

Geographic Factors Explaining Worktrip Length Changes

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List of Tables	Page
Table 1A. Nonstop Worktrips: Distributions of Durations, 1983 vs. 1990	2-16
Table 1B. Nonstop Worktrips: Distributions of Distances, 1983 vs. 1990	2-16
Table 1C. Chi-Square Values For Tests of the Null Hypothesis That Trip Duration and Trip Distance Distributions Did Not Change Between 1983 and 1990	2-16
Table 2A. Nonstop Worktrips: Mean Trip Times and Distances, 1983 and 1990, Time of Day, Metropolitan Size, Place of Residence	2-17
Table 2B. Nonstop Worktrips: Mean Trip Times and Distances, 1983, 1990, Time of Day, Metropolitan Size, Place of Residence	2-18
Table 2C. Nonstop Worktrips: Comparison of Mean Trip Times and Distances, 1983 and 1990, Time of Day, Metropolitan Size, Place of Residence	2-19
Table 2D. Nonstop Worktrips: Comparison of Mean Trip Speeds, 1983 and 1990, Time of Day, Metropolitan Size, Place of Residence	2-20
Table 2E. Nonstop Worktrips: Comparison of Mean Worktrip Speeds, 1983 and 1990, Place of Residence (Private Vehicles, Drive-Alone Only)	2-21
Table 3A. Nonstop Worktrips: Comparisons by Urbanized Area Size, Time of Day, Private Vehicles, Inside Central City, 1990	2-22
Table 3B. Nonstop Worktrips: Comparisons by Urbanized Area Size, Time of Day, Private Vehicles, Inside Central City, 1983	2-22
Table 3C. Nonstop Worktrips: Comparisons by Urbanized Area Size, Time of Day, Private Vehicles, Outside Central City, 1990	2-22
Table 3D. Nonstop Worktrips: Comparisons by Urbanized Area Size, Time of Day, Private Vehicles, Outside Central City, 1983	2-23
Table 3E. Nonstop Worktrips: Comparisons by Urbanized Area Size, Time of Day, Solo Drivers, Private Vehicles, Inside Central City, 1990	2-23
Table 3F. Nonstop Worktrips: Comparisons by Urbanized Area Size, Time of Day, Solo Drivers, Private Vehicles, Inside Central City, 1983	2-23
Table 3G. Nonstop Worktrips: Comparisons by Urbanized Area Size, Time of Day, Solo Drivers, Private Vehicles, Outside Central City, 1990	2-24
Table 3H. Nonstop Worktrips: Comparisons by Urbanized Area Size, Time of Day, Solo Drivers, Private Vehicles, Outside Central City, 1983	2-24
Table 4. Nonstop Worktrips: ANOVA F-Values For Null Hypothesis That City Size Does Not Affect Average Speeds	2-25
Table 5A. Distribution of Person-Trips by Trips Purpose and Time of Day, 20 CMSAs, 1990 (all modes)	2-25
Table 5B. Nonstop Worktrips: Durations and Speeds Compared With CMSA Growth (1980-1990) (private vehicles only)	2-26
 Geographic Factors Explaining Worktrip Length Changes	 2-3

Geographic Factors Explaining Worktrip Length Changes

List of Tables (cont.)		Page
Table 6.	Racial Comparisons: Nonstop Worktrip Distances and Durations by MSA Size and Income	2-27
Table 7A.	Nonstop Worktrips: Distribution of Commuting Mode Choices by Number of Workers Per Household, 1983 and 1990	2-28
Table 7B.	Nonstop Worktrips: Mean Household Commuting Times and Distances, 1983 and 1990 (all modes)	2-28
Table 7C.	Nonstop Worktrips: Mean Household Commuting Times and Distances, 1983 and 1990 (private vehicles; drive alone)	2-29
Table 7D.	Nonstop Worktrips: Mean Household Commuting Times and Distances, 1983 and 1990 (private vehicles; drive with others)	2-29
Table 8.	Annual Per Capita Worktrips by Gender and Mode, 1983 and 1990	2-29
Table 8A.	Nonstop Worktrips: Time, Distance, Speed, by Income Group, Gender, and Year (private vehicles)	2-30
Table 8B.	Nonstop Worktrips: Time, Distance, Speed, by Income Group, Gender, and Year (drive alone)	2-30
Table 9A.	Nonstop Worktrips: Time, Distance, Speed, by Age Group, Gender, and Year	2-31
Table 9B.	Nonstop Worktrips: Time, Distance, Speed, by Age Group, Gender, and Year (drive alone)	2-31
Table 10A.	Nonstop Worktrips: Comparisons by Region, MSA Size, Time of Day, Private Vehicles, 1990, Commuters Residing Inside Central City	2-32
Table 10B.	Nonstop Worktrips: Comparisons by Region, MSA Size, Time of Day, Private Vehicles, 1990, Commuters Residing Outside Central City	2-33
Table 10C.	Nonstop Worktrips: Comparisons by Region, MSA Size, Time of Day, Solo Drivers, Private Vehicles, 1990, Commuters Residing Inside Central City	2-34
Table 10D.	Nonstop Worktrips: Comparisons by Region, MSA Size, Time of Day, Solo Drivers, Private Vehicles, 1990, Commuters Residing Outside Central City	2-35
Table 11A.	Nonstop Worktrips: Comparisons by Residential Density of Commuters' Residential Zip Code, Private Vehicles, 1990	2-36
Table 11B.	Nonstop Worktrips: Comparisons by Residential Density of Commuters' Residential Zip Code, Solo Drivers, Private Vehicles Only, 1990	2-36
Table 11C.	Nonstop Worktrips: Comparisons by Residential Density of Commuters' Residential Zip Code, Private Vehicles with Passengers Only, 1990	2-36
Table 12.	Distribution of Person-Trips by Trips Purpose and Time of Day, MSA Size, 1990 (all modes)	2-37

Geographic Factors Explaining Worktrip Length Changes

Appendix Tables		Page
Table 1.	Nonstop Worktrips: Mean Trip Times, Distances, Speeds, 1983 and 1990, Nonmetropolitan Areas (all modes)	2-38
Table 2.	Metropolitan Area Size Class Population Growth, 1980–90 (population in 000's)	2-38
Table 3.	Nonstop Worktrips: Comparisons by Region, MSA Size, Time of Day, Private Vehicles Only, 1990, Commuters Residing Inside Central City	2-39
Table 4.	Nonstop Worktrips: Comparisons by Region, MSA Size, Time of Day, Private Vehicles Only, 1990, Commuters Residing Outside Central City	2-40
Table 5.	Nonstop Worktrips: Comparisons by Region, MSA Size, Time of Day, Solo Drivers, Private Vehicles Only, 1990, Commuters Residing Inside Central City	2-41
Table 6.	Nonstop Worktrips: Comparisons by Region, MSA Size, Time of Day, Solo Drivers, Private Vehicles Only, 1990, Commuters Residing Outside Central City	2-42
Table 7.	Per Capita Annual Person-Trips by Men, by Mode and Purpose, 1983 and 1990 NPTS	2-43
Table 8.	Per Capita Annual Person-Trips by Women, by Mode and Purpose, 1983 and 1990 NPTS	2-43

Executive Summary

Analyzing the 1983–1990 growth of almost 40 percent in U.S. vehicle miles travelled (VMT), Pisarski shows that much of it is accounted for by a 35.9 percent jump in average vehicle trip lengths (the other contributors being population growth, decline in vehicle occupancy, mode shifts to privately operated vehicles, and increased trips per capita). *Worktrip* VMT grew by even more, increasing by nearly 50 percent. Again, the contributors were more people and more workers, although the latter grew faster, largely because of greater female labor force participation. Although annual worktrips per worker fell slightly (from 450 to 425), there were in aggregate 8.2 percent more person worktrips. Because workers per vehicle fell (less transit use, fewer auto passengers) and because walking to work also diminished, the growth in vehicle worktrips grew much faster, 18.2 percent, in the 7-year interval. Yet, most of the worktrip VMT growth was explained by the almost 27 percent growth in average distance travelled (from 8.6 to 10.9 miles, one-way).

In spite of this and depending on how the data are aggregated, average worktrip *durations* either fell slightly or grew by much smaller percentages than distances. Either way, there were significant increases in average trip speeds. This casts doubt on reports of worsening congestion, such as those emanating from the Texas Transportation Institute (TTI). Of greater significance, however, is the idea that the welfare inferences to be drawn from the data will vary significantly, depending on whether increased trip distances (and TTI congestion measures) or whether higher average speeds and shorter (or nonincreasing) average trip times are emphasized. A third view reconciles the seeming paradox: suburbanization of jobs and residences is such that people are able to exercise the choice to live further away from activity centers but, because of higher speeds on less congested roads, are paying a modest cost (if any) in terms of extra time travelled.

This paper analyzes commuting data from the 1993 and 1990 NPTS. The results of this study support the third view.

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I. Introduction

Analyzing the 1983–1990 growth of almost 40 percent in U.S. vehicle miles travelled (VMT), Pisarski shows that much of it is accounted for by a 35.9 percent jump in average vehicle trip lengths (the other contributors being population growth, decline in vehicle occupancy, mode shifts to privately operated vehicles, and increased trips per capita).¹ *Worktrip* VMT grew by even more, increasing by nearly 50 percent. Again, the contributors were more people and more workers, although the latter grew faster, largely because of greater female labor force participation. Although annual worktrips per worker fell slightly (from 450 to 425), there were in aggregate 8.2 percent more person worktrips. Because workers per vehicle fell (less transit use, fewer auto passengers) and because walking to work also diminished, the growth in vehicle worktrips grew much faster, 18.2 percent, in the 7-year interval. Yet, most of the worktrip VMT growth was explained by the almost 27 percent growth in average distance travelled (from 8.6 to 10.9 miles, one-way).

In spite of this and depending on how the data are aggregated, average worktrip *durations* either fell slightly or grew by much smaller percentages than *distances*. Either way, there were significant increases in average trip speeds. This casts doubt on reports of worsening congestion, such as those emanating from the Texas Transportation Institute (TTI).² Of greater significance, however, is the idea that the welfare inferences to be drawn from the data will vary significantly, depending on whether increased trip distances (and TTI congestion measures) or whether *higher average speeds and shorter (or nonincreasing) average trip times* are emphasized. A third view reconciles the seeming paradox: suburbanization of jobs and residences is such that people are able to exercise the choice to live further away from activity centers but, because of higher speeds on less congested roads, are paying a modest cost (if any) in terms of extra time travelled.

Our previous work has shown that, where there are quicker commutes, they can be attributed to increased suburb-to-suburb commuting, although some of the changes are also accounted for by the mode changes cited earlier.³ The plan of this research is to control for each of these effects so that commuting trends can be better understood. In much of what follows, person trips will be analyzed (to control for changes in vehicle occupancy), and metropolitan area trip data will be studied to test the effects of city size; most of the intertemporal comparisons will focus on private auto trips to control for mode choice changes.

II. Recent AHS and Census Findings

Recent reports analyze some of the new data on trends in U.S. commuting. The main points appear to be—

1. American Housing Survey (AHS) data show increasing median worktrip lengths for both home owners and renters, going back to 1974. In 1985, the respective distances were 7 and 10 miles; by 1989, they were 8 and 11 miles. These increases were across-the-board, with the notable exceptions of small town residents, individuals classified as in the poverty population, and Hispanics. In 1989, trips were longest for suburban residents. Between 1985 and 1989, there was a drop-off in trips less than four miles and an increase in all of the distance categories greater than five miles. Suburban trips had also become longer.⁴
2. AHS worktrip travel times had a median value of 19 minutes in 1985 (average of 20.9 minutes) and a corresponding 1989 median value of 20 minutes. However, there was no change in metropolitan area median trip times. The data show that just 9.0 percent of all urban commuters took trips that were longer than 45 minutes in 1989, down slightly from the 9.1 percent that did

so in 1985. The below-poverty population had shorter median commutes than the general population; their median commute declined from 18 to 17 minutes in the 4-year interval. Blacks had a higher median commute, which became longer in 1989; Hispanics showed no change, the same as the general population in 1989.⁵

3. Census comparisons are only possible for travel times. The increase was from an average of 21.7 minutes in 1980 to 22.4 minutes in 1990 (about 40 seconds).⁶

Neither the AHS or the Census survey questions address trip linking as part of the worktrip and are therefore difficult to use for this analysis. They do not allow analysts to control for the massive shifts in travel modes chosen, and they do not allow the effects of *trip chaining* to be held constant. For example, Liao has used NPTS data to show that trip chains that involve worktrips increased from 14.7 percent of all worktrips in 1983 to 19.2 percent in 1990.⁷ Because only the NPTS data allow for the isolation of direct worktrips (a restriction we observed throughout our analysis), the Census and AHS data are difficult to interpret. The 40-second increase in average trip times recorded by the Census may simply reflect the increase in trip chaining.

