. The average was 2.3 vehicles per household and the median was 2.0 vehicles per household. One percent don’t have any household vehicles. Eighteen percent have one vehicle, 52 percent have two vehicles, and twenty percent have three vehicles. Six percent have four vehicles and three percent of respondents have five or more vehicles available in his/her household.

TABLE V-1- HOW MANY VEHICLES ARE AVAILABLE IN YOUR HOUSEHOLD? (N=7,504)

Average – 2.3
Median – 2.0

FIGURE V-1- HOW MANY VEHICLES ARE AVAILABLE IN YOUR HOUSEHOLD? (N=7,504)



V.1.1 Household Vehicles by Mode

Table V-2 presents cross tabulation data by mode of transportation and number of vehicles by household for passengers who reside in the state of Texas. For each category of number of vehicles in the household, the most common mode of transportation to the airport was using a private vehicle.

TABLE V-2- HOUSEHOLD VEHICLES AND MODE OF TRANSPORTATION – TEXAS RESIDENTS (N=536)

Mode of Transportation	Number of Vehicles in Household					
	0	1	2	3	4	5 or more
Private vehicle	54%	49%	47%	60%	60%	34%
Rental vehicle	46%	22%	16%	20%	17%	10%
Hotel/motel shuttle	0%	11%	12%	7%	8%	30%
Dart light rail/ bus	0%	3%	1%	0%	0%	4%
Taxi/ limousine	0%	9%	14%	7%	0%	0%
Airport shuttle	0%	1%	4%	3%	12%	10%
Ridesharing (Uber)	0%	4%	5%	3%	3%	11%
Charter/ organized bus	0%	0%	1%	0%	0%	0%
Other	0%	1%	1%	0%	0%	0%
Sample Size	2	101	274	101	34	24

V.2 Household Size

The survey asked passengers “Including yourself, how many people live in your household?” Table V-3 and Figure V-2 represent a summary of the responses to the question. The average was 2.8 people and the median 2.0 people. The largest subgroup (38 percent) is two people. Only 13 percent of respondents live alone.

TABLE V-3- HOW MANY PEOPLE LIVE IN YOUR HOUSEHOLD? (N=7,488)

Average – 2.8
Median – 2.0

FIGURE V-2- HOW MANY PEOPLE LIVE IN YOUR HOUSEHOLD? (N=7,488)

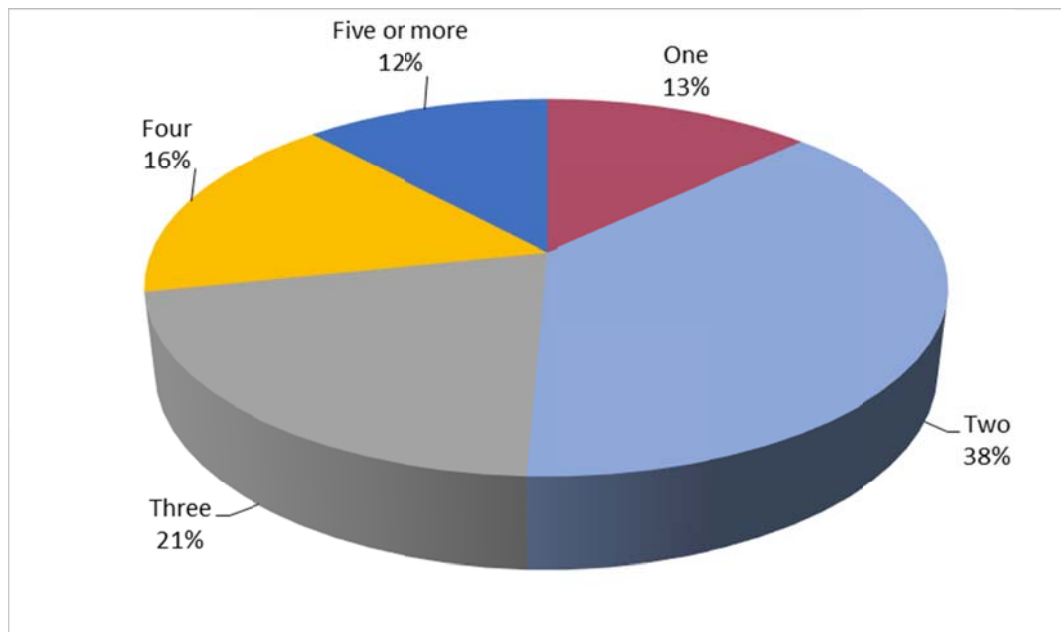


Table V-4 shows a cross-tabulation of travel party size and household size. Eleven percent of passengers who live alone travel alone. For passengers who live in a household of two or more people, the percentage of those traveling alone is significantly smaller at five to six percent.

