

## **TECHNICAL APPENDIX**

### **OUR NATION'S TRAVEL: 1995 NPTS Early Results Report**

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## **1995 NPTS SUMMARY**

### **SPONSORS**

Research Triangle Institute conducted the 1995 NPTS under the sponsorship of four agencies of the U.S. Department of Transportation:

Federal Highway Administration (FHWA)

Bureau of Transportation Statistics (BTS)

Federal Transit Administration (FTA)

National Highway Traffic Safety Administration (NHTSA).

FHWA has the lead role in coordinating the survey.

### **PURPOSE OF THE SURVEY**

The NPTS serves as the nation's inventory of daily personal travel. It is the only authoritative source of national data on the daily trips including, but not limited to:

- purpose of the trip (work, shopping, etc.)
  - means of transportation used (e.g., car, bus, subway, walk)
  - how long the trip took , i.e., travel time
  - time of day the trip took place
  - day of week the trip took place,
- and, if a private vehicle trip:
- number of people in the vehicle , i.e., vehicle occupancy
  - driver characteristics (age, sex, worker status, education level, etc.)
  - vehicle attributes (make, model, model year, amount of miles driven in a year).

These data are collected for:

- all trips
- all modes
- all purposes
- all trip lengths, and
- all areas of the county, urban and rural.

### **USES OF NPTS DATA**

The Department of Transportation uses NPTS data to:

- quantify travel behavior
- analyze changes in travel trends over time
- relate travel behavior the demographics of the traveller
- look at the relationship of demographics and travel over time

-- look at the relationship of travel and land use.

The primary uses of the NPTS data are in gaining a better understanding of travel behavior. The data are used to enable DOT officials to assess program initiatives, review programs and policies, and plan for the future.

The NPTS is a tool in the urban transportation planning process, by providing data on personal travel behavior, trends in travel over time, trip generation rates, national data to use as a benchmark in reviewing local data, and in various other planning and modeling applications.

The transportation research community, including academics, consultants and government, use the NPTS extensively to examine:

- travel behavior at the individual and household level
- the characteristics of travel, such as trip chaining, use of the various modes, amount and purpose of travel by time of day & day of week, vehicle occupancy, and a host of other attributes
- the relationship between demographics and travel, e.g. the 1990 NPTS showed increases in personal mobility among women, older Americans, youth, and to some degree, low-income households.
- the public's perceptions of the transportation system.

People in various fields use the NPTS data to connect the role of transportation with other aspects of our lives. Medical researchers use the data to determine accident exposure rates of school age children, particularly when they are travelling on their own by walking or biking. Social service agencies need to know more about how low-income households currently travel, which has taken on heightened importance with the employment initiatives for unemployed portion of the welfare population.

## **SURVEY COVERAGE**

**Who** -- The NPTS is a survey of the civilian, non-institutionalized population of the United States. As such, it does not include:

- military personnel living on base or overseas, OR
- residents of group quarters, such as nursing homes or assisted-living facilities, college dormitories, long-term medical institutions, prisons.

Military personnel are included if they live in civilian housing. College students are included if they live in

apartments or other off-campus housing, or if they are at home for the summer.

**When--** The 1995 NPTS was conducted from May 1995 to July 1996. Travel data were collected for all seven days of the week, and all months throughout that period. Travel was collected for all holidays in that period. Interviewing for daily travel data starts the day after the day of travel, which allowed for holidays to be travel days.

**Where** - All trips by U. S. residents were recorded, including those where the destination was a foreign country.

## **SAMPLE SIZE**

The 1995 NPTS dataset contains the data from the following:

42,033 Households  
95,360 Persons  
75,217 Vehicles  
409,025 Daily trips  
29,647 Long trips.