To develop a clear picture of worktrip trends, we have used NPTS data and (unless otherwise noted) arranged our files as follows (and these arrangements distinguish our results from other studies that use the NPTS data):

1. Only nonstop (direct) worktrips are studied.
2. Observations with implausible values have been deleted (trips less than 1 mile or greater than 150 miles, trips less than 1 minute or greater than 150 minutes, trips less than 3 MPH or more than 80 MPH).
3. Only privately operated vehicle (POV) trips are included.
4. Only the trips of residents residing inside metropolitan areas are studied.⁸
5. AM-peak is 6-9 a.m., PM-peak is 4-7 p.m., and off-peak includes all weekend trips.
6. Because the 1983 and 1990 data were coded differently for trips of less than one-half mile, these were deleted to allow comparisons between the two years.

III. NPTS Commuting Data

III.1 1983 vs. 1990 Comparison of Trip Distributions

For all metropolitan area commuters, average commuting distances and durations increased in the 7 years between surveys, echoing the results for all U.S. commuters cited in the earlier reports. In terms of time and distance *distributions*, this is reflected in proportionately fewer short trips and proportionately more long trips. The change is apparent for all three major travel modes (privately operated vehicles, POVs with solo driver, and public transit), as shown in Tables 1A and 1B. Chi-square tests (Table 1C) reveal that the differences between distributions are, in every case, statistically significant. Nevertheless, in both years the number of commutes taking 45 minutes or more remains small, 7.3 percent in 1983 and 9.2 percent in 1990. The AHS data show a slightly higher share of 45 minute-plus commutes (10.1 percent in 1985 and 10.3 percent in 1989), but this may merely reinforce the importance of purging worktrip time estimates of worktrips that involve trip chaining because of their built-in bias toward longer commutes. Likewise, long-distance trips remain atypical; one-way commutes of 20 miles or more accounted for 12.3 percent of all Metropolitan Statistical Area (MSA) commutes in 1983 and 17.5 percent of all MSA commutes in 1990. Because the NPTS files allow for various disaggregations of metropolitan commuting, it is important to study these variations rather than merely focussing on averages (or medians).

III.2 Metropolitan Area Size Groups

Detailed *metropolitan area* commuting data by major size groups are shown in Tables 2A–2E. They display trip durations and distances for each of the two recent NPTS surveys (1983 and 1990). Trips are aggregated by place of residence of the respondent (inside central cities or outside central cities of metropolitan areas), time of day (peak periods vs. off-peak), and metropolitan area size class.

Though most (not all) average worktrip distances deteriorated in the 7 years (with the interesting exception of peak-hour commutes by inside-central-city residents of the largest metropolitan areas), there is a far more complex mixture of improvements and deteriorations when trip times are studied: for inside-central-city residents, trip durations improved during the morning peak in three of the five MSA-size groups (including the over-3-million group).⁹ There were also trip-time improvements in three of the five groups for the afternoon peak. For outside-central-city residents, trip durations improved for two of the five groups. For the PM-peak, worktrip times fell in three of the five cases.

The pooled survey results on durations and distances were converted to data on trip speeds. The latter are more likely to be normally distributed and more appropriate for standard statistical testing. Trip speed comparisons are shown in Table 2D. *For all 30 of the survey comparisons shown*, trip speeds were higher in 1990 for all but two of them by statistically significant amounts. The results are substantially the same for drive-alone comparisons (Table 2E).

III.3 Urbanized Area Size Groups

Intertemporal comparisons between *urbanized area* size groups (selected for analysis because this is the file that makes a distinction between rail and nonrail cities) is made difficult by moderate changes in some of the category size cutoffs adopted in the 1990 NPTS (Tables 3A–3H). Again, there is a mixed picture of travel time and distance deteriorations as well as improvements; suburban residents in all groups travelled longer distances in 1990, regardless of time of day. Yet, again, the 30 intertemporal comparisons that are possible if the reclassification is ignored also show *across-the-board higher average speeds*. Apparently, urban development is such that there are opportunities to allow longer distances from activity centers to be enjoyed at little or no cost in extra time spent travelling.

The urbanized area tables show that the worst commutes (lowest average speeds) were in the largest urbanized areas with subways or rail transit available, largely because this group is dominated by older cities, especially New York. In fact, the contrasts between large cities with and without rail is instructive. In most cases, the areas with rail required lower speeds and more time to traverse similar (or even shorter) distances.

III.4 Cross-Sectional Tests

Cross-sectional ANOVA tests were conducted on the null hypothesis that average trip speeds were *independent of metropolitan area size*. Our previous cross-sectional analysis of the 1983 data revealed no significant differences between metro-area-size classes;¹⁰ similar tests on the 1990 data yielded slightly different results. Table 4 shows that city size makes no differences for inside-central-city residents' AM-peak and off-peak worktrips. It is a factor, however, for inside-central-city residents' PM-peak travel and for all outside-central-city trips.

It is possible to expand the cross-sectional analysis by studying the 20 Consolidated Metropolitan Statistical Areas (CMSAs) for 1990 (the 1983 NPTS reported no such data). Table 5A indicates that the distributions of trip types are remarkably similar across the set of CMSAs. Table 5B shows that there is no

simple relationship between trip speed and metropolitan area sizes. The middle-sized CMSAs appear to show the highest speeds. Even more intriguing is the finding that, while the most growth (more than 3 million people) took place in the Los Angeles CMSA, its central-city commuters' average speeds were eighth and its suburban commuters' average speeds were ninth. The accommodation made possible by suburbanization appears to be quite powerful.

III.5 Spatial Mismatch

Because the samples are small, metropolitan-area size-group data had to be aggregated into only three categories in order to test travel time and distance differences between blacks and whites. We used the 1990 NPTS data to test the widespread notion that the decentralization of employment works only to the advantage of white commuters (the "spatial mismatch" hypothesis). Table 6 shows that no systematic disadvantage for blacks was apparent. In black-white comparisons, holding income and metropolitan area constant, 30 pairs of means were calculated. Most showed no statistically significant differences. Of the seven cases where there were significant differences, five of them indicated *shorter* trips for black workers. While not all of the respondents in the NPTS data file are workers, the number of unemployed (those who responded that they were recently actively searching for work) necessarily showed too few worktrips to be included in the analysis. This inability to analyze the unemployed with the NPTS data leaves the spatial mismatch issue somewhat unresolved.

III.6 Household Commuting

Very little is known about how commuting behavior is affected by the number of workers in the household.¹¹ Table 7A shows that, almost without exception, the mode shifts that characterized the population (more solo travel in private autos, less carpooling, less transit use, less use of other modes) were common to households *no matter how many workers were present*.

Tables 7B–7D show average commuting times and distances *for the entire household* for the various modes. Because multiworker households are more likely to carpool than the population at large, it may be instructive to study Table 7C (*drive-alone POVs*). The longest trips were taken by workers from one-worker households. As workers were added, incremental household travel time and distance became smaller (the increments are even smaller for household members—Table 7D—that carpool, indicating that many of them do so with housemates). Also, while distances to work increased over the 7-year interval, travel time increased by smaller proportions. Average speeds must have risen. It appears that opportunities have arranged themselves in geographic space to cater to multiworker households.

III.7 Income and Gender

As a background to the discussion of gender, Table 8 shows the worktrips per capita by mode for both sexes in 1983 and 1990. Although the average annual number of worktrips per capita is significantly higher for men than for women (by 34.7 percent in 1990), *female worktrips per capita have been increasing* (by 9.1 percent, 1983–90) while male trips have declined (by 4.4 percent, 1983–90). Even more interesting, the growth in female worktrips has been restricted to private vehicles; female commuting by public transit and by other modes has declined.

Tables 8A and 8B examine the influences of income and gender on worktrip lengths, times, and speeds. Data on five broad income groups (in current dollars; unfortunately, constant dollar comparisons are difficult because the individual records list income group rather than dollar income) for both genders show that *everyone* travelled at significantly greater average speeds in 1990. Males travelled longer durations in 1990 only if they were in the highest income group. Females in the \$15,000–\$24,999 income group travelled significantly *shorter* durations in 1990, while those in the next income bracket experienced, on average, significantly longer durations. The lowest income males and the highest income males travelled

greater distances in 1990. Middle-income females, on the other hand, travelled significantly longer distances in 1990. It makes little difference when drive-alone-only trips are studied (Table 8B). It appears that neither income nor gender is a good predictor of commuting differences. Rather, the changes described earlier, opportunities for faster speeds along less congested suburban roads that permit greater distances to workplaces, are available across-the-board.

III.8 Age and Gender

Similar findings are obtained when the age variable is tested (Tables 9A and 9B). *Everyone* drove faster in 1990, all except the oldest (65+) by statistically significant amounts. Likewise, everyone drove longer distances, usually by significant amounts, except for the youngest males (16–19) and the oldest two groups (60–64 and 65+) of both genders. *Changes in trip durations were more complex: the youngest and oldest males had lower duration commutes, although the differences were not significant; all females experienced longer duration worktrips, although this was significant only for the three youngest and the oldest cohorts.* The findings stratified by age and sex (Table 9B) are more or less the same for drive-alone commuters.

IV. Regional Differences

There are some data variables in the 1990 NPTS relevant to an evaluation of the effects of geographic factors on worktrips that were not included in the 1983 survey; hence, for these variables, 1983–1990 comparisons were impossible. Yet, there are some cross-sectional comparisons on these variables that merit attention.

Tables 10A–10D show the durations, distances, and speeds of nonstop worktrips for all private vehicle trips and for solo drivers by MSA size, time, and residence location for the nine Census Division regions in 1990. There appear to be no systematic regional differentials in worktrip lengths. Suburban worktrips are consistently longer than central-city-originating worktrips, although there is more regional variation among the central-city worktrip lengths. However, the regional outliers are not stable across city size classes.

V. The Effect of Residential Densities

The 1990 NPTS includes a measure of residential density by zip code. With the use of this variable, it is possible to obtain some insights into how urban structure affects worktrip lengths, times, and speeds. These insights can only be partial because the database tells us nothing about densities at destinations, and most worktrips are long enough to cross over zip code boundaries. Tables 11A and 11B show how nonstop worktrips vary among zip codes classified by residential density levels for all private vehicle commuters and for solo drivers. There is no systematic difference in worktrip lengths as the residential densities of commuter-origin areas change. However, there is a regular tendency for speeds to decline as residential densities increase. But, the rate of decline is very modest until very high densities (more than 10,000 persons per square mile) are reached. In consequence, travel times remain very stable (clustering around 20 minutes) from origin areas with very different densities; again, only when zip code densities rise above 10,000 persons per mile do peak trip commuting times increase sharply (above 50,000 persons per mile—characteristic of only a few locations in U.S. metropolitan areas—for off-peak trips). If travel by carpoolers (private vehicles with passengers; Table 11C) is studied, the findings are approximately the same.

VI. Conclusions

Our analysis of NPTS commuting data suggests much more benign conclusions than have been drawn from other recent studies that emphasize longer 1990 commutes. Considerable insight is gained by studying commuting *speeds* of the direct worktrips. Faster commuting was observed across-the-board; improvement was not restricted to a particular gender, ethnic group, income group, or age group, nor did place of residence matter (size of city or residence inside or outside of central cities). Our explanation is the increase of suburb-to-suburb commuting. More worktrips than ever now take place on faster and less congested roads. This is remarkable in light of the large number of nonwork trips that occur in all places, even in the peak periods. Tables 5A and 12 show that the distribution of trip types (nonstop worktrips, chained worktrips, all other trips) is strikingly stable across metropolitan areas and metropolitan-area size groups.

Our findings cast doubt on the many "doomsday" studies of congestion (including those that rely on TTI's synthetic congestion indices). What appears to be happening is that workers are able to locate further from activity centers (often on cheaper land) without paying the penalty of appreciably longer commutes. Our analysis has focused on the direct private vehicle worktrips (often also looking at single-occupant commutes, although this distinction made little difference) because we wanted to understand the changing spatial relationships that were taking place. It is, after all, the responsiveness of urban spatial structure to changing circumstances (including people's lifestyle choices) that is the true measure of the success of the land-use transportation system.