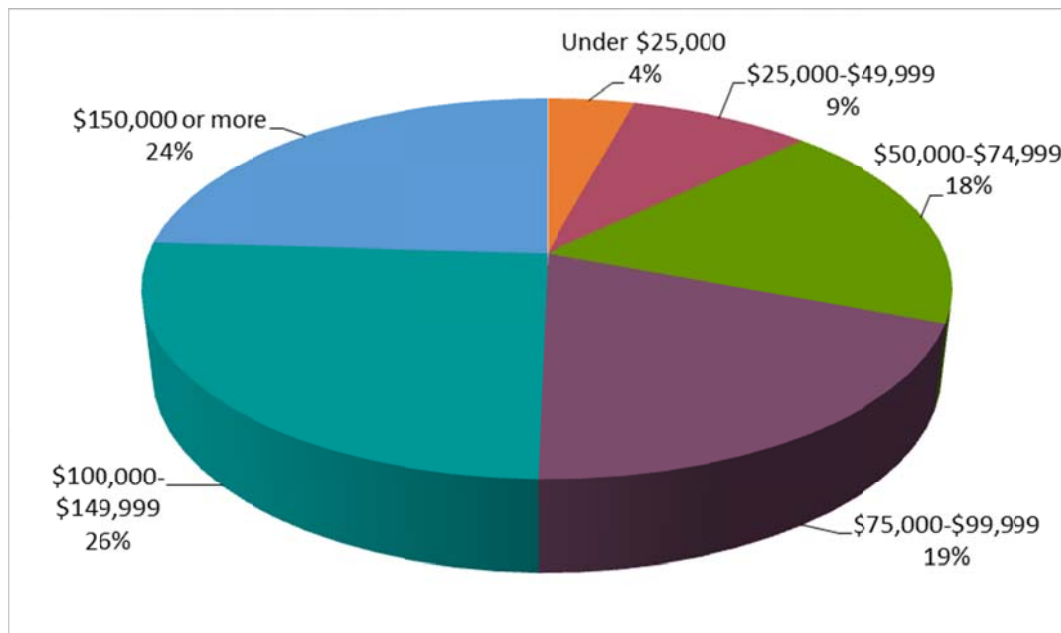
TABLE V-4- TRAVEL PARTY SIZE AND HOW MANY PEOPLE LIVE IN YOUR HOUSEHOLD? (N=7,488)

Travel Party Size:	# of People Living in Your Household					
	1	2	3	4	5	More than 5
1	11%	6%	6%	5%	5%	5%
2	64%	74%	54%	58%	43%	61%
3	10%	11%	27%	18%	21%	14%
4	10%	6%	8%	14%	9%	8%
5	1%	1%	1%	2%	14%	5%
More than 5	4%	2%	3%	3%	8%	7%

V.3 Annual Income

The survey asked passengers to provide their annual gross household income; the responses to this question are presented in Figure V-3. Half of the passengers report household incomes of \$100,000 or more with 24% reporting incomes of \$150,000 or more and 26% reporting incomes between \$100,000 and \$149,999. Nineteen percent report incomes between \$75,000 and \$99,999 and 18% report incomes of \$50,000 to \$74,999 annually. Thirteen percent report incomes of less than \$50,000.

FIGURE V-3- WHICH CATEGORY BEST DESCRIBES YOUR TOTAL ANNUAL HOUSEHOLD INCOME (BEFORE TAXES)? (N=6,066)