## **SURVEY SCOPE**

**What the NPTS Includes** - The 1995 NPTS data set includes:

- Household data on relationship of household members, education level, income categories, housing characteristics, and other demographic information.
- Motor vehicle information including year, make, model, and odometer readings, converted to annual estimates.
- Information on the availability of public transportation.
- Data about drivers, including information on travel as part of work.
- Data about trips taken during a designated 24-hour period (the household's travel day) including the time the trip began, length of

trip, composition of the travel party, mode of transportation, purpose of the trip, and vehicle used (if a household vehicle was used).

- Data describing trips taken during a 14-day period (the household's travel period) where the farthest point of the trip was at least 75 miles from home, including the destination, mode, and purpose.
- Information to describe characteristics of the geographic area in which the sample household and workplace of sample persons are located.
- Data on telecommuting
- Data on people who use transit occasionally
- Public perceptions of the transportation system
- Reasons for not car-pooling or using public transit for the work trip
- Incidence of seat belt use, and reasons people don't always wear seat belts.

### **What is NOT Included in NPTS**

In the past there have been many requests for data that are closely related to the NPTS, but are not available in the NPTS. Examples of the most common requests for data that is NOT included in NPTS are:

- information on costs of travel (other than parking costs at work)
- information about specific travel routes or types of roads used
- how travel of the sample households changes over time

( Note: The NPTS is a cross-sectional survey, which means that different households are selected for the sample each time it is conducted. Tracking

the sample households over time is called a longitudinal survey.)

- information that would identify the exact household or workplace location
- information on travel in specific metropolitan areas or states
- travel by household members under the age of 5 when they travel with non-household members ( e.g., a day care provider takes your child to the park, another parent takes your child to their house)
- information on the fuel economy of vehicles, i.e., miles per gallon or MPG (however, vehicle make, model and model year is included which would allow linking the NPTS with another source of MPG)
- the traveller's reason for selecting a specific mode of travel over another mode.

## PLOT POINTS FOR GRAPHICS

### CHANGES IN POPULATION AND VEHICLES as % of 1969 value (Figure 1)

	Households	Persons	Drivers	Workers	Vehicles
1969	100	100	100	100	100
1977	121	108	124	123	166
1983	137	116	143	136	198
1990	149	121	158	156	228
1995	155	123	172	174	244

### CHANGES IN RATES (Figure 2)

	Persons Per Household	Workers Per Household	Drivers Per Household	Vehicles Per Household	Vehicles Per Drivers	Vehicles Per Worker	Workers Per 16+
1969	3.16	1.21	1.65	1.16	0.70	0.96	0.55
1977	2.83	1.23	1.69	1.59	0.94	1.29	0.59
1983	2.69	1.21	1.72	1.68	0.98	1.39	0.59
1990	2.56	1.27	1.75	1.77	1.01	1.40	0.64
1995	2.44	1.33	1.79	1.78	1.00	1.34	0.70

### SHARE OF WORKERS & DRIVERS BY GENDER (Figure 3)

	Male Drivers Per Male 16+	Male Workers Per Male 16+	Female Drivers Per Female 16+	Female Workers Per Female 16+
1969	0.87	0.72	0.61	0.37
1977	0.89	0.75	0.73	0.45
1983	0.9	0.70	0.77	0.48
1990	0.93	0.74	0.86	0.56
1995	0.93	0.74	0.85	0.59

**HOUSEHOLDS BY NUMBER OF VEHICLES**

**(Millions)**

**Figure 4**

	0 Vehicles	1 Vehicles	2 Vehicles	3+ Vehicles
1969	12.9	30.3	16.5	2.9
1977	11.5	26.1	25.9	11.8
1983	11.5	28.8	28.6	16.4
1990	8.6	30.7	35.9	18.2
1995	8.0	32.1	40.0	18.9

**ZERO VEHICLE HOUSEHOLDS**

**(Percent)**

**Figure 5**

	All	0 Vehicles
African American	11.8	35.1
Hispanic	7.8	11.9
Single Parent	5.3	12.3
Below \$25K Income Households	28.6	65.1