Endnotes

1. Pisarski, Alan E., *Travel Behavior Issues in the 90's*, U.S. Department of Transportation, Federal Highway Administration, Washington, D.C., July, 1992.
2. Hanks, James W., Jr., and Lomax, Timothy J., "1989 Roadway Congestion Estimates and Trends," Texas Transportation Institute Research Report 1131-4, 1992.
3. Gordon, P., and Richardson, H.W., "Congestion Trends in Metropolitan Areas," *Urban Transportation Congestion Pricing*, National Research Council, 1993.
4. Pisarski, Alan E., *Travel Behavior Issues in the 90's*, U.S. Department of Transportation, Federal Highway Administration, Washington, D.C., July, 1992.
5. Pisarski, Alan E., *Travel Behavior Issues in the 90's*, U.S. Department of Transportation, Federal Highway Administration, Washington, D.C., July, 1992.
6. Pisarski, Alan E., *New Perspectives in Commuting*, U.S. Department of Transportation, Federal Highway Administration, Washington, D.C., July, 1992.
7. Liao, Yu-chun, "Trip Chaining in Urban Travel," paper presented at University of Southern California, Urban Economics Group Seminar, April, 1993.
8. Nonmetropolitan commuting data are summarized in Table A1 of the appendix.
9. Richard Forstal of the Census Bureau has recently completed calculations that show the extent to which central city redefinitions complicate population comparisons over the 7-year interval of our study. These are not major and it is difficult to identify the effects on the NPTS data.
10. Gordon, Peter, Richardson, H.W., and Kumar, Ajay, "Congestion, Changing Metropolitan Structure and City Size," *International Regional Science Review*, 12, pp. 45-56, 1989.
11. There were no serious problems in the 1990 NPTS with nonresponding households. The household response rate was 84 percent, and within the survey households travel information was collected for 87 percent of eligible persons (i.e., household members age 5 and older). In addition, nonresponse and poststratification adjustments were made to the NPTS survey weights. The only major difference is that another knowledgeable household member was permitted to provide proxy information for household members who were impossible to reach for interview.

Table 1A: NONSTOP WORKTRIPS: DISTRIBUTIONS OF DURATIONS, 1983 vs. 1990

	Privately Operated Vehicles		Privately Operated Vehicles Drive-Along		Public Transit	
	1983	1990	1983	1990	1983	1990
< 15 min	38.88	36.68	39.54	36.76	7.18	9.40
15-29 min	39.44	38.52	40.82	39.03	26.44	26.47
30-44 min	14.34	15.63	13.38	15.42	24.14	28.27
45-59 min	3.98	5.25	3.55	5.15	17.53	14.54
60-89 min	2.93	3.09	2.38	2.87	20.40	15.52
> = 90 min	0.43	0.83	0.33	0.77	4.31	5.80

Table 1B: NONSTOP WORKTRIPS: DISTRIBUTIONS OF DISTANCES, 1983 vs. 1990

	Privately Operated Vehicles		Privately Operated Vehicles Drive-Along		Public Transit	
	1983	1990	1983	1990	1983	1990
< 1 mi	3.77	2.27	3.61	2.17	0.00	0.41
1-4 mi	33.33	26.87	33.12	26.62	33.05	31.86
5-9 mi	25.88	24.66	27.74	24.90	30.17	23.20
10-19 mi	24.72	27.68	24.42	28.07	29.02	19.61
20-29 mi	8.15	10.53	7.69	10.40	3.74	10.87
30-49 mi	3.50	6.21	2.94	6.17	3.16	8.50
> = 50 mi	0.65	1.78	0.47	1.67	0.86	5.56

Note: Trips of less than one mile included since distances within the interval are not required.

TABLE 1C: CHI-SQUARE VALUES FOR TESTS OF THE NULL HYPOTHESIS THAT TRIP DURATION AND TRIP DISTANCE DISTRIBUTIONS DID NOT CHANGE BETWEEN 1983 and 1990

Mode	Duration	Distance
POV	24.003	162.401
POV (Drive Alone)	46.992	170.767
Public Transit	17.196	68.393

Rejection thresholds for the 99% level of significance are 15.09 (df = 5), and 16.81 (df = 6).

**Table 2A: NONSTOP WORKTRIPS: MEAN TRIP TIMES AND DISTANCES,
1983 and 1990, TIME OF DAY, METROPOLITAN SIZE, PLACE OF RESIDENCE**

MSA Population Size			AM-Peak	PM-Peak	Off-Peak
Residing Inside Central Cities					
Below 250,000	T ¹	1983	15.2	17.2	13.6
		1990	15.0	16.8	13.0
	D ¹	1983	6.7	7.6	6.2
		1990	7.8	9.6	7.0
250,000- 499,999	T	1983	15.1	15.2	15.7
		1990	14.8	15.7	14.2
	D	1983	6.1	7.7	7.5
		1990	7.6	7.7	7.8
500,000- 999,999	T	1983	17.3	20.8	14.9
		1990	17.9	17.9	16.1
	D	1983	8.5	9.3	6.9
		1990	10.2	9.2	9.2
1-3 Million	T	1983	18.3	20.8	17.9
		1990	19.5	21.3	17.8
	D	1983	8.7	8.3	8.7
		1990	10.4	11.1	9.7
Over 3 Million	T	1983	28.8	29.4	23.0
		1990	22.9	24.6	21.7
	D	1983	12.7	12.3	10.4
		1990	11.7	11.8	12.1

¹ T refers to time in minutes, and D to distance in miles.

**Table 2B: NONSTOP WORKTRIPS: MEAN TRIP TIMES AND DISTANCES, 1983, 1990
TIME OF DAY, METROPOLITAN SIZE, PLACE OF RESIDENCE**

MSA Population Size			AM-Peak	PM-Peak	Off-Peak
Residing Outside Central Cities					
Below 250,000	T ¹	1983	18.4	20.2	16.6
		1990	19.1	20.0	20.4
	D ¹	1983	9.9	9.9	8.8
		1990	11.7	12.2	13.2
250,000- 499,999	T	1983	19.2	19.7	16.9
		1990	19.3	21.9	19.4
	D	1983	10.6	9.9	8.8
		1990	12.0	13.6	12.5
500,000- 999,999	T	1983	22.5	25.5	21.7
		1990	21.1	23.0	20.8
	D	1983	12.1	13.2	11.1
		1990	13.1	13.9	13.2
1-3 Million	T	1983	22.1	23.2	19.5
		1990	21.5	22.8	21.0
	D	1983	11.2	11.2	10.7
		1990	12.5	12.1	12.9
Over 3 Million	T	1983	22.3	25.5	18.3
		1990	24.3	26.4	21.7
	D	1983	11.2	11.5	9.3
		1990	13.5	14.0	12.9

¹ T refers to time in minutes, and D to distance in miles.

Table 2C: NONSTOP WORKTRIPS: COMPARISON OF MEAN TRIP TIMES AND DISTANCES, 1983 AND 1990, TIME OF DAY, METROPOLITAN SIZE, PLACE OF RESIDENCE

Population Size			AM-Peak	PM-Peak	Off-Peak
Residing Inside Central Cities					
Below 250,000	T ¹	83-90	Down	Down	Down
	D ¹	83-90	Up	Up	Up
250,000-499,999	T	83-90	Down	Up	Down
	D	83-90	Up	n/c	Up
500,000-999,999	T	83-90	Up	Down	Up
	D	83-90	Up	Down	Up
1-3 Million	T	83-90	Up	Up	Down
	D	83-90	Up	Up	Up
Over 3 Million	T	83-90	Down	Down	Down
	D	83-90	Down	Down	Up
Residing Outside Central Cities					
Below 250,000	T	83-90	Up	Down	Up
	D ¹	83-90	Up	Up	Up
250,000-499,999	T	83-90	Up	Up	Up
	D	83-90	Up	Up	Up
500,000-999,999	T	83-90	Down	Down	Down
	D	83-90	Up	Up	Up
1-3 Million	T	83-90	Down	Down	Up
	D	83-90	Up	Up	Up
Over 3 Million	T	83-90	Up	Up	Up
	D	83-90	Up	Up	Up

¹ T refers to time in minutes, and D to distance in miles.

Table 2D: NONSTOP WORKTRIPS: COMPARISON OF MEAN TRIP SPEEDS, 1983 AND 1990, TIME OF DAY, METROPOLITAN SIZE, PLACE OF RESIDENCE

MSA Population Size		AM-Peak	PM-Peak	Off-Peak
Residing Inside Central Cities				
Below 250,000	1983	25.0	22.9	24.6
	1990	29.6*	31.4*	30.2*
250,000-499,999	1983	23.5	25.0	24.9
	1990	29.9*	28.7	31.5*
500,000-999,999	1983	27.4	25.4	25.4
	1990	31.6*	29.3**	32.4*
1-3 Million	1983	27.6	24.2	27.5
	1990	30.7*	30.4*	31.7*
Over 3 Million	1983	25.9	25.5	25.9
	1990	30.0*	28.0	30.6*
Residing Outside Central Cities				
Below 250,000	1983	30.3	27.3	28.2
	1990	35.2*	34.1*	36.6*
250,000-499,999	1983	30.7	27.7	28.4
	1990	34.8*	35.1*	34.9*
500,000-999,999	1983	30.6	29.6	28.6
	1990	35.2*	34.9**	35.9*
1-3 Million	1983	28.4	27.0	29.9
	1990	33.5*	30.7*	34.7*
Over 3 Million	1983	28.1	25.8	27.3
	1990	31.8*	30.7*	33.1*

* Significantly greater than 1983 at the 99% confidence level.

** Significantly greater than 1983 at the 95% confidence level.

Table 2E: NONSTOP WORKTRIPS: COMPARISON OF MEAN WORKTRIP SPEEDS, 1983 AND 1990, PLACE OF RESIDENCE (PRIVATE VEHICLES, DRIVE-ALONE ONLY)

MSA Population Size		AM-Peak	PM-Peak	Off-Peak
<i>Residing Inside Central Cities</i>				
Below 250,000	1983	25.81	23.23	24.77
	1990	29.82**	31.57*	30.64*
250,000-499,999	1983	23.71	24.86	24.60
	1990	29.67*	29.30	32.27*
500,000-999,999	1983	28.05	26.93	25.27
	1990	30.95	28.50	32.99*
1-3 Million	1983	27.21	23.71	28.28
	1990	31.25*	30.80*	32.13*
Over 3 Million	1983	25.89	26.19	26.71
	1990	30.38*	28.38	30.40**
<hr/>				
MSA Population Size		AM-Peak	PM-Peak	Off-Peak
<i>Residing Outside Central Cities</i>				
Below 250,000	1983	30.34	27.50	26.56
	1990	35.38*	35.00**	36.46*
250,000-499,999	1983	30.88	27.88	28.58
	1990	34.98*	35.08*	35.39*
500,000-999,999	1983	30.99	29.34	29.16
	1990	34.98**	35.07**	36.32*
1-3 Million	1983	28.42	27.02	30.15
	1990	33.60*	30.64*	34.60*
Over 3 Million	1983	27.40	26.36	27.44
	1990	31.76*	30.75*	33.28*

* Significantly greater than 1983 at the 99% confidence level.

** Significantly greater than 1983 at the 95% confidence level.

Table 3A: NONSTOP WORKTRIPS: COMPARISONS BY URBANIZED AREA SIZE, TIME OF DAY, PRIVATE VEHICLES, INSIDE CENTRAL CITY, 1990

Size of Urbanized Areas	AM Peak			PM Peak			Off Peak		
	Duration (minutes)	Distance (miles)	Speed (mph)	Duration (minutes)	Distance (miles)	Speed (mph)	Duration (minutes)	Distance (miles)	Speed (mph)
50,000-199,999	15.11	7.80	29.28	16.39	9.10	30.55	13.59	7.47	30.18
200,000-499,999	16.18	8.56	30.96	16.60	8.03	28.74	15.44	8.43	31.81
500,000-999,000	18.89	10.19	30.97	20.10	10.45	30.01	16.60	9.03	32.37
1 Million+ w/o Subway/Rail	20.67	11.04	31.23	23.54	11.89	29.69	19.19	11.15	32.13
1 Million+ w/ Subway/Rail	22.99	11.66	29.22	23.71	11.35	28.24	22.16	11.83	29.32

Table 3B: NONSTOP WORKTRIPS: COMPARISONS BY URBANIZED AREA SIZE, TIME OF DAY, PRIVATE VEHICLES, INSIDE CENTRAL CITY, 1983

Size of Urbanized Areas	AM Peak			PM Peak			Off Peak		
	Duration (minutes)	Distance (miles)	Speed (mph)	Duration (minutes)	Distance (miles)	Speed (mph)	Duration (minutes)	Distance (miles)	Speed (mph)
50,000-199,999	14.85	6.47	24.33	16.09	6.81	22.38	13.45	5.77	23.34
200,000-749,999	15.91	7.19	25.89	18.22	8.86	25.78	15.44	7.54	26.40
750,000-1,249,000	16.99	7.63	26.33	17.38	6.65	23.75	15.70	7.02	25.66
1.25 Million+ w/o Subway/Rail	21.88	11.22	28.76	24.21	10.66	26.20	19.97	10.12	28.62
1.25 Million+ w/ Subway/Rail	30.58	11.70	23.68	28.88	9.80	20.90	22.98	10.03	24.64