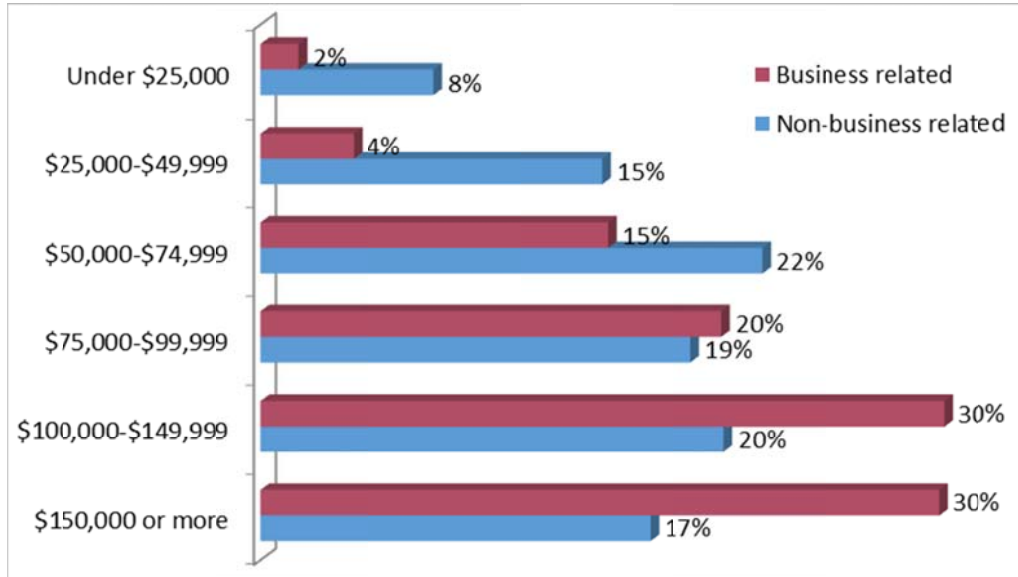


V.3.1 Income by Trip Purpose

Cross tabulation analysis reveals the majority of passengers traveling for business related reasons have high household annual incomes. Thirty percent of business passengers report incomes of \$150,000 or more and another 30 percent report incomes between \$100,000 and \$149,999. The percentage of passengers

traveling for non-business related purposes is smaller: 17 percent have incomes of \$150,000 or more and 20 percent have incomes between \$100,000 and \$149,999. Only two percent of business passengers report incomes under \$25,000. Meanwhile a larger percentage of passengers traveling for non-business related reasons (8%) have incomes of less than \$25,000. The full cross tabulation analysis can be seen in Figure V-4.

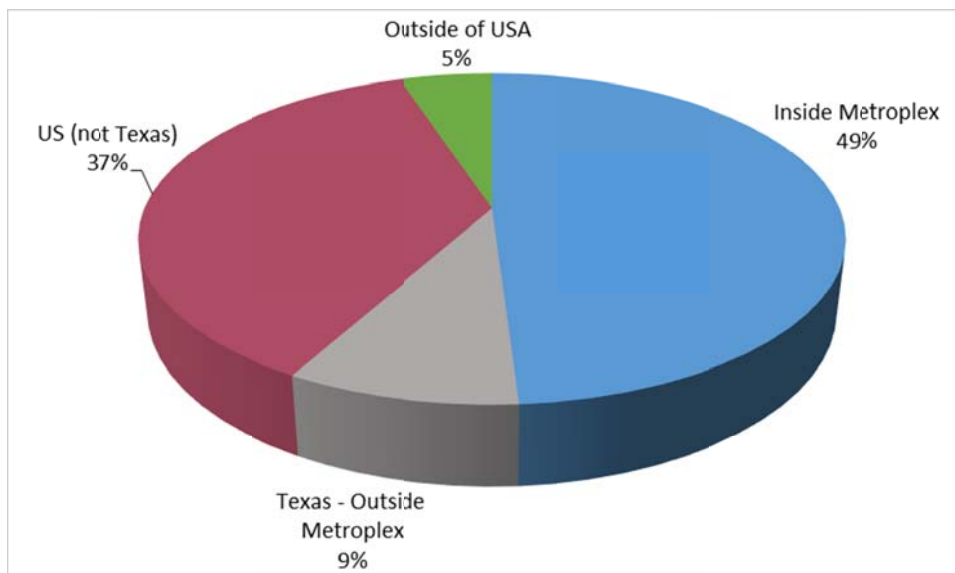
FIGURE V-4- TOTAL ANNUAL HOUSEHOLD INCOME AND TRIP PURPOSE (N=6,066)



V.4 Home Location

After Unison geocoded home address, they categorized responses into four categories: inside DFW Metroplex, Texas - Outside Metroplex, US (not Texas), and International (Outside of the U.S.). The DFW Metroplex was defined as a 12 county area, and is described in Section II.8. The largest subgroup (49 percent) of passengers resides inside the DFW Metroplex. Another nine percent reside inside the state of Texas but outside of the DFW Metroplex. Thirty-seven percent of passengers reside outside of Texas in another state, and five percent reside outside of the U.S. The breakdown of the responses is displayed in Figure V-5.

