

An Assessment of the Potential Saturation in Men's Travel

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Executive Summary

For planners and decisionmakers to make improvements to the transportation system in the United States, understanding the level of demand from individuals is useful, given their current travel behavior. Previous studies have indicated that the projected levels of future congestion and gridlock based on recent trends may be overstated due to the apparent saturation of demand for automobiles and driver's licenses. According to Nationwide Personal Transportation Survey (NPTS) trend data, both household vehicle availability and the licensing of persons eligible to drive have exhibited growth trends that have stabilized since 1969. However, the effects of saturation in these two elements influence only one half of the travel demand equation: the supply of persons wanting to travel and the number of vehicles at their disposal. Additional analysis is needed to evaluate the other half of the equation, i.e., the individuals' demand for travel.

This study addresses the hypothesis that male travel trends may be approaching or have reached saturation. In analyzing this particular issue, this study examined the overall and gender-based trends in four indicators of travel (vehicle trips, vehicle miles of travel, person trips, and person miles of travel) as well as the trends in related factors (e.g., licensed drivers, household vehicle availability). In addition, the changes in average daily per person travel rates were analyzed for specific segments of the male population as defined by a selection of demographic, economic, and geographic characteristics that contribute to male travel.

Results of this study reveal that total male travel has not indicated signs of stabilization, but has actually increased over time at an accelerated rate. However, analysis of the contributing characteristics shows that various segments of the male population did experience saturation in their average daily travel rates, especially for their person travel measures (trips and miles of travel on all modes). From these findings it can be concluded that total male *vehicle travel* (trips and miles of travel driving a personal vehicle) has not yet exhibited signs of stabilized growth, and its future saturation can only be assumed based on the stability of the trends for licensed driver and household vehicle availability growth. It can also be concluded that the NPTS data did not truly evidence the current saturation in total male *person travel*. However, the stability shown by the various segments of the male population for their average daily person travel rates indicates that the stabilization in total male person travel has already begun and should be more evident in subsequent NPTS data.

Introduction and Overview

Travel behavior has changed significantly over the last several decades. These changes have resulted from changes in the economy, advancements in technology, new social values and norms, and shifts in the locations of households and firms (1). Similarly, changes in travel costs and transportation system performance also have contributed to societal changes. Many of these changes have occurred rapidly, not allowing the transportation infrastructure to keep pace. Accelerated growth in the suburbs, the influx of women into the labor force, and increasing vehicle ownership are a few of the factors that have altered national travel characteristics and commuting patterns (2).

Between 1969 and 1990, the total population in the United States increased more than 21 percent; however, as shown in Table 1, the growth in travel as measured by total vehicle miles of travel (VMT) was nearly four times greater, with an increase of approximately 82 percent during this time. Given these trends, it is easy to see why urban transportation planners are eager to predict the extent to which these increases in demand will continue.

Indicators	1969	1977	1983	1990	% Change 1969-90
Households (000)	62,504	75,412	85,377	93,347	49.4%
Persons, All (000)	197,213	213,141	229,740	239,416	21.4%
Persons, 5 years & older (000)	n/a	198,434	213,228	222,101	11.9%
Vehicle Trips (million)	87,284	108,826	126,911	158,927	82.1%
Vehicle Miles of Travel (million)	775,940	907,603	1,002,519	1,409,574	81.7%
Person Trips (million)	145,146	211,769	224,459	249,562	71.9%
Person Miles of Travel (million)	1,404,137	1,879,215	1,947,481	2,315,273	64.9%

Source: 1977, 1983, and 1990 data tapes; "Summary of Travel Trends: 1990 Nationwide Personal Transportation Survey," FHWA, March 1992.

In trying to understand future travel demand, one question that repeatedly arises concerns the prediction of when per capita travel demand will be saturated. One hypothesis is that men's travel may be becoming saturated. That is, men are close to reaching or have already reached an upper limit on their total travel, given that there is some maximum amount of time available to spend for travel on any given day. According to preliminary analyses of NPTS data, personal travel has increased significantly over the last two decades; however, the rates of increases in travel demand differ significantly by gender. An examination of person trips reveals that average daily trip-making for women has increased approximately 12 percent on a per person (persons five years and older) basis since the 1977 NPTS survey. Comparatively, average daily trip-making for men declined nearly two percent on a per person basis during this period.

While these data seem to indicate that men's travel may indeed be approaching some level of saturation, other data and factors must be considered before this particular hypothesis can be substantiated. For example, what, if any, demographic, geographic, and/or economic characteristics are contributing to a potential saturation of male travel?