Table 3C: NONSTOP WORKTRIPS: COMPARISONS BY URBANIZED AREA SIZE, TIME OF DAY, PRIVATE VEHICLES, OUTSIDE CENTRAL CITY, 1990

Size of Urbanized Areas	AM Peak			PM Peak			Off Peak		
	Duration (minutes)	Distance (miles)	Speed (mph)	Duration (minutes)	Distance (miles)	Speed (mph)	Duration (minutes)	Distance (miles)	Speed (mph)
50,000-199,999	18.64	11.54	33.97	20.14	12.33	34.03	16.76	9.81	32.63
200,000-499,999	18.61	11.31	35.32	20.44	11.58	33.74	17.81	10.74	33.20
500,000-999,000	20.72	11.35	30.69	21.50	10.42	27.41	18.91	11.05	32.90
1 Million+ w/o Subway/Rail	22.37	12.57	33.37	24.82	12.66	31.03	20.41	12.14	34.90
1 Million+ w/ Subway/Rail	23.66	12.65	30.71	25.33	12.86	29.14	21.49	12.32	31.62

Table 3D: NONSTOP WORKTRIPS: COMPARISONS BY URBANIZED AREA SIZE, TIME OF DAY, PRIVATE VEHICLES, OUTSIDE CENTRAL CITY, 1983

Size of Urbanized Areas	AM Peak			PM Peak			Off Peak		
	Duration (minutes)	Distance (miles)	Speed (mph)	Duration (minutes)	Distance (miles)	Speed (mph)	Duration (minutes)	Distance (miles)	Speed (mph)
50,000-199,999	20.12	10.18	27.47	22.75	11.38	27.31	18.50	8.30	27.18
200,000-749,999	19.02	9.52	29.23	20.48	9.68	27.15	16.87	7.98	26.37
750,000-1,249,000	16.36	7.70	26.39	15.77	6.65	23.96	15.48	8.08	29.26
1.25 Million+ w/o Subway/Rail	21.17	10.99	29.35	25.07	12.26	27.09	16.41	8.29	28.60
1.25 Million+ w/ Subway/Rail	22.33	10.33	25.56	22.93	9.72	23.80	19.16	9.64	26.63

Table 3E: NONSTOP WORKTRIPS: COMPARISONS BY URBANIZED AREA SIZE, TIME OF DAY, SOLO DRIVERS, PRIVATE VEHICLES, INSIDE CENTRAL CITY, 1990

Size of Urbanized Areas	AM Peak			PM Peak			Off Peak		
	Duration (minutes)	Distance (miles)	Speed (mph)	Duration (minutes)	Distance (miles)	Speed (mph)	Duration (minutes)	Distance (miles)	Speed (mph)
50,000-199,999	14.68	7.71	29.45	16.13	9.16	30.93	13.45	7.56	30.65
200,000-499,999	16.00	8.33	30.62	16.16	7.69	28.72	14.93	8.36	32.65
500,000-999,000	18.86	10.19	31.09	20.11	10.44	30.02	16.42	9.21	33.17
1 Million+ w/o Subway/Rail	20.66	11.24	31.91	23.70	12.13	30.15	19.27	11.11	31.72
1 Million+ w/ Subway/Rail	23.71	12.20	29.51	23.96	11.69	28.56	21.50	11.08	29.41

Table 3F: NONSTOP WORKTRIPS: COMPARISONS BY URBANIZED AREA SIZE, TIME OF DAY, SOLO DRIVERS, PRIVATE VEHICLES, INSIDE CENTRAL CITY, 1983

Size of Urbanized Areas	AM Peak			PM Peak			Off Peak		
	Duration (minutes)	Distance (miles)	Speed (mph)	Duration (minutes)	Distance (miles)	Speed (mph)	Duration (minutes)	Distance (miles)	Speed (mph)
50,000-199,999	14.21	6.38	24.80	14.73	6.42	22.64	13.52	6.03	24.12
200,000-749,999	15.46	6.97	26.07	16.10	7.16	25.99	14.58	6.66	25.72
750,000-1,249,000	16.89	7.76	26.74	16.67	6.70	23.81	16.53	7.54	26.01
1.25 Million+ w/o Subway/Rail	21.75	10.90	28.49	24.92	10.65	25.89	19.51	10.07	29.48
1.25 Million+ w/ Subway/Rail	26.49	11.32	25.13	26.69	9.64	21.83	22.04	9.79	26.22

**Table 3G: NONSTOP WORKTRIPS: COMPARISONS BY URBANIZED AREA SIZE,
TIME OF DAY, SOLO DRIVERS, PRIVATE VEHICLES, OUTSIDE CENTRAL CITY, 1990**

Size of Urbanized Areas	AM Peak			PM Peak			Off Peak		
	Duration (minutes)	Distance (miles)	Speed (mph)	Duration (minutes)	Distance (miles)	Speed (mph)	Duration (minutes)	Distance (miles)	Speed (mph)
50,000-199,999	17.93	10.76	33.71	20.70	12.75	34.32	16.91	9.72	32.42
200,000-499,999	18.65	11.47	35.77	19.99	10.84	32.91	16.81	9.81	32.97
500,000-999,000	20.59	11.37	30.78	21.20	10.82	28.04	18.78	11.02	33.05
1 Million+ w/o Subway/Rail	21.47	12.27	33.74	24.31	12.38	30.95	19.94	12.00	34.82
1 Million+ w/ Subway/Rail	23.22	12.33	30.48	24.61	12.61	29.10	20.58	11.83	31.73

**Table 3H: NONSTOP WORKTRIPS: COMPARISONS BY URBANIZED AREA SIZE,
TIME OF DAY, SOLO DRIVERS, PRIVATE VEHICLES, OUTSIDE CENTRAL CITY, 1983**

Size of Urbanized Areas	AM Peak			PM Peak			Off Peak		
	Duration (minutes)	Distance (miles)	Speed (mph)	Duration (minutes)	Distance (miles)	Speed (mph)	Duration (minutes)	Distance (miles)	Speed (mph)
50,000-199,999	22.45	11.00	27.36	26.75	11.75	25.12	19.44	8.44	25.53
200,000-749,999	18.48	9.41	29.88	19.71	9.19	27.02	16.21	7.75	26.58
750,000-1,249,000	14.85	6.78	26.45	14.47	6.04	23.80	14.65	7.29	28.50
1.25 Million+ w/o Subway/Rail	20.11	10.19	28.53	23.01	10.97	26.57	16.55	8.61	29.82
1.25 Million+ w/ Subway/Rail	22.10	9.97	25.38	22.86	9.84	24.38	19.54	9.52	26.14

Table 4: NONSTOP WORKTRIPS: ANOVA F-VALUES FOR NULL HYPOTHESIS THAT CITY SIZE DOES NOT AFFECT AVERAGE SPEEDS

Residence	AM-Peak		PM-Peak		Off-Peak	
	Work	Other	Work	Other	Work	Other
Inside Central Cities 1990	1.05 (0.3797)*	3.70 (0.0052)	2.65 (0.0321)	2.71 (0.0287)	1.48 (0.2067)	10.74 (0.0001)
Outside Central Cities 1990	8.11 (0.0001)	11.61 (0.0001)	9.00 (0.0001)	10.16 (0.0001)	5.77 (0.0001)	72.35 (0.0001)

* Significance levels are shown in parentheses.

Table 5A: DISTRIBUTION OF PERSON-TRIPS BY TRIP PURPOSE AND TIME OF DAY, 20 CMSAs, 1990 (all modes)

	Nonstop Worktrips			Worktrip Chains ^a			All Other Trips ^b		
	AM Peak	PM Peak	Off Peak	AM Peak	PM Peak	Off Peak	AM Peak	PM Peak	Off Peak
New York	7.57	5.30	7.16	1.13	3.65	4.42	4.34	10.60	55.83
Los Angeles	6.46	4.60	7.54	1.17	4.25	5.66	5.73	11.54	53.05
Chicago	6.63	4.03	8.71	1.17	3.39	5.84	4.37	9.88	55.97
San Francisco	5.66	4.15	6.10	0.78	3.17	5.37	6.39	12.59	55.78
Philadelphia	7.59	4.89	7.38	0.99	3.38	5.72	3.69	10.45	55.90
Detroit	5.76	3.74	7.12	1.21	3.39	4.40	3.94	12.13	58.31
Boston	6.56	3.77	6.56	1.62	3.95	5.21	3.23	11.59	57.50
Dallas	5.42	3.22	6.79	1.01	5.00	4.65	5.24	12.75	55.93
Houston	5.64	3.87	6.03	1.77	4.59	5.96	4.91	11.21	56.03
Miami	6.42	4.55	4.90	2.10	4.08	4.32	4.20	9.80	59.63
Cleveland	6.34	5.13	5.69	1.86	3.54	5.13	3.45	12.49	56.38
Seattle	6.46	4.76	6.80	1.81	4.42	7.14	5.33	10.54	52.72
Pittsburgh	5.76	3.65	7.64	0.89	3.10	4.87	4.65	10.41	59.03
Denver	7.57	4.34	7.07	0.99	3.97	3.47	4.71	13.77	54.09
Cincinnati	7.01	4.76	8.89	0.75	2.50	6.38	4.13	14.39	51.19
Milwaukee	5.54	3.50	7.73	1.17	3.21	3.79	4.66	12.83	57.58
Portland	4.88	5.04	6.67	1.95	2.11	3.58	3.58	11.06	61.14
Buffalo	7.25	3.63	7.25	0.90	3.63	4.23	3.93	11.48	57.70
Providence	3.46	2.07	7.37	0.92	1.15	3.92	2.53	5.30	73.27
Hartford	6.94	4.50	5.75	1.76	4.86	5.37	4.41	10.04	56.38
ALL U.S. MSAs	6.36	4.23	6.80	1.35	3.80	5.26	4.88	11.72	55.61

^a Includes all legs of worktrip chains.

^b Includes direct nonwork trips and all legs of nonwork trip chains.

Table 5B: NONSTOP WORKTRIPS: DURATIONS AND SPEEDS COMPARED WITH CMSA GROWTH (1980-1990) (private vehicles only)

CMSA	1990	Pop.	% Pop.	Central City	Worktrip Duration		Worktrip Speed	
	Pop. (000)	Change (000) 1980-1990	Change 1980-1990	PM Peak - Worktrip Duration 1990 (min.)	1990 (mins.) Inside	Residing Outside Central City	1990 (mph) Inside	Residing Outside Central City
Los Angeles	14,532	3034	26.4	25.5	23.7	26.0	31.7	33.6*
Dallas	3,885	954	32.6	25.5	21.0	18.8	33.0	36.1
San Francisco	6,253	885	16.5	16.6	19.7	21.9	29.6	33.9*
Houston	3,711	611	19.7	24.7	20.2	24.5	29.2	33.9*
Miami	3,193	549	20.8	19.8	19.7	23.5	32.8	28.6
New York	18,087	547	3.1	26.1	23.0	23.4	26.7	31.5*
Seattle	2,559	466	22.3	19.8	20.1	30.1	32.3	29.5
Denver	1,848	230	14.2	24.7	21.2	20.5	31.6	32.2
Philadelphia	5,899	218	3.8	22.3	22.6	22.1	34.8*	30.8
Boston	4,172	200	5.0	24.3	21.3	20.8	26.9	33.2*
Portland	1,478	180	13.9	18.3	16.8	21.6	26.7	35.0*
Chicago	8,066	129	1.6	30.4	27.8	23.3	32.5*	28.1
Cincinnati	1,744	84	5.1	19.2	17.4	22.0	31.5	34.8
Hartford	1,086	72	7.1	19.2	17.1	22.2	29.6	32.6*
Providence	1,142	59	5.5	16.7	12.5	19.1	39.0	35.1
Milwaukee	1,607	37	2.4	21.5	19.8	19.1	29.9	35.1*
Buffalo	1,189	-54	-4.4	16.7	17.7	24.1	35.5	34.3
Cleveland	2,760	-74	-2.6	19.1	19.8	20.3	27.1	30.4
Detroit	4,665	-88	-1.9	24.2	20.9	22.8	29.4	36.8*
Pittsburgh	2,243	-180	-7.4	28.8	22.2	17.7	25.6	29.5

* Significantly greater at the 95 percent level of confidence.