FIGURE V-5- WHERE IS YOUR HOME RESIDENCE? (N=8,379)





Appendix A- Survey Questionnaire

DFW FINAL SURVEY QUESTIONNAIRE

Nbr	Question Name / Type	Header Question Text	Choices <i>(italic for randomized choices)</i>	Branching and Skip Patterns
001	Airline / Single	What airline are you flying with today?	[1] American [2] Aeromexico [3] Air Canada [4] Alaska [5] Avianca [6] British Airways [7] Delta [8] Emirates [9] Etihad [10] Frontier [11] JetBlue [12] KLM [13] Korean [14] Lufthansa [15] Quantas [16] Qatar [17] Spirit [18] Sun Country [19] United [20] US Airways [21] Volaris [22] WestJet [23] Other (FileName: aa_jan.txt)	Next Question
002	American flights / ItemSelectionList	What is your flight number?	(FileName: air_canada_flights.txt)	Next Question
003	Air Canada flights / ItemSelectionList	What is your flight number?	(FileName: aeromexico_flights.txt)	Next Question
004	Aero mexico flights / ItemSelectionList	What is your flight number?	(FileName: alaska_flights.txt)	Next Question
005	Alaska flights / ItemSelectionList	What is your flight number?	(FileName: avianca_flights.txt)	Next Question
006	Avianca Flights / ItemSelectionList	What is your flight number?	(FileName: british_flights.txt)	Next Question
007	British flights / ItemSelectionList	What is your flight number?	(FileName: dl_jan.txt)	Next Question
008	Delta flights / ItemSelectionList	What is your flight number?	(FileName: emirates_flights.txt)	Next Question
009	Emirates flights / ItemSelectionList	What is your flight number?	(FileName: etihad_flights.txt)	Next Question
010	Etihad flights / ItemSelectionList	What is your flight number?		Next Question

*Note: Skip conditions and branch logic programming does not appear on paper version

Nbr	Question Name / Type	Header Question Text	Choices <i>(italic for randomized choices)</i>	Branching and Skip Patterns
011	Frontier flights / ItemSelectionList	What is your flight number?	(FileName: frontier flights.txt)	Next Question
012	JetBlue flights / ItemSelectionList	What is your flight number?	(FileName: jet blue flights.txt)	Next Question
013	KLM flights / ItemSelectionList	What is your flight number?	(FileName: klm flights.txt)	Next Question
014	Korean flights / ItemSelectionList	What is your flight number?	(FileName: korean flights.txt)	Next Question
015	Lufthansa flights / ItemSelectionList	What is your flight number?	(FileName: lufthansa flights.txt)	Next Question
016	Qantas flights / ItemSelectionList	What is your flight number?	(FileName: qantas flights.txt)	Next Question
017	Qatar flights / ItemSelectionList	What is your flight number?	(FileName: qatar flights.txt)	Next Question
018	Spirit flights / ItemSelectionList	What is your flight number?	(FileName: spirit_jan.txt)	Next Question
019	Sun Country flights / ItemSelectionList	What is your flight number?	(FileName: sun country_jan.txt)	Next Question
020	United flights / ItemSelectionList	What is your flight number?	(FileName: ua_jan.txt)	Next Question
021	US airways flights / ItemSelectionList	What is your flight number?	(FileName: aa_jan.txt)	Next Question
022	Volaris flights / ItemSelectionList	What is your flight number?	(FileName: volaris flights.txt)	Next Question
023	West Jet flights / ItemSelectionList	What is your flight number?	(FileName: westjet flights.txt)	Next Question
024	Connecting / Single	Are you starting your trip here at this airport or connecting from another flight?	[1] Starting here	Next Question
025	Final destination / Single	What airport is your FINAL destination?	[2] Connecting from another flight [1] Another U.S. Airport [2] Outside U.S.	End of Survey Next Question
026	US Airport dest / ItemSelectionList	What U.S. airport is your FINAL destination?	(FileName: airport_list_2015.txt)	Outside U.S dest Trip Origination
027	Outside U.S dest / ItemSelectionList	In what country is your FINAL destination airport located?	(FileName: world countries_2015.txt)	Next Question
028	Trip Origination / Single	YOUR STARTING LOCATION Where did you come from prior to arriving at the airport today?	[1] My home [2] Someone else's residence (friend/family/rental) [3] Work/ Business/ Company (a place of work) [4] Hotel/Motel [5] Dallas Convention Center [6] Other	Origin Dallas MSA Origin Dallas MSA Origin Dallas MSA Origin Dallas MSA Home info Next Question
029	Trip Origination - Other / Verbatim	What other location?	(Minimum Digits: 0) (Maximum Digits: 300)	Next Question