**DISTRIBUTION OF HOUSEHOLD VEHICLES BY AGE**

**(Vehicles in Thousands)**

**Figure 6**

Ages	0-2	3-5	6-9	10+
1969	22765	24070	17835	7830
1977	33387	35549	30865	20297
1983	27306	39234	38515	38659
1990	27427	45436	41801	50558
1995	37854	35389	50355	52467

### TOTAL ANNUAL TRAVEL

(Billions)

Figure 7

All Person Miles	Person Miles by POV	Vehicle Miles
3407	3105	2064

### NPTS TRIP RATES PERSONS AGE 5 AND OVER

Figure 8

Daily Person Trips per Person	
1990 Unadjusted	3.1
1990 Adjusted	3.8
1995	4.2

### CHANGE IN DAILY TRIPS PER PERSON

Percent of Change by Source

Figure 9

Increase in Trips	36
Survey Methods	64

### PURPOSE OF TRAVEL BY PERCENT

Figure 10

	Person Trips	Person Miles
Shopping	20.2	13.5
Work Related	2.6	5.8
Work	17.7	22.5
Other	0.2	0.4
Other Social/Recreational	16.7	19.5
Visiting	8.2	11.2
Church & School	8.8	5.7
Other Family/Personal	24.2	19.9
Doctor/Dentist	1.5	1.5

## COMMUTE PROFILE

**Figure 11**

	1983	1990	1995	% Change 83-95
Average Work Trip Length (Miles)	8.5	10.6	11.6	36.5
Average Work Travel Time (Minutes)	18.2	19.7	20.7	13.7
Average Work Trip Speed (MPH)	28	32.3	33.6	20.0

## WORK/NON-WORK TRIPS

### BY TIME OF DAY

(Percent of Days Travel)

**Figure 12**

	Work	Non-Work
Mid-6AM	1.1	1.1
6-9	5.0	8.8
9-Noon	1.6	15.4
Noon-4PM	3.5	25.8
4-06	4.6	18.3
7-Mid.	1.9	12.9

## SHOPPING TRIPS

(Percent of Week's Travel)

**Figure 13**

	Weekday	Weekend
Midnight-6AM	0.35	0.18
6AM-9AM	3.46	1.53
9AM-Noon	13.75	8.21
Noon-4PM	21.99	13.19
4PM-7PM	16.37	7.54
7PM-Midnight	7.48	5.94

**PICKUP-DROPOFF TRIPS  
(Percent)  
Figure 14**

Weekday	77.7
Weekend	22.3
Men	37.3
Women	62.7

**MEANS OF TRAVEL  
BY PERCENT  
Figure 15**

	<b>Person Trips</b>	<b>Person Miles</b>
POV	86.2	90.8
Transit	1.8	2.1
Walk	5.4	0.3
School Bus	1.7	1.3
Other	4.9	5.5

**BIKE & WALK TRIPS  
By Percent  
Figure 16**

	<b>Walk</b>	<b>Bike</b>
Family/Personal	43	22
Social/Recreational	34	60
Work	7	8
School/Relegious	14	9
Other	2	1

### MEN'S TRAVEL

Figure 17

(Annual Person Miles in Billions)		
Ages	Driver	Non-Driver
5-15	N/A	165
16-19	50	40
20-34	417	84
35-49	468	60
50-64	242	39
65+	112	24

### WOMEN'S TRAVEL

Figure 18

(Annual Person Miles in Billions)		
Ages	Driver	Non-Driver
5-15	N/A	172
16-19	35	40
20-34	276	140
35-49	288	127
50-64	114	87
65+	60	61

### PASSENGER/DRIVER PERSON MILES BY WORKER/NON-WORKER

(Trillion Person Miles)

Figure 19

	Driver	Passenger
Worker	1.7	0.4
Non-Worker	0.4	0.6

**PASSENGER & DRIVER MILES  
BY HOUSEHOLD INCOME  
(Billion of Person Miles)**

**Figure 20**

	Passenger Miles	Driver Miles
<25K	198	346
25-40K	239	514
40-65K	248	498
65K+	201	418
Not Reported	153	289