Table 6: RACIAL COMPARISONS: NONSTOP WORKTRIP DISTANCES AND DURATIONS BY MSA SIZE AND INCOME

MSA Size	Income Group	Blacks	Whites	Significantly Different at 95% Confidence*
Less than 1 million	< \$ 15,000	6.07 mi	9.08 mi	YES
		14.29 mins	16.72 mins	NO
	\$ 15,000 - \$ 24,999	11.16 mi	9.62 mi	NO
		19.64 mins	17.32 mins	NO
	\$ 25,000 - \$ 39,999	7.54 mi	11.05 mi	YES
		16.22 mins	18.20 mins	NO
	\$ 40,000 - \$ 54,999	8.69 mi	12.04 mi	YES
		15.86 mins	19.49 mins	YES
> \$ 55,000	11.78 mi	11.21 mi	NO	
	21.00 mins	18.44 mins	NO	
1 - 3 million	< \$ 15,000	6.71 mi	8.72 mi	YES
		17.06 mins	16.70 mins	NO
	\$ 15,000 - \$ 24,999	8.70 mi	10.67 mi	NO
		23.07 mins	18.90 mins	NO
	\$ 25,000 - \$ 39,999	10.36 mi	11.30 mi	NO
		20.42 mins	20.09 mins	NO
	\$ 40,000 - \$ 54,999	10.45 mi	11.36 mi	NO
		19.33 mins	20.63 mins	NO
> \$ 55,000	10.48 mi	12.95 mi	NO	
	18.95 mins	22.23 mins	NO	
Greater than 3 million	< \$ 15,000	12.78 mi	15.32 mi	NO
		23.91 mins	21.67 mins	NO
	\$ 15,000 - \$ 24,999	10.47 mi	8.47 mi	NO
		26.29 mins	16.18 mins	YES
	\$ 25,000 - \$ 39,999	12.14 mi	11.82 mi	NO
		26.96 mins	21.81 mins	YES
	\$ 40,000 - \$ 54,999	12.61 mi	14.37 mi	NO
		25.78 mins	24.37 mins	NO
> \$ 55,000	13.65 mi	14.80 mi	NO	
	29.02 mins	26.66 mins	NO	

* Two-tailed t-tests.

Table 7A: NONSTOP WORKTRIPS: DISTRIBUTION OF COMMUTING MODE CHOICES BY NUMBER OF WORKERS PER HOUSEHOLD, 1983 and 1990

Number of Workers in Household	Private Drive -Alone		Private Drive w/Others		Public Transportation		All Others	
	1983	1990	1983	1990	1983	1990	1983	1990
1 Worker	73.93	82.56	15.21	9.73	8.00	5.90	2.85	1.81
2 Workers	75.36	82.48	16.49	12.45	5.13	3.80	3.02	1.28
3 Workers	72.06	78.13	20.11	15.98	—	4.41	4.45	1.49
More than 3 Workers	71.64	70.10	22.39	21.08	—	6.62	—	—
All	74.16	81.33	16.92	12.40	5.68	4.74	3.23	1.53

Note: Blank if fewer than 20 observations.

Table 7B: NONSTOP WORKTRIPS: MEAN HOUSEHOLD COMMUTING TIMES AND DISTANCES, 1983 and 1990 (all modes)

Number of Workers in Household	Time		Distance	
	1983	1990	1983	1990
1 Worker	36.4	37.6	15.9	20.2
2 Workers	50.6	52.9	23.5	29.2
3 Workers	64.0	65.8	30.3	35.2
More than 3 Workers	75.8	92.2	35.2	48.4

Note: Trips by workers on any day, not just travel day.

Table 7C: NONSTOP WORKTRIPS: MEAN HOUSEHOLD COMMUTING TIMES AND DISTANCES, 1983 and 1990 (private vehicles; drive alone)

Number of Workers in Household	Time		Distance	
	1983	1990	1983	1990
	1 Worker	30.8	34.4	15.0
2 Workers	43.0	47.6	21.1	27.3
3 Workers	51.3	55.4	24.5	30.6
More than 3 Workers	55.6	67.6	28.3	39.0

TABLE 7D: NONSTOP WORKTRIPS: MEAN HOUSEHOLD COMMUTING TIMES AND DISTANCES, 1983 and 1990 (private vehicles; drive with others)

Number of Workers in Household	Time		Distance	
	1983	1990	1983	1990
	1 Worker	39.3	36.2	19.1
2 Workers	39.4	41.8	19.5	22.5
3 Workers	41.6	39.6	22.5	22.5
More than 3 Workers	59.5	52.8	27.9	26.2

Table 8: ANNUAL PER CAPITA WORKTRIPS BY GENDER AND MODE, 1983 and 1990

	Mode						Total		Percent Change 1983-1990
	Private		Public		Other ^a		1983	1990	
	1983	1990	1983	1990	1983	1990	1983	1990	
Male	236.4	237.8	9.4	9.5	25.9	12.5	271.7	259.9	-4.4
Female	154.3	175.2	10.6	8.1	12.0	9.6	176.9	193.0	9.1

Note: ^a Include trips by bicycle, walking, school bus, taxi, airplane, Amtrak, moped and other modes.

Source: Travel Day data, Patricia S. Hu and Jennifer Young, *Summary of Travel Trends: 1990 NPTS*, 1992.

Table 8A: NONSTOP WORKTRIPS: TIME, DISTANCE, SPEED, BY INCOME GROUP, GENDER, AND YEAR (private vehicles)

Family Income Group	Year	Time		Distance		Speed	
		Male	Female	Male	Female	Male	Female
<\$15,000	1983	18.17	16.12	8.98	7.31	27.52	25.59
	1990	20.21	16.05	12.33*	7.97	32.02*	30.51*
\$15,000-\$24,999	1983	20.47	18.36	9.95	8.79	27.36	25.80
	1990	19.76	16.63*	11.00	8.43	31.18*	29.89*
\$25,000-\$39,999	1983	21.73	16.90	11.37	7.39	28.52	25.25
	1990	20.71	18.71*	11.95	10.02*	32.95*	30.88*
\$40,000-\$54,999	1983	22.91	17.95	12.11	8.21	30.02	26.86
	1990	23.05	19.15	13.72*	10.52*	34.09*	31.44*
\$55,000+	1983	21.86	21.45	10.99	9.73	27.91	26.43
	1990	25.20*	20.73	14.93*	10.96	34.03*	30.96*

* Significantly different at 95% level of confidence (two-tailed test).

Table 8B: NONSTOP WORKTRIPS: TIME, DISTANCE, SPEED, BY INCOME GROUP, GENDER, AND YEAR (drive alone)

Family Income Group	Year	Time		Distance		Speed	
		Male	Female	Male	Female	Male	Female
<\$15,000	1983	17.11	15.91	8.61	7.43	28.20	26.85
	1990	17.89	15.78	10.03	7.91	31.64*	30.89*
\$15,000-\$24,999	1983	19.42	18.29	9.43	8.98	27.19	26.09
	1990	18.92	16.63	10.59	8.54	31.01*	30.08*
\$25,000-\$39,999	1983	20.19	16.33	10.29	6.95	28.11	25.10
	1990	20.22	19.01*	11.72*	10.31*	33.04*	31.15*
\$40,000-\$54,999	1983	22.02	17.63	11.53	8.23	29.91	27.07
	1990	22.97	19.70	13.64*	10.93*	34.12*	31.75*
\$55,000+	1983	20.69	21.48	10.18	9.52	27.58	25.91
	1990	24.36*	19.96	14.56*	10.75	34.20*	31.12*

* Significantly different at 95% level of confidence (two-tailed test).

**Table 9A: NONSTOP WORKTRIPS: TIME, DISTANCE, SPEED,
BY AGE GROUP, GENDER, AND YEAR**

Age Group	Year	Time			Distance			Speed		
		Male	Female	Total	Male	Female	Total	Male	Female	Total
16-19	1983	15.32	11.48	13.60	7.87	4.88	6.53	26.87	24.08	25.62
	1990	15.22	15.34*	15.28	8.66	8.51*	8.59	32.75*	31.91*	32.37
20-29	1983	19.11	18.38	18.80	9.33	8.52	8.98	27.60	26.25	27.02
	1990	21.14	19.18	20.27	12.68*	10.84*	11.87	34.50*	33.17*	33.91
30-39	1983	23.60	17.98	21.11	12.36	8.66	10.72	29.24	27.34	28.40
	1990	23.75	20.02*	22.29	14.37*	10.89*	13.01	33.96*	31.61*	33.04
40-49	1983	21.91	17.11	19.99	11.61	7.93	10.14	29.21	26.35	28.07
	1990	24.08*	18.61*	21.69	14.24*	9.50*	12.16	33.65*	29.78*	31.96
50-59	1983	21.96	18.05	20.41	11.28	7.37	9.74	28.35	23.70	26.52
	1990	23.51	18.57	21.52	12.78*	8.84*	11.19	30.90*	27.72*	29.62
60-64	1983	18.68	16.46	17.96	8.29	6.82	7.82	24.93	20.99	23.65
	1990	19.41	15.79	17.95	9.62	7.44	8.74	28.95*	26.06*	27.78
65+	1983	20.52	21.03	20.79	7.79	7.62	7.70	23.87	20.51	22.06
	1990	18.82	16.24	17.88	9.18	5.56	7.85	27.55	21.97	25.51

* Significantly different at 95% level of confidence (two-tailed test).

**Table 9B: NONSTOP WORKTRIPS: TIME, DISTANCE, SPEED,
BY AGE GROUP, GENDER, AND YEAR (drive alone)**

Age Group	Year	Time			Distance			Speed		
		Male	Female	Total	Male	Female	Total	Male	Female	Total
16-19	1983	15.58	12.41	14.22	8.20	5.54	7.07	26.73	26.02	26.42
	1990	15.35	16.17*	15.71	9.09	9.22*	9.15	33.08*	32.82*	32.96
20-29	1983	17.94	17.53	17.77	8.82	8.20	8.56	27.68	26.48	27.18
	1990	20.69*	19.51*	20.18	12.47*	11.14*	11.89*	34.83*	33.49*	34.24
30-39	1983	22.46	17.71	20.48	11.73	8.66	10.45	29.02	27.63	28.44
	1990	22.96	20.03*	21.84	13.77*	11.09*	12.74	33.89*	31.77*	33.08
40-49	1983	20.22	16.85	18.91	10.17	7.55	9.15	28.81	26.17	27.78
	1990	23.21*	18.15	21.04	13.79*	9.41*	11.92	33.72*	30.11*	32.18
50-59	1983	20.31	18.45	19.64	10.48	7.60	9.44	28.42	24.09	26.86
	1990	23.31*	18.25	21.36	12.76*	8.57	11.15	31.13*	27.48*	29.73
60-64	1983	18.04	16.26	17.55	7.93	6.76	7.61	24.96	20.25	23.67
	1990	18.54	15.52	17.35	9.26	7.35	8.50	28.96*	26.20*	27.87
65+	1983	21.25	21.61	21.44	7.79	8.32	8.08	23.55	21.52	22.46
	1990	17.91	15.43*	17.15	9.02	5.80	8.03	26.99	22.71	25.68

* Significantly different at 95% level of confidence (two-tailed test).

Table 10A: NONSTOP WORKTRIPS: COMPARISONS BY REGION, MSA SIZE, TIME OF DAY, PRIVATE VEHICLES, 1990, COMMUTERS RESIDING INSIDE CENTRAL CITY

Size of MSA or CMSA of Household	Census Division	AM Peak			PM Peak			Off Peak		
		Distance (minutes)	Duration (miles)	Speed (mph)	Distance (minutes)	Duration (miles)	Speed (mph)	Distance (minutes)	Duration (miles)	Speed (mph)
Less than 250,000	New England	19.14	10.52	32.91	18.94	9.88	34.49	10.76	5.12	27.77
	Middle Atlantic	10.63	5.00	24.75	13.75	6.75	29.00	14.07	6.50	22.28
	East North Central	14.07	7.05	29.29	15.38	6.55	25.08	12.31	6.17	28.79
	West North Central	11.14	5.37	27.71	14.06	6.76	29.59	10.19	5.02	31.34
	South Atlantic	18.33	10.37	31.75	19.16	11.59	34.16	16.44	9.73	32.09
	East South Central	16.69	10.08	33.57	38.57	32.57	36.00	13.33	8.07	32.88
	West South Central	14.05	6.78	28.65	15.43	8.98	33.25	13.42	8.20	32.51
	Mountain	15.00	7.68	29.82	13.00	8.05	31.95	14.67	7.26	29.89
Pacific	11.60	4.87	23.23	11.29	4.00	20.09	12.04	5.57	24.99	
250,000- 499,000	New England	12.88	6.24	25.52	10.29	5.29	27.57	14.44	7.32	27.45
	Middle Atlantic	15.86	7.55	28.29	15.38	7.19	25.86	17.35	7.35	24.48
	East North Central	12.65	6.51	31.98	14.47	6.58	27.22	15.78	8.85	32.91
	West North Central	13.79	7.79	34.14	12.60	6.60	30.60	13.59	8.18	35.82
	South Atlantic	15.54	6.98	27.86	15.29	7.46	28.75	14.91	9.47	34.24
	East South Central	15.34	8.78	30.06	17.91	8.78	28.91	15.26	8.78	36.57
	West South Central	17.63	9.95	33.40	17.89	10.06	33.20	11.04	5.27	28.64
	Mountain	15.05	8.63	33.12	12.44	6.13	29.03	9.93	4.07	25.93
Pacific	14.86	7.06	27.68	18.10	8.62	27.96	12.28	7.50	31.85	
500,000- 999,000	New England	14.97	7.12	25.29	12.35	5.50	26.44	19.89	12.33	33.15
	Middle Atlantic	18.79	11.58	31.49	16.93	9.00	25.37	13.11	5.92	26.26
	East North Central	16.68	9.64	32.46	16.47	9.47	31.23	14.14	7.44	29.43
	West North Central	12.33	7.56	35.68	12.29	7.86	36.56	9.50	5.25	35.77
	South Atlantic	17.73	9.14	28.82	20.68	9.37	26.11	18.51	10.58	30.52
	East South Central	20.44	13.77	36.22	19.40	13.08	35.76	15.35	8.27	32.99
	West South Central	18.29	10.84	35.27	18.41	9.41	31.81	16.58	10.65	37.63
	Mountain	16.65	8.18	29.33	17.15	7.62	26.75	17.48	10.00	35.09
Pacific	22.09	9.36	22.65	20.27	8.64	24.06	16.44	9.78	31.78	
1 - 3 Million	New England	17.75	10.15	32.29	19.03	8.46	26.99	12.88	6.83	32.82
	Middle Atlantic	20.33	9.46	29.74	24.83	11.25	30.83	18.48	9.19	31.48
	East North Central	19.06	9.84	30.19	20.72	10.84	30.63	17.43	9.49	31.73
	West North Central	19.02	9.84	30.85	22.92	11.56	30.70	17.69	9.96	32.47
	South Atlantic	20.95	10.94	30.83	21.93	10.06	28.40	18.07	9.25	29.67
	East South Central									
	West South Central	18.84	12.61	35.96	17.80	10.72	35.60	17.03	8.94	31.03
	Mountain	20.55	10.83	29.93	23.15	12.54	30.33	19.40	9.80	28.17
Pacific	19.59	10.84	30.22	22.44	13.14	31.37	20.04	13.14	37.17	
Greater than 3 Million	New England	18.58	9.82	29.63	19.69	10.59	28.97	15.73	7.75	28.65
	Middle Atlantic	27.03	12.32	27.48	29.29	13.04	27.31	22.70	9.90	25.23
	East North Central	23.59	12.94	31.10	27.40	13.31	28.21	25.54	16.88	32.85
	West North Central									
	South Atlantic	21.34	10.78	27.51	19.81	9.58	26.51	27.29	16.76	36.92
	East South Central									
	West South Central	19.77	10.65	31.92	25.11	12.72	30.82	19.19	11.27	31.51
	Mountain									
Pacific	23.35	12.62	31.77	23.12	10.82	27.01	21.86	13.09	32.79	

Table 10B: NONSTOP WORKTRIPS: COMPARISONS BY REGION, MSA SIZE, TIME OF DAY, PRIVATE VEHICLES, 1990, COMMUTERS RESIDING OUTSIDE CENTRAL CITY

Size of MSA or CMSA of Household	Census Division	AM Peak			PM Peak			Off Peak		
		Distance (minutes)	Duration (miles)	Speed (mph)	Distance (minutes)	Duration (miles)	Speed (mph)	Distance (minutes)	Duration (miles)	Speed (mph)
Less than 250,000	New England	20.31	12.86	36.60	17.59	11.24	37.61	18.31	11.49	33.19
	Middle Atlantic	18.58	11.85	35.55	23.14	12.21	30.63	21.73	14.22	36.62
	East North Central	17.15	10.83	35.59	20.53	11.64	32.01	20.42	12.20	35.95
	West North Central	19.08	10.88	34.91	18.44	8.88	28.44	23.04	14.52	38.87
	South Atlantic	20.92	12.32	32.04	21.46	15.00	36.03	16.28	10.00	34.58
	East South Central	21.52	12.26	34.40	12.00	5.00	28.83	25.21	17.82	38.14
	West South Central	16.13	10.55	39.67	16.33	9.56	36.60	16.26	11.61	42.29
	Mountain	25.45	16.09	32.06	25.00	19.67	39.06	33.50	22.55	33.95
	Pacific	17.50	10.64	32.43	27.18	20.18	37.05	12.54	8.35	38.19
250,000- 499,000	New England	19.86	14.30	35.78	18.81	10.76	30.77	27.54	20.18	37.38
	Middle Atlantic	25.66	16.19	35.36	26.31	16.19	37.19	16.51	9.38	32.10
	East North Central	17.40	10.49	33.97	19.42	13.79	36.52	18.65	12.20	35.79
	West North Central	21.55	13.64	36.45	24.38	14.88	36.63	16.25	8.50	28.15
	South Atlantic	21.02	12.55	35.42	25.07	14.36	32.26	22.55	14.35	35.18
	East South Central	17.90	10.51	34.20	21.45	13.68	37.61	17.89	13.64	40.43
	West South Central	15.38	9.08	33.15	16.67	10.67	35.25	16.90	10.25	34.41
	Mountain	16.38	10.00	31.75	25.00	15.00	36.67	20.75	10.50	29.00
	Pacific	10.60	6.10	34.28	15.82	9.71	35.28	15.70	9.00	33.13
500,000- 999,000	New England	19.43	12.10	35.40	20.26	13.19	35.79	17.81	10.40	33.86
	Middle Atlantic	22.31	14.04	35.64	27.46	16.08	33.84	25.83	16.65	35.44
	East North Central	22.97	15.13	39.17	21.48	13.45	35.43	17.77	11.77	37.35
	West North Central	22.78	11.78	30.78	30.00	10.80	20.48	25.00	12.83	31.00
	South Atlantic	20.20	12.69	35.31	24.20	14.31	35.76	20.43	12.83	36.56
	East South Central	23.07	14.46	35.40	24.09	14.45	36.11	18.61	12.09	36.55
	West South Central	18.96	11.50	33.75	23.25	14.80	34.99	26.63	16.16	34.30
	Mountain	20.83	9.58	29.92	20.00	10.00	30.37	25.00	10.86	31.00
	Pacific	20.53	11.67	30.35	18.86	8.86	27.16	26.87	21.17	42.76
1-3 Million	New England	21.92	13.24	33.48	23.17	12.29	30.34	21.32	12.94	33.73
	Middle Atlantic	19.44	10.99	32.40	20.38	11.89	32.21	21.04	12.16	32.63
	East North Central	20.59	11.91	33.26	21.96	11.99	30.56	19.12	11.87	35.02
	West North Central	21.23	13.71	35.67	23.80	13.12	31.95	18.01	11.19	36.95
	South Atlantic	22.24	12.68	33.71	20.95	11.09	30.77	22.97	14.50	34.65
	East South Central	21.67	14.78	33.47	20.56	9.33	27.52	17.40	11.40	29.40
	West South Central	17.57	10.26	32.46	24.53	12.40	31.81	17.95	10.40	34.18
	Mountain	18.50	10.31	32.93	24.03	12.17	30.16	19.46	11.24	34.10
	Pacific	25.45	13.66	33.18	27.14	12.80	29.31	25.69	15.60	35.31
Greater than 3 Million	New England	21.89	13.23	32.46	25.33	14.98	31.63	17.14	10.86	33.02
	Middle Atlantic	24.23	13.40	31.11	25.48	12.95	29.12	22.24	12.60	32.28
	East North Central	24.64	13.27	31.03	25.34	13.25	30.71	20.80	12.37	32.93
	West North Central									
	South Atlantic	30.55	14.09	28.38	31.78	15.59	29.59	22.63	12.14	31.81
	East South Central									
	West South Central	21.37	13.09	37.74	23.95	13.32	34.06	21.25	13.09	32.49
	Mountain									
Pacific	23.67	13.77	32.79	28.00	15.21	32.13	24.08	15.51	35.49	

Table 10C: NONSTOP WORKTRIPS: COMPARISONS BY REGION, MSA SIZE, TIME OF DAY, SOLO DRIVERS, PRIVATE VEHICLES, 1990, COMMUTERS RESIDING INSIDE CENTRAL CITY

Size of MSA or CMSA of Household	Census Division	AM Peak			PM Peak			Off Peak		
		Distance (minutes)	Duration (miles)	Speed (mph)	Distance (minutes)	Duration (miles)	Speed (mph)	Distance (minutes)	Duration (miles)	Speed (mph)
Less than 250,000	New England	19.46	10.79	33.44	18.94	9.88	34.49	11.00	5.68	29.75
	Middle Atlantic	10.63	5.00	24.75	13.75	6.75	29.00	14.07	6.50	22.28
	East North Central	12.56	6.51	28.65	12.54	5.92	25.43	11.02	5.57	29.14
	West North Central	11.07	5.14	26.74	14.33	6.60	27.94	9.95	5.05	32.26
	South Atlantic	17.84	10.00	31.24	18.10	11.06	34.19	16.84	9.79	30.48
	East South Central	15.50	10.10	35.44	61.67	59.00	50.00	11.82	7.00	32.91
	West South Central	14.20	7.23	30.66	15.67	9.30	34.28	13.83	8.69	33.45
	Mountain	12.11	6.81	30.21	13.28	8.22	31.64	10.91	6.05	30.05
	Pacific	12.07	5.07	23.17	11.29	4.00	20.09	12.21	6.05	26.46
250,000- 499,000	New England	11.36	5.07	24.74	11.17	5.83	28.17	13.68	6.73	27.22
	Middle Atlantic	15.67	7.52	28.50	16.83	8.58	28.64	16.67	7.27	24.87
	East North Central	12.51	6.34	31.64	14.47	6.58	27.22	15.44	9.06	33.98
	West North Central	14.08	7.62	32.15	12.60	6.60	30.60	13.81	8.06	34.31
	South Atlantic	14.56	6.53	27.17	15.30	7.52	28.96	14.90	9.73	35.06
	East South Central	15.57	9.07	30.39	18.67	9.33	29.95	10.32	5.47	38.11
	West South Central	17.63	9.95	33.40	17.89	10.06	33.20	11.23	5.77	31.12
	Mountain	16.44	9.56	34.33	12.27	6.20	29.63	9.50	3.75	23.62
	Pacific	14.55	6.70	26.99	16.84	7.84	27.54	12.52	7.65	31.71
500,000- 999,000	New England	14.44	6.93	24.93	12.00	5.59	26.52	20.59	13.48	34.37
	Middle Atlantic	15.75	8.88	30.46	11.42	4.25	22.31	13.09	6.44	28.48
	East North Central	14.32	7.79	31.75	13.21	6.93	30.00	14.06	7.33	29.56
	West North Central	13.60	7.40	30.42	13.67	7.67	30.30	9.45	5.09	35.20
	South Atlantic	17.87	9.27	29.13	20.97	9.72	26.91	17.86	10.19	30.64
	East South Central	20.50	14.02	36.46	19.48	13.22	35.69	14.93	8.30	33.94
	West South Central	18.33	10.71	34.70	19.44	9.72	30.62	16.74	10.74	37.58
	Mountain	16.07	6.93	26.57	17.33	7.42	25.65	15.89	9.32	34.89
	Pacific	21.44	7.11	20.72	19.22	6.22	22.44	17.63	10.63	32.94
1-3 Million	New England	17.16	10.21	33.63	17.75	7.88	28.20	12.73	7.00	33.16
	Middle Atlantic	17.94	9.67	32.79	23.13	12.00	35.83	19.27	9.73	32.69
	East North Central	19.31	10.17	30.71	20.90	11.10	31.20	17.31	9.69	32.47
	West North Central	18.02	10.06	32.31	23.61	12.52	32.15	17.38	10.17	32.21
	South Atlantic	21.22	10.95	30.21	21.92	9.92	27.88	19.30	9.82	29.22
	East South Central									
	West South Central	18.15	12.55	37.18	17.62	10.38	34.58	17.43	9.43	32.71
	Mountain	20.89	11.06	30.29	23.21	12.37	29.89	20.81	10.57	28.45
	Pacific	20.64	11.58	30.99	23.07	13.50	31.16	21.17	13.99	37.27
Greater than 3 Million	New England	19.70	10.52	29.76	20.14	10.98	28.94	16.78	8.41	29.04
	Middle Atlantic	28.60	13.03	27.18	29.86	13.50	27.55	22.59	10.46	26.74
	East North Central	24.12	13.62	32.23	28.12	13.83	28.96	20.92	10.62	28.97
	West North Central									
	South Atlantic	21.92	11.43	28.44	19.69	9.15	25.50	26.81	17.68	38.99
	East South Central									
	West South Central	20.14	10.92	32.01	25.21	13.13	31.45	17.66	9.88	30.21
	Mountain									
Pacific	23.47	12.56	32.68	23.22	10.90	27.71	21.89	13.24	32.89	