Nbr	Question Name / Type	Header Question Text	Choices <i>(italic for randomized choices)</i>	Branching and Skip Patterns
030	Origin Dallas MSA / Single	WITHIN 100 MILES OF AIRPORT Is this location in the Dallas Fort Worth Metroplex area?	[1] YES [2] NO [3] Don't know	Next Question Outside Dallas MSA Next Question
031	Type of info / Single	To improve access to the airport, we need to know your starting location. What can you provide:	[1] Address [2] Cross Streets and City [3] Name of Landmark/ Business/ Hotel and City (Minimum Digits: 0) (Maximum Digits: 7)	Next Question Starting Location cross .. Starting Location landm.. Next Question
032	Starting Location address / Numeric	INFORMATION WILL ONLY BE USED BY THE TEXAS COUNCIL OF GOVERNMENTS FOR THIS STUDY What is the address number?	(FileName: DAL_Roads-V2.txt)	Next Question
033	Starting Location cross street / ItemSelectionList	INFORMATION WILL ONLY BE USED BY THE TEXAS COUNCIL OF GOVERNMENTS FOR THIS STUDY What is the street name?	(FileName: DAL_Roads-V2.txt)	Next Question
034	Starting Location cross street(1) /	INFORMATION WILL ONLY BE USED BY THE TEXAS COUNCIL OF GOVERNMENTS FOR THIS STUDY What is the OTHER street name?	(FileName: DAL_Roads-V2.txt)	Next Question
035	Starting Location landmark / Verbatim	INFORMATION WILL ONLY BE USED BY THE TEXAS COUNCIL OF GOVERNMENTS FOR THIS STUDY What is the name of the location? Business, hotel/motel, landmark, attraction, public building	(Minimum Digits: 0) (Maximum Digits: 300)	Next Question
036	Starting location city / ItemSelectionList	INFORMATION WILL ONLY BE USED BY THE TEXAS COUNCIL OF GOVERNMENTS FOR THIS STUDY What is the name of the city?	(FileName: DAL_Cities_v2.txt)	Next Question
037	Zip code / Numeric	INFORMATION WILL ONLY BE USED BY THE TEXAS COUNCIL OF GOVERNMENTS FOR THIS STUDY What is the zip code?	(Minimum Digits: 5) (Maximum Digits: 5)	INTERVIEWER USE
038	Outside Dallas MSA / Verbatim	INFORMATION WILL ONLY BE USED BY THE TEXAS COUNCIL OF GOVERNMENTS FOR THIS STUDY Where is this location?	(Minimum Digits: 0) (Maximum Digits: 300)	Next Question
039	INTERVIEWER USE / Single	IS INFORMATION COMPLETE? INTERVIEWER'S USE ONLY	[1] Yes [2] No	Next Question End of Survey
040	Home info / Single	Where do you live?	[1] Texas [2] Other U.S. State [3] Outside U.S.	Next Question State of residence Country of residence Purpose of Travel
041	Home zip code / Numeric	INFORMATION WILL ONLY BE USED BY THE TEXAS COUNCIL OF GOVERNMENTS FOR THIS STUDY What is your home zip code?	(Minimum Digits: 5) (Maximum Digits: 5)	Purpose of Travel
042	State of residence / ItemSelectionList	INFORMATION WILL ONLY BE USED BY THE TEXAS COUNCIL OF GOVERNMENTS FOR THIS STUDY In what state do you live?	(FileName: State_list.txt)	Purpose of Travel
043	Country of residence / ItemSelectionList	In which country do you live?	(FileName: world countries_2015.txt)	Next Question