As part of this study, gender-based travel trends were analyzed utilizing four basic indicators of travel demand included in the NPTS database: vehicle trips, vehicle miles of travel, person trips, and person miles of travel. Information from the 1977, 1983, and 1990 data tapes were used to construct total and per

person travel trends. The 1983 and 1990 NPTS databases were used for more specific and detailed cross-tabulations.¹

A literature review is included in this report. Some sources in this literature review discuss a person's daily travel time budget. While the topic of maximum time available for traveling during a given day may be an important consideration in the treatment of the concept of travel saturation, it was beyond the scope of this study. Therefore, it has only been addressed partially and is better left as an issue recommended for additional research.

Ultimately, the value of this research may be in the potential for enhanced capabilities in predicting future travel demand as a function of population growth and demographic characteristics. If, indeed, men's travel is becoming saturated, then it is possible that current travel forecasts that extrapolate historical trends are overestimating future demand and, therefore, producing exaggerated projections of future congestion. It may be the case that the nation's future roadway network will not be as "undersupplied" as was once thought. In addition, analysis of this potentially saturated condition may result in a better understanding of the relationship between demographic and trip-making characteristics.

Previous Studies

A great deal of research has been devoted to the differences in travel behavior attributable to gender. Women's travel patterns generally have been studied in more detail, and with justification, given the significant changes that have occurred over the last several decades. However, noteworthy changes in men's travel behavior also have been taking place, possibly as a result of the rising economic independence of women.

Some of the research reviewed originated in Europe (England, in particular). The use of this reference material is supported by the fact that the United States is experiencing many of the same trends in labor-force participation as many western European nations. For example, data from the mid-1980s indicate that England, France, and the U.S. have had similar female labor-participation rates (with the Netherlands not far behind). These countries also share a number of other trends, including the trend in driver's licensing rates.

An analysis of driver's license-holding rates for men and women over time, indicates evidence that these rates are converging (3, 4, 5, 6). Greene, using NPTS data, notes that the license-holding rates for men have remained virtually the same while those for women have increased substantially. Spielberg, Andrie, Ernst, and Kemp estimate that the share of men holding driver's licenses will actually fall one percent by the year 2000. Kitamura shows that from 1979 to 1983, men's license-holding increased by only 2.9 million, while increasing for women by 6.1 million. Similarly, Bell demonstrates, using data from home interview surveys, that males with licenses increased by 6 percent during the 1970s, while during the same decade women's licensing rates grew 18 percent. These rates show a stabilization in license-holding by males.

Furthermore, Spielberg et al. report that labor force participation rates of men have been declining and are expected to level off and remain constant. They also note that travel by men has fallen from about

¹It should be noted that for a number of variables within the NPTS database, responses of "not ascertained" or "refused" were indicated in the 1990 data but not in the 1983 data. In these instances, the unknown responses were omitted from the 1990 weighted total data before calculating percentage distributions so that the 1983 and 1990 distributions were directly comparable. Also, in cases where the response cohorts were not identical for 1983 and 1990, cohorts were restructured, if possible, to allow for the most accurate trend comparisons. Notations concerning dissimilar cohorts were provided where applicable.

55 percent of total travel in the early 1960s to 51 percent of total travel by 1973-74. Bell adds that the number of males in the labor force working full time declined during the 1970s, which, in part, explains decreases in work trips by males.

Rosenbloom studies how growing children and their travel needs affect the travel behavior of their parents (7). Utilizing interviews, including 100 surveys of U.S. households, it is noted that men are more likely to link trips to work when their children are very young. Also, when the children in a household are young, little disparity exists between the types of trips men and women make for them. As children grow, fathers make fewer trips for or with them.

Other interesting differences between men's and women's travel are revealed in the literature. Despite any recent changes in travel behavior, it remains clear that men are still commuting much longer distances than women (8, 9, 10, 11). A Transport and Road Research Lab (TRRL) report and Dasgupta's study both determine that men tend to travel almost twice the distance of women. Additionally, Dasgupta completes an examination of men's and women's travel behavior through different life-cycle stages using the results of a travel-to-work survey. Like other researchers, he relates the travel differences between men and women to the different types of jobs each typically hold. A distinct relationship is found between the types of jobs held, the distance traveled, and choice of mode for men and women.

The TRRL study analyzes the travel patterns of economically inactive housewives. The data, from the 1975-76 National Travel Survey, reveal that they have quite low personal mobility. Their mobility is restricted by young children and the lack of an available vehicle, since it appears that, if only one car is available, the husband has priority in its use. This study observes travel patterns of working women as well and found that they are usually drawn to employment that is closer to their homes. Gordon, Kumar, and Richardson's study also notes that women are attracted to more local employment (12). Furthermore, Gordon et al. establish that women generate more non-work trips, while men make more work-related trips.