**WORK TRAVEL BY MODE  
(Percent)**

**Figure 21**

	Person Trips	Person Miles
POVS	90.7	93.0
<i>Single Occupant</i>	74.7	75.9
<i>Carpool</i>	16.0	17.1
TRANSIT	3.5	3.5
WALK	2.3	0.15
OTHER	3.5	3.5

**DAILY TIME SPENT DRIVING  
(Minutes)**

**Figure 22**

Ages	Male	Female
16 - 19	57.7	56.1
20-34	80.7	65.4
35-49	85.5	67.4
50-64	87.7	61.1
65+	73.2	54.7
All	81.3	63.6

**AVERAGE ANNUAL MILES  
BY DRIVER AGE AND SEX**

**Figure 23**

Ages	Men	Women
16-19	7543	5984
20-34	16920	11074
35-54	18028	10637
55-64	14951	7049
65+	9830	4151

**VEHICLE OCCUPANCY  
BY PURPOSE  
(Persons/Vehicle)**

**Figure 24**

All Purposes	1.59
Work	1.14
Shopping	1.79
Family/Personal	1.82
School/Church	1.65
Visiting	2.08
Other Social/Recreational	2.17

**PERCENT OF VEHICLE TRIPS  
BY VEHICLE OCCUPANTS AND TRIPS PURPOSE**

**Figure 25**

	2+ Occupants	One Occupant
All	32	68
Other Social & Recreational	52	48
Other Family & Personal	41	59
Visit	36	64
School/Church	36	64
Shopping	33	67
Work-related	13	87
Work	9	91

**TRAVEL BY ELDERLY**  
**(Percent)**  
**Figure 26**

	<i>65+</i>	<i>Under 65</i>
Population	12.9	87.1
<i>% Person Trips by Age Group and Purpose</i>		
Work	5.5	19.1
Shopping	29.5	19.2
Oth Fam/Per	27.4	23.8
Soc/Rec	26.9	24.7
Other	10.7	13.2
<i>% Person Trips by Age Group by Mode</i>		
POV-Driver	66.3	59.9
POV-Passenger	22.7	26.1
Public Transit	1.8	1.8
Walk	5.3	5.4

**ANNUAL PERSON TRIPS PER PERSON**  
**For African Americans and Caucasians**  
**Figure 27**

	African Americans	Caucasians
All	1421	1602
POV Driver	722	1006
POV Passenger	352	411
Transit	95	15
Walk	131	72
Other	121	98

**ANNUAL PERSON TRIPS PER PERSON  
For Hispanics and Non-Hispanics**

**Figure 28**

	Hispanics	Non-Hispanics
All	1535	1572
POV Driver	820	965
POV Passenger	434	400
Transit	48	25
Walk	126	80
Other	107	102

**TRAVEL BY CHILDREN (5-15)**

**Figure 29**

	5-9 Years	10-15 Years
<i>% Trips by Trips Purpose</i>		
Social/Recreational	39.6	40.6
Family/Personal	31.3	28.5
School	26.3	26.8
Other	2.8	4.1
<i>Annual Trips/Person</i>		
POV Passenger	982	890
School Bus	120	143
Walk	107	157
Transit	16	22
Other	109	154
<i>% School Trips by mode</i>		
POV	52.8	43.5
School Bus	30.2	36.0
Walk	10.5	12.4
Other	6.5	8.1

## 1995 NPTS - CONTROL TOTALS

Variable	Sample Size	Weighted Sum <sup>2/</sup>	95 % Confidence Interval
Households	42,033	98,990,000	± 0.7%
Persons	95,360	241,675,000	± 1.1%
Household Vehicles	75,217	176,066,660	± 0.9%
Drivers	69,876	176,330,410	± 0.9%
Workers	46,679	117,746,380	± 1.1%
Person trips (travel day)	409,025	387,930,363,336	± 1.3%
Vehicle trips (travel day)	249,882	229,537,000,000	± 1.3%