Nbr	Question Name / Type	Header Question Text	Choices <i>(italic for randomized choices)</i>	Branching and Skip Patterns
044	Purpose of Travel / Single	What is the primary purpose of your trip?	<ul style="list-style-type: none"> [1] Business related (includes conferences/conventions) [2] Vacation/pleasure [3] Visit family/ friends [4] Travel to/ from college [5] Military [6] Other 	<ul style="list-style-type: none"> Next Question Next Question Next Question Next Question Next Question Next Question
045	Other purpose / Verbatim	What is the other reason?	<ul style="list-style-type: none"> (Minimum Digits: 0) (Maximum Digits: 300) 	Next Question
046	Travel time / Numeric	FROM THE TIME YOU LEFT YOUR STARTING LOCATION TO THE TIME YOU CAME TO THE TERMINAL How many minutes did it take to travel to the airport today?	<ul style="list-style-type: none"> (Minimum Digits: 1) (Maximum Digits: 3) 	Next Question
047	Arriving Transportation / Single	What was your primary mode of transportation to the airport?	<ul style="list-style-type: none"> [1] Private vehicle (car, van, motorcycle) [2] Rental vehicle [3] Hotel/Motel shuttle or courtesy van [4] DART light rail/bus [5] Taxi/Limousine [6] Airport Shuttle (Super Shuttle, Prime Time) [7] Ridesharing Service (Uber, Lyft, Sidecar, etc.) [8] Charter bus/ organized bus [9] Other 	<ul style="list-style-type: none"> Private Parking Reimbursement Travel Duration Reasons for trans pref Reimbursement Reimbursement Reimbursement Travel Duration Next Question Reimbursement
048	Arriving Transportation - Other / Verbatim	What OTHER mode of transportation did you use to get to the airport?	<ul style="list-style-type: none"> (Minimum Digits: 0) (Maximum Digits: 300) 	Reimbursement
049	Private Parking / Single	Where is the car parked?	<ul style="list-style-type: none"> [1] Didn't park - I was dropped off [2] DFW Terminal Garage [3] DFW Express (North/South Parking) [4] DFW Remote/Economy Parking [5] DFW Airport Valet [6] Parking Spot [7] Park and Fly [8] Swift Park [9] Other Lot 	<ul style="list-style-type: none"> Reasons for trans pref Reasons for Parking Pref Reasons for Parking Pref Reasons for Parking Pref Reasons for Parking Pref Reasons for Parking Pref Reasons for Parking Pref Reasons for Parking Pref Next Question Reimbursement
050	Private Parking - Other / Verbatim	What OTHER parking lot did you use?	<ul style="list-style-type: none"> (Minimum Digits: 0) (Maximum Digits: 300) 	Next Question

Nbr	Question Name / Type	Header Question Text	Choices <i>(italic for randomized choices)</i>	Branching and Skip Patterns
051	Reasons for Parking Pref / Multi Normal	Select all that apply, then press NEXT Why did you park there?	<p>[1] Comfort and convenience</p> <p>[2] Lack of time/Was running late</p> <p>[3] Cost</p> <p>[4] Size of travel party</p> <p>[5] Number of luggages</p> <p>[6] Covered parking</p> <p>[7] Travel time</p> <p>[8] Other</p> <p>(Min: 0, Max: 0, Exclusive: 0)</p>	Next Question
052	Reasons for Parking Pref - Other / Verbatim	What is the OTHER reason?	<p>(Minimum Digits: 0)</p> <p>(Maximum Digits: 300)</p>	Next Question
053	Parking cost / Numeric	PLEASE PROVIDE BEST ESTIMATE How much will you pay for parking per day?	<p>(Minimum Digits: 1)</p> <p>(Maximum Digits: 3)</p>	Next Question
054	Reimbursement / Single	Will you get reimbursed for transportation or parking?	<p>[1] Yes</p> <p>[2] No</p>	Next Question
055	Percent_reimbursement / Numeric	What % of transportation or parking will you get reimbursed?	<p>(Minimum Digits: 1)</p> <p>(Maximum Digits: 3)</p>	Reasons for trans pref
056	Reasons for trans pref / Multi Normal	Select all that apply, then press NEXT Why did you choose this mode of transportation?	<p>[1] Travel time</p> <p>[2] Reliability</p> <p>[3] Lack of time/Was running late</p> <p>[4] Cost</p> <p>[5] Size of travel party</p> <p>[6] Comfort and convenience</p> <p>[7] Number of luggages</p> <p>[8] Personal preference</p> <p>[9] Personal vehicle was not available</p> <p>[10] Other</p> <p>(Min: 0, Max: 0, Exclusive: 0)</p>	Next Question
057	Reasons for trans pref other / Verbatim	What is the other reason?	<p>(Minimum Digits: 0)</p> <p>(Maximum Digits: 300)</p>	Next Question
058	Travel Duration / Single	How many days have you or will you be away from home on this trip?	<p>[1] 1 day or less</p> <p>[2] 2-3 days</p> <p>[3] 4-5 days</p> <p>[4] More than 5 days</p>	Next Question
059	Traveling Alone / Single	Did you come to the airport alone today?	<p>[1] No - traveling with others or others came to see me off</p> <p>[2] Yes - traveling alone</p>	Next Question
060	Traveling Party / Single	How many people are traveling with you (including yourself)?	<p>[1] 1</p> <p>[2] 2</p> <p>[3] 3</p> <p>[4] 4</p> <p>[5] 5</p> <p>[6] More than 5</p>	Gender
				Well wisher
				Well wisher
				Well wisher
				Well wisher
				Well wisher
				Next Question