Table 10D: NONSTOP WORKTRIPS: COMPARISONS BY REGION, MSA SIZE, TIME OF DAY, SOLO DRIVERS, PRIVATE VEHICLES, 1990, COMMUTERS RESIDING OUTSIDE CENTRAL CITY

Size of MSA or CMSA of Household	Census Division	AM Peak			PM Peak			Off Peak		
		Distance (minutes)	Duration (miles)	Speed (mph)	Distance (minutes)	Duration (miles)	Speed (mph)	Distance (minutes)	Duration (miles)	Speed (mph)
Less than 250,000	New England	20.60	13.11	36.96	17.62	11.08	36.88	19.45	12.23	32.63
	Middle Atlantic	17.74	10.53	32.94	23.92	12.83	30.95	23.73	15.10	34.84
	East North Central	16.69	10.58	36.29	21.42	12.39	34.12	21.50	13.18	38.23
	West North Central	19.91	11.36	35.08	18.33	9.92	32.08	19.41	13.45	40.20
	South Atlantic	20.30	12.04	32.17	22.21	15.83	36.66	15.28	9.42	34.63
	East South Central	21.52	12.26	34.40	12.00	5.00	28.83	27.39	19.00	36.64
	West South Central	15.69	10.36	40.30	16.58	9.81	37.32	15.78	10.96	41.30
	Mountain Pacific	27.50 19.00	17.40 12.09	31.67 34.18	25.00 20.50	19.67 13.63	39.06 34.88	34.14 12.32	23.05 7.68	33.85 36.23
250,000- 499,000	New England	17.05	10.71	34.57	19.45	11.15	30.81	24.82	17.74	37.37
	Middle Atlantic	24.58	15.13	34.56	27.18	17.09	37.94	16.88	9.72	31.99
	East North Central	17.31	10.71	34.73	19.27	13.76	36.54	18.50	12.41	36.48
	West North Central	21.55	13.64	36.45	24.38	14.88	36.63	17.57	9.57	30.94
	South Atlantic	21.25	12.47	35.37	24.27	12.92	30.78	23.08	14.89	35.88
	East South Central	18.49	10.86	34.11	21.52	13.62	37.25	18.16	13.88	40.55
	West South Central	16.50	10.30	35.30	16.25	11.13	37.63	17.06	10.44	35.13
	Mountain Pacific	16.75 11.11	10.83 6.56	35.06 35.42	20.00 15.60	12.50 9.47	37.50 35.58	25.83 15.44	13.33 8.88	31.67 33.60
500,000- 999,000	New England	19.63	12.29	34.79	20.07	12.79	35.07	18.80	11.01	33.86
	Middle Atlantic	22.40	14.38	36.76	28.71	16.88	34.25	23.95	16.00	37.49
	East North Central	23.83	15.47	37.80	22.69	14.12	34.41	18.03	12.07	38.01
	West North Central	23.75	12.00	29.63	30.00	10.80	20.48	25.00	12.83	31.00
	South Atlantic	19.35	11.73	34.54	20.49	12.09	35.12	20.32	12.87	36.96
	East South Central	23.47	14.71	36.24	25.26	16.33	39.06	17.88	11.54	37.01
	West South Central	18.91	11.35	33.26	23.61	15.33	35.32	29.13	17.75	34.92
	Mountain Pacific	16.88 21.38	8.25 11.92	28.75 28.87	18.75 21.67	10.25 10.17	34.20 26.69	17.00 28.00	9.20 21.59	34.40 40.96
1-3 Million	New England	22.46	13.66	33.67	23.56	12.59	30.08	21.22	13.01	33.98
	Middle Atlantic	19.92	11.47	32.82	22.17	13.00	32.52	21.63	12.57	33.08
	East North Central	20.26	11.81	33.43	22.46	12.47	30.77	18.66	11.54	34.73
	West North Central	20.41	13.02	35.26	22.15	12.00	31.62	18.14	11.45	36.49
	South Atlantic	22.41	12.87	33.84	21.29	11.32	31.16	20.75	12.92	34.81
	East South Central	22.50	16.00	35.15	18.57	9.71	30.17	17.40	11.40	29.40
	West South Central	17.57	10.26	32.46	26.14	13.14	29.80	17.72	9.89	32.98
	Mountain Pacific	19.02 22.64	10.35 12.74	32.43 33.01	23.79 25.58	11.68 11.79	29.24 28.68	20.14 23.51	11.02 15.65	32.25 36.21
Greater than 3 Million	New England	20.74	12.50	32.49	24.44	14.44	31.53	17.05	10.82	33.11
	Middle Atlantic	23.73	13.03	30.74	24.25	12.52	28.89	21.58	12.26	32.09
	East North Central	24.53	13.09	30.94	25.54	13.45	30.97	19.90	11.94	33.44
	West North Central									
	South Atlantic	30.91	14.39	28.62	31.83	16.02	30.31	21.96	12.45	33.18
	East South Central									
	West South Central	21.50	13.12	38.04	24.32	13.32	33.98	21.45	13.49	32.99
	Mountain Pacific									

**Table 11A: NONSTOP WORKTRIPS: COMPARISONS BY RESIDENTIAL DENSITY OF COMMUTERS'
RESIDENTIAL ZIP CODE, PRIVATE VEHICLES, 1990**

Population Density, Commuter Residence Zip Code	AM Peak			PM Peak			Off Peak		
	Duration (minutes)	Distance (miles)	Speed (mph)	Duration (minutes)	Distance (miles)	Speed (mph)	Duration (minutes)	Distance (miles)	Speed (mph)
1000-1999	20.65	11.72	32.43	21.80	12.02	31.81	19.46	11.21	32.47
2000-2999	20.36	10.63	30.93	22.60	11.41	29.56	18.49	10.78	33.85
3000-3999	19.09	9.82	29.42	20.63	9.81	27.74	16.09	8.66	30.39
4000-4999	20.69	10.53	29.33	20.87	9.92	28.72	20.18	11.97	32.33
5000-7499	20.30	10.49	29.76	24.93	11.55	27.21	19.50	10.17	30.02
7500-9999	20.31	10.64	29.32	21.13	9.95	26.87	20.34	11.21	31.05
10000-49999	24.64	11.37	27.46	27.36	10.89	24.76	19.96	8.56	26.45
50000+	35.42	9.42	17.68	37.50	10.00	17.00	27.17	9.83	19.44

**Table 11B: NONSTOP WORKTRIPS: COMPARISONS BY RESIDENTIAL DENSITY OF COMMUTERS'
RESIDENTIAL ZIP CODE, SOLO DRIVERS, PRIVATE VEHICLES ONLY, 1990**

Population Density, Commuter Residence Zip Code	AM Peak			PM Peak			Off Peak		
	Duration (minutes)	Distance (miles)	Speed (mph)	Duration (minutes)	Distance (miles)	Speed (mph)	Duration (minutes)	Distance (miles)	Speed (mph)
1000-1999	20.22	11.35	32.19	21.52	11.63	31.34	18.96	10.92	32.81
2000-2999	19.89	10.59	31.23	22.40	11.35	29.57	17.90	10.55	33.57
3000-3999	18.95	9.86	29.92	20.38	9.71	27.87	15.57	8.47	30.87
4000-4999	20.28	10.38	29.53	20.49	9.94	29.08	19.15	10.68	32.06
5000-7499	20.01	10.33	29.75	23.75	11.23	27.45	19.29	10.28	30.34
7500-9999	20.68	10.91	29.59	21.75	10.42	27.17	20.51	11.60	31.51
10000-49999	25.66	11.79	27.75	26.93	10.90	25.09	19.60	8.60	26.98
50000+	34.44	9.00	17.52	40.00	11.67	19.33	30.00	13.67	24.87

**Table 11C: NONSTOP WORKTRIPS: COMPARISONS BY RESIDENTIAL DENSITY OF COMMUTERS'
RESIDENTIAL ZIP CODE, PRIVATE VEHICLES WITH PASSENGERS ONLY, 1990**

Population Density, Commuter Residence Zip Code	AM Peak			PM Peak			Off Peak		
	Duration (minutes)	Distance (miles)	Speed (mph)	Duration (minutes)	Distance (miles)	Speed (mph)	Duration (minutes)	Distance (miles)	Speed (mph)
1000-1999	23.87	15.08	34.98	23.60	14.62	35.24	22.57	13.22	29.87
2000-2999	23.18	10.74	29.04	23.97	11.82	29.52	20.99	12.05	35.95
3000-3999	20.15	9.63	26.08	22.35	10.48	26.89	19.09	9.78	27.73
4000-4999	22.80	11.00	27.77	22.15	9.58	26.94	25.74	19.06	33.63
5000-7499	21.29	10.85	29.58	31.15	13.13	25.90	20.44	9.70	28.58
7500-9999	18.24	9.14	27.87	18.69	8.15	25.69	19.25	9.13	28.82
10000-49999	20.76	9.89	26.70	25.76	9.76	24.00	21.06	8.34	24.49
50000+	NA	NA	NA	NA	NA	NA	NA	NA	NA

**Table 12: DISTRIBUTION OF PERSON-TRIPS BY TRIP PURPOSE AND TIME OF DAY,
MSA SIZE, 1990 (all modes)**

		Nonstop Worktrips			Worktrip Chains ^a			All Other Trips ^b		
		AM Peak	PM Peak	Off Peak	AM Peak	PM Peak	Off Peak	AM Peak	PM Peak	Off Peak
Below 250,000	1983	5.49	2.68	6.69	1.17	3.14	5.45	5.39	11.78	58.21
	1990	5.18	3.13	6.76	1.46	3.49	5.84	5.33	12.61	56.21
250,000-499,999	1983	6.53	3.67	7.44	1.17	3.38	4.77	5.85	12.50	54.69
	1990	5.91	3.65	6.28	1.25	3.99	5.52	5.59	12.80	55.00
500,000-999,999	1983	5.63	2.86	6.14	1.08	2.80	6.65	6.42	12.15	56.28
	1990	6.01	4.01	6.25	1.50	3.65	5.13	4.79	12.46	56.19
1-3 Million	1983	6.62	4.19	4.88	1.48	3.29	4.25	5.64	12.05	55.61
	1990	6.58	4.56	6.81	1.45	3.89	5.20	4.77	11.46	55.28
Over 3 Million	1983	6.97	4.51	8.03	0.75	2.42	3.86	6.84	10.41	56.21
	1990	6.82	4.59	7.14	1.20	3.81	5.07	4.64	11.03	55.69
Total	1983	6.37	3.76	7.09	1.16	3.01	4.77	6.03	11.71	56.09
	1990	6.35	4.23	6.79	1.35	3.80	5.26	4.88	11.72	55.62

^a Includes all legs of worktrip chains.

^b Includes direct nonwork trips and all legs of nonwork trip chains.

**Appendix Table 1: NONSTOP WORKTRIPS:
MEAN TRIP TIMES, DISTANCES, SPEEDS,
1983 and 1990, NONMETROPOLITAN AREAS
(all modes)**

		AM- Peak	PM- Peak	Off- Peak
Time	1983	18.25	19.19	17.73
	1990	18.22	19.66	19.08
Distance	1983	9.60	10.18	9.74
	1990	11.61	12.53	12.58
Speed	1983	28.07	28.05	28.45
	1990	34.47*	34.08*	35.94*

* Significantly faster at 99% confidence level.

**Appendix Table 2: METROPOLITAN AREA SIZE CLASS
POPULATION GROWTH, 1980-90 (population in 000's)**

	1980	1990	Average Annual Growth Rate
All metro areas	172,678(284)*	192,726(284)	1.104%
3 million	10,077(2)	10,808(2)	0.703
1-3 million	7,455(4)	9,145(6)	2.064
500,000-999,999	10,914(16)	10,677(16)	-0.220
250,000-499,999	12,217(34)	14,115(40)	1.455
less than 250,000	132,015(228)	147,981(220)	1.147

**Appendix Table 3: NONSTOP WORKTRIPS: COMPARISONS BY REGION, MSA SIZE,
TIME OF DAY, PRIVATE VEHICLES ONLY, 1990, COMMUTERS RESIDING INSIDE CENTRAL CITY**

MSA Population Size Class	Census Region	AM Peak			PM Peak			Off Peak		
		Distance (minutes)	Duration (miles)	Speed (mph)	Distance (minutes)	Duration (miles)	Speed (mph)	Distance (minutes)	Duration (miles)	Speed (mph)
Less than 250,000	Northeast	17.30	9.32	31.15	17.95	9.29	33.45	11.60	5.47	26.37
	North Central	12.76	6.29	28.58	14.89	6.63	26.75	11.18	5.55	30.15
	South	16.14	8.65	30.50	19.00	12.10	33.88	14.60	8.80	32.38
	West	13.89	6.76	27.67	12.54	6.96	28.76	13.46	6.48	27.64
250,000- 499,000	Northeast	14.56	6.97	27.09	13.83	6.61	26.38	15.62	7.33	26.25
	North Central	12.96	6.86	32.58	14.08	6.58	27.92	15.33	8.71	33.50
	South	15.90	8.22	29.77	16.94	8.65	30.04	13.77	7.93	33.10
	West	14.93	7.60	29.56	15.65	7.54	28.43	11.53	6.40	29.96
500,000- 999,000	Northeast	16.34	8.72	27.51	14.24	6.94	26.00	16.41	9.04	29.61
	North Central	15.42	9.03	33.39	15.25	9.00	32.78	12.98	6.90	31.01
	South	18.72	11.11	33.37	19.53	10.27	30.52	16.76	9.83	33.88
	West	18.79	8.64	26.70	18.58	8.08	25.52	17.02	9.90	33.63
1-3 Million	Northeast	18.61	9.92	31.44	20.51	9.17	27.97	14.89	7.68	32.34
	North Central	19.06	9.84	30.29	21.09	10.96	30.64	17.46	9.54	31.81
	South	20.52	11.28	31.88	21.03	10.20	29.98	17.86	9.19	29.95
	West	20.04	10.83	30.09	22.74	12.89	30.93	19.74	11.55	32.90
Greater than 3 Million	Northeast	23.66	11.32	28.34	25.60	12.09	27.95	20.11	9.10	26.50
	North Central	23.59	12.94	31.10	27.40	13.31	28.21	25.54	16.88	32.85
	South	20.36	10.70	30.27	22.99	11.47	29.09	21.53	12.85	33.07
	West	23.35	12.62	31.77	23.12	10.82	27.01	21.86	13.09	32.79

**Appendix Table 4: NONSTOP WORKTRIPS: COMPARISONS BY REGION, MSA SIZE,
TIME OF DAY, PRIVATE VEHICLES ONLY, 1990, COMMUTERS RESIDING OUTSIDE CENTRAL CITY**

MSA Population Size Class	Census Region	AM Peak			PM Peak			Off Peak		
		Distance (minutes)	Duration (miles)	Speed (mph)	Distance (minutes)	Duration (miles)	Speed (mph)	Distance (minutes)	Duration (miles)	Speed (mph)
Less than 250,000	Northeast	19.58	12.44	36.16	20.10	11.68	34.46	20.34	13.10	35.22
	North Central	17.74	10.85	35.38	19.88	10.79	30.91	21.14	12.84	36.75
	South	19.35	11.68	35.22	18.15	11.49	35.56	19.01	12.85	37.82
	West	21.00	13.04	32.27	26.41	20.00	37.76	22.15	14.85	36.25
250,000- 499,000	Northeast	22.86	15.27	35.56	23.54	14.19	34.83	20.22	13.01	33.87
	North Central	17.96	10.91	34.31	20.28	13.98	36.54	18.43	11.86	35.09
	South	19.34	11.48	34.76	22.76	13.60	34.23	20.13	13.42	36.68
500,000- 999,000	West	13.17	7.83	33.16	17.91	10.91	35.59	16.86	9.34	32.18
	Northeast	20.48	12.80	35.49	22.39	14.05	35.21	20.60	12.57	34.41
	North Central	22.94	14.50	37.60	22.74	13.06	33.24	18.97	11.94	36.29
1-3 Million	South	21.24	13.27	35.12	23.99	14.45	35.77	20.44	12.92	36.30
	West	20.67	10.74	30.16	19.38	9.38	28.64	26.43	18.77	40.01
	Northeast	21.12	12.51	33.13	22.26	12.16	30.95	21.22	12.68	33.37
	North Central	20.82	12.55	34.12	22.58	12.37	31.03	18.68	11.60	35.78
Greater than 3 Million	South	21.72	12.51	33.56	21.31	11.12	30.67	22.22	13.96	34.36
	West	23.10	12.53	33.10	26.17	12.60	29.58	23.61	14.15	34.90
	Northeast	23.57	13.35	31.48	25.44	13.52	29.83	20.88	12.14	32.47
	North Central	24.64	13.27	31.03	25.34	13.25	30.71	20.80	12.37	32.93
Greater than 3 Million	South	26.78	13.68	32.22	28.53	14.65	31.45	22.05	12.54	32.10
	West	23.67	13.77	32.79	28.00	15.21	32.13	24.08	15.51	35.49

Appendix Table 5: NONSTOP WORKTRIPS: COMPARISONS BY REGION, MSA SIZE, TIME OF DAY, SOLO DRIVERS, PRIVATE VEHICLES ONLY, 1990, COMMUTERS RESIDING INSIDE CENTRAL CITY

MSA Population Size Class	Census Region	AM Peak			PM Peak			Off Peak		
		Distance (minutes)	Duration (miles)	Speed (mph)	Distance (minutes)	Duration (miles)	Speed (mph)	Distance (minutes)	Duration (miles)	Speed (mph)
Less than 250,000	Northeast	17.50	9.50	31.51	17.95	9.29	33.45	11.96	5.93	27.43
	North Central	11.94	5.94	27.85	13.20	6.17	26.35	10.44	5.29	30.83
	South	15.95	8.75	31.41	18.85	12.34	34.94	14.89	9.00	32.20
	West	12.10	6.22	27.81	12.72	7.04	28.41	11.51	6.05	28.39
250,000- 499,000	Northeast	13.94	6.54	26.99	14.94	7.67	28.48	14.89	6.95	26.26
	North Central	12.94	6.69	31.78	14.08	6.58	27.92	15.10	8.86	34.05
	South	15.63	8.21	29.74	17.19	8.87	30.53	12.54	7.37	34.65
	West	15.16	7.63	29.39	14.82	7.12	28.46	11.90	6.85	30.05
500,000- 999,000	Northeast	14.93	7.65	26.99	11.76	5.03	24.78	16.41	9.56	31.09
	North Central	14.17	7.71	31.47	13.29	7.06	30.05	12.91	6.77	30.97
	South	18.78	11.12	33.11	20.09	10.57	30.32	16.52	9.79	34.23
	West	18.08	7.00	24.38	18.14	6.90	24.28	16.69	9.91	34.00
1-3 Million	Northeast	17.41	10.04	33.36	19.09	8.91	30.11	15.02	7.95	32.99
	North Central	19.11	10.15	30.95	21.34	11.33	31.36	17.32	9.74	32.44
	South	20.61	11.27	31.60	20.97	10.02	29.36	18.98	9.75	29.82
	West	20.77	11.31	30.64	23.13	13.00	30.60	20.99	12.34	33.01
Greater than 3 Million	Northeast	24.68	11.93	28.32	25.66	12.41	28.15	20.34	9.66	27.63
	North Central	24.12	13.62	32.23	28.12	13.83	28.96	20.92	10.62	28.97
	South	20.74	11.09	30.81	23.25	11.71	29.33	19.91	11.80	32.37
	West	23.47	12.56	32.68	23.22	10.90	27.71	21.89	13.24	32.89

Appendix Table 6: NONSTOP WORKTRIPS: COMPARISONS BY REGION, MSA SIZE, TIME OF DAY, SOLO DRIVERS, PRIVATE VEHICLES ONLY, 1990, COMMUTERS RESIDING OUTSIDE CENTRAL CITY

MSA Population Size Class	Census Region	AM Peak			PM Peak			Off Peak		
		Distance (minutes)	Duration (miles)	Speed (mph)	Distance (minutes)	Duration (miles)	Speed (mph)	Distance (minutes)	Duration (miles)	Speed (mph)
Less than 250,000	Northeast	19.59	12.20	35.54	20.64	11.92	34.03	21.89	13.86	33.89
	North Central	17.75	10.84	35.89	20.56	11.70	33.55	20.94	13.26	38.76
	South	18.99	11.51	35.45	18.50	11.88	36.13	18.88	12.58	37.04
	West	23.05	14.62	32.98	22.43	16.21	36.67	22.98	15.19	35.07
250,000- 499,000	Northeast	21.13	13.11	34.57	24.26	14.85	35.25	19.53	12.39	33.78
	North Central	17.95	11.15	34.99	20.18	13.96	36.55	18.41	12.15	35.96
	South	19.81	11.69	34.92	22.42	12.92	33.67	20.56	13.86	37.24
	West	13.37	8.27	35.28	16.53	10.11	35.98	17.45	9.74	33.23
500,000- 999,000	Northeast	20.58	13.01	35.47	22.66	14.01	34.82	20.45	12.61	35.02
	North Central	23.82	14.84	36.31	23.87	13.58	32.16	19.23	12.20	36.81
	South	20.97	12.89	35.04	22.91	14.33	36.70	20.34	12.89	36.76
	West	19.67	10.52	28.82	20.50	10.20	29.69	25.50	18.77	39.47
1-3 Million	Northeast	21.66	12.97	33.41	23.11	12.72	30.88	21.35	12.87	33.69
	North Central	20.31	12.25	34.10	22.36	12.31	31.05	18.47	11.51	35.38
	South	21.80	12.68	33.72	21.69	11.44	30.95	20.27	12.54	34.33
	West	21.26	11.83	32.79	24.95	11.75	28.87	22.39	14.11	34.89
Greater than 3 Million	Northeast	22.90	12.88	31.22	24.30	13.06	29.64	20.35	11.87	32.36
	North Central	24.53	13.09	30.94	25.54	13.45	30.97	19.90	11.94	33.44
	South	26.90	13.85	32.64	28.39	14.78	32.00	21.73	12.93	33.09
	West	22.75	13.34	33.07	27.58	15.12	32.35	23.77	15.24	35.39

**Appendix Table 7: PER CAPITA ANNUAL PERSON-TRIPS BY MEN,
BY MODE AND PURPOSE, 1983 AND 1990 NPTS**

Purpose	Mode								Percent Change
	Private		Public		Other ^a		Total		
	1983	1990	1983	1990	1983	1990	1983	1990	
Earning a living	236.38	237.82	9.43	9.52	25.86	12.54	271.68	259.87	-4.35
Family & personal business	269.20	353.55	3.59	3.06	47.41	24.95	320.20	381.56	19.16
Civic, educational & religious	59.44	66.10	4.70	3.91	46.07	44.35	110.20	114.36	3.77
Social & recreational	215.10	228.48	5.05	3.13	58.99	33.87	279.14	265.48	-4.89
All purposes ^b	798.45	892.00	22.71	19.85	182.05	117.10	1003.20	1028.95	2.57

Notes: ^a Includes trips by bicycle, walking, school bus, taxi, airplane, Amtrak, moped and other modes.
^b Category "Other trips" not shown.

Source: Travel Day data, Patricia S. Hu and Jennifer Young, 1992, *Summary of Travel Trends: 1990 Nationwide Personal Transportation Survey*. Conversations with the authors indicate that 1983 data are estimates currently being revised.

**Appendix Table 8: PER CAPITA ANNUAL PERSON-TRIPS BY WOMEN,
BY MODE AND PURPOSE, 1983 AND 1990 NPTS**

Purpose	Mode								Percent Change
	Private		Public		Other ^a		Total		
	1983	1990	1983	1990	1983	1990	1983	1990	
Earning a living	154.32	175.24	10.60	8.09	11.99	9.63	176.91	192.96	9.07
Family & personal business	339.16	444.89	4.04	5.25	29.46	30.17	372.66	480.31	28.89
Civic, educational & religious	69.29	80.02	6.10	5.02	44.90	37.29	120.30	122.32	1.68
Social & recreational	223.00	217.64	3.63	3.07	34.54	30.81	261.17	251.53	-3.69
All purposes ^b	805.06	924.11	24.78	21.49	124.17	109.07	954.00	1054.67	10.55

Notes: ^a Includes trips by bicycle, walking, school bus, taxi, airplane, Amtrak, moped and other modes.
^b Category "Other trips" not shown.

Source: Travel Day data, Patricia S. Hu and Jennifer Young, 1992, *Summary of Travel Trends: 1990 Nationwide Personal Transportation Survey*. Conversations with the authors indicate that 1983 data are estimates currently being revised.