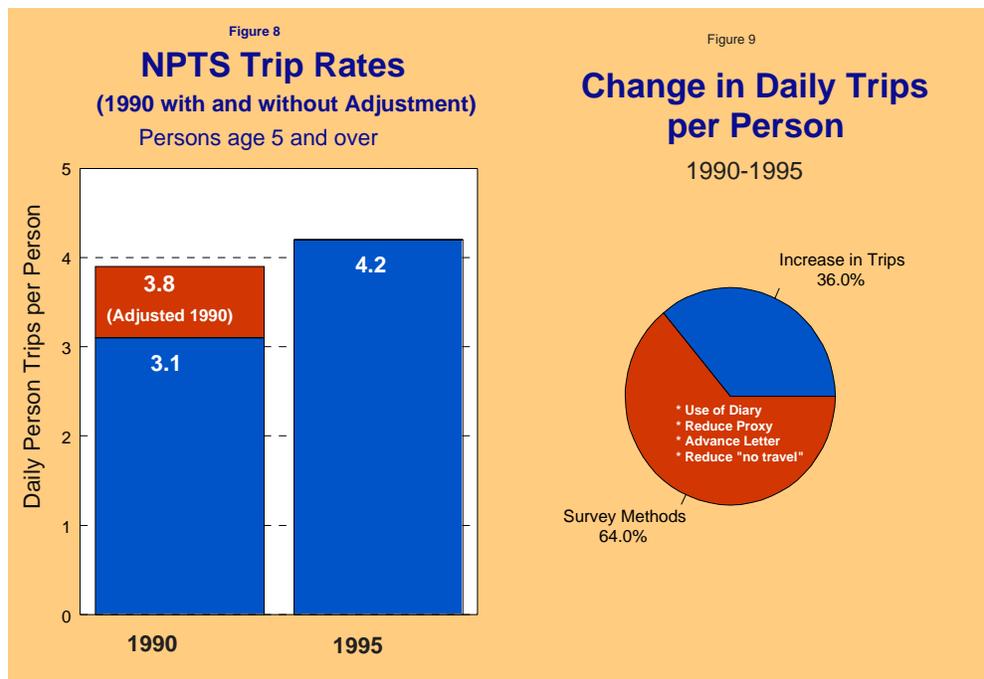
<sup>2/</sup> annual, national estimates

**WARNING: Do not compare the 1995 data on trips and travel directly to the 1990 NPTS data.** See page 17 of Our Nation's Travel and the section on Changes in Travel between 1990 and 1995 in this Technical Appendix.

## CHANGES IN TRAVEL BETWEEN 1990 AND 1995: NPTS AND U.S. REGIONAL TRAVEL SURVEYS

### OVERVIEW

When comparing the 1995 and 1990 NPTS datasets directly, there is nearly an increase of about 1.1 trips per person per day in 5 years, or 35% increase (3.1 trips in 1990 compared to 4.2 trips in 1995). However, much of this apparent increase is due to changes in survey methods. We estimate that one-third of this increase is a real increase in travel, and two-thirds due to changes in survey methods implemented in the 1995 survey. That is, between 1990 and 1995, daily person trips increased from 3.8 trips to 4.2 trips. By comparing the 1990 and 1995 NPTS data to regional data, we estimate that an increase of 0.4 trips per person per day can be attributed to “real” increases in travel, and 0.7 trips per day are attributable to changes in survey methods. Thus, to make 1990 NPTS more comparable to 1995 NPTS, the 1990 overall trip rates should increase by 22%.



## **METHOD OF COMPARISON**

**Step 1.** Getting regional datasets from approximately the same time period.

Six regional travel surveys for 1990 used in the analysis and seven different regional survey were used for 1995 data. Data for these cities was extracted from the 1990 and 1995 NPTS for comparison.