Nbr	Question Name / Type	Header Question Text	Choices <i>(italic for randomized choices)</i>	Branching and Skip Patterns
061	Traveling Party out of DAL / Numeric	IF MORE THAN 5 (INCLUDING YOURSELF) How many people are traveling with you?	(Minimum Digits: 1) (Maximum Digits: 2)	Next Question
062	Well wisher / Single	How many people came to the airport to see you off today?	[1] None [2] 1 [3] 2 [4] 3 [5] 4 [6] 5 [7] More than 5	One Vehicle One Vehicle One Vehicle One Vehicle One Vehicle One Vehicle Next Question
063	Travel No / Numeric	IF MORE THAN 5 How many people came to the airport see you off today?	(Minimum Digits: 1) (Maximum Digits: 2)	Next Question
064	One Vehicle / Single	Did your party come to the airport in one vehicle?	[1] Yes [2] No	Gender Next Question
065	Number of Vehicles / Numeric	How many vehicles did you use to come to the airport?	(Minimum Digits: 1) (Maximum Digits: 2)	Next Question
066	Gender / Single	What is your gender?	[1] Male [2] Female	Next Question Next Question
067	Age Bracket / Single	Please select your age bracket:	[1] 16-18 [2] 19-24 [3] 25-34 [4] 35-49 [5] 50-64 [6] 65 or older	Next Question Next Question Next Question Next Question Next Question Next Question
068	Employment / Single	Are you?	[1] Employed, Full time [2] Employed, Part time [3] Not Employed, Looking for work [4] Not Employed, Not Looking for work (retired, family/household care giver, etc.) [5] Student [6] Other	Ethnicity Ethnicity Ethnicity Ethnicity Ethnicity
069	Employment - Other / Verbatim	What OTHER employment status are you?	(Minimum Digits: 0) (Maximum Digits: 300)	Next Question
070	Ethnicity / Single	Are you:	[1] American Indian/Alaska Native [2] Asian [3] Black/African American [4] Hispanic/Latino [5] Native Hawaiian/Pacific Islander [6] White [7] Other	People Living at Home People Living at Home People Living at Home People Living at Home People Living at Home People Living at Home Next Question
071	Ethnicity - Other / Verbatim	What OTHER ethnicity are you?	(Minimum Digits: 0) (Maximum Digits: 300)	Next Question
072	People Living at Home / Numeric	INCLUDING YOURSELF How many people live in your household?	(Minimum Digits: 0) (Maximum Digits: 2)	Next Question

Nbr	Question Name / Type	Header Question Text	Choices <i>(italic for randomized choices)</i>	Branching and Skip Patterns
073	Household Vehicles / Numeric	How many vehicles are available in your household?	(Minimum Digits: 0) (Maximum Digits: 2)	Next Question
074	Annual Income / Single	Which category best describes your total annual household income (before taxes):	[1] Under \$24,999 [2] \$25,000-\$49,999 [3] \$50,000-\$74,999 [4] \$75,000-\$99,999 [5] \$100,000-\$149,999 [6] \$150,000 or more	Next Question Next Question Next Question Next Question Next Question Next Question



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