**Step 2.** Making the datasets comparable

Several controls were established to reduce the possible impact of differences in survey implementation, between the various regional datasets, and with the NPTS. These controls included:

- Travel days Monday through Friday only
- Persons age 5 and over
- Bike and walk trips included ONLY if traveling to/from work
- People who made no trips were excluded
- Proxy reports excluded (when identifiable)
- Travel reported within 3 days of assigned travel day (when identifiable)

**Step 3.** Calculating daily trips rates by person, total and by trip purpose.

Using these controlled datasets, the 1990 NPTS daily person trip rate is slightly lower than the 1990 regional datasets. In 1995, the reverse is true. When the data were controlled by the attributes listed above, NPTS shows an increase of 0.6 daily person trips per person between 1990 and 1995. With the same controls in place, the regional datasets show an increase of 0.4 trips per person over the same time.

**Step 4.** Adjusting for the difference.

To adjust for total trips. Overall, the 1990 trips should be increased by 22% to account for the difference in survey methods. NOTE: When using the datasets with the controls in place an adjustment of 0.5 daily trips per person is sufficient. However, once the controls are removed a 22% increase in the 1990 NPTS is required.

**IMPACT OF TRIP PURPOSE**

The quality of trip reporting varies by trip purpose. Typically, important trips, such as to work or school, are less likely to be forgotten even when a diary is not used. Thus the 1990 NPTS, which was conducted from memory has good coverage of home to work trips. Less important trips, such as trips to the gas station, dry cleaner, post office, etc. which may be considered incidental are more likely to be forgotten. For basic comparisons, one should reduce the 1990 NPTS home-based Work trips, and increase both the home-based non-work trips and the non-home-based trips.

		1990	1990 adjusted
Home-based Work	Decrease by 14%	0.87	0.75
Home-based Other	Increase by 19%	1.60	1.91
Non-home based	Increase by 55%	0.73	1.13
Total		3.2	3.8

In the 1995 NPTS, which used a diary, there is a dramatic increase in the number of non-home-based trips, such as trips from work to shopping or personal errands, before going home. Concurrently, there is a decrease in the number of home-based work trips, again, this indicates that people were more likely in 1990 to report a trip made directly from work to home, rather than reporting that they stopped along the way before returning home. Note that people are more likely to make stops on the way home from work, compared to making stops on the way to work.--1990 NPTS, Strathman and Dueker, "Understanding Trip Chaining".

The most significant difference is that in 1990, the NPTS report many more home-based work trips, relative to the number of non-home-based trips. In 1995, the NPTS results are much more similar to the regional travel surveys.

## **FURTHER ANALYSIS**

FHWA will be conducting and publishing further analysis of how to adjust 1990 NPTS data, so that it can be compared with 1995 NPTS results without survey methods skewing the results. This analysis will cover trips and travel by major mode and major purpose. However, the data user should be aware that there are many variables of interest for which FHWA will not be able to develop adjustment factors.

## **IMPACT OF SURVEY METHODS**

Survey Methods that likely had the greatest impact on trip reporting are:

1. Use of a written diary to help remember travel on a specific day. In the pretest conducted in 1994 for the 1995 NPTS, a written diary was compared to the retrospective (or recall) method. The diary method averaged .5 trips more per person per day than the retrospective method. (Draft report on NPTS Pretest Methods, PlanTrans, Spring 1997)
2. Use of an advance letter to notify potential respondents that they would be recruited for the survey. We believe that the advance letter added legitimacy to the telephone recruitment, which contributed to higher quality data. The effect of the advance letter cannot be measured quantitatively.
3. Confirmation of "no travel" to distinguish from "soft refusals." The proportion of persons who said they made no trips on the assigned travel day was significantly reduced in 1995, compared to 1990. The 1990 rate of approximately 25% probably included a significant number who preferred to say they did not travel, rather than to give an outright refusal to participating in the telephone survey.

## **FOR MORE INFORMATION**

Please see the following portions of the 1995 NPTS Users' Guide for more information:

- Chapter 3 - Survey Procedures and Methods
- Appendix J - Comparison of NPTS Trip Rates 1990-1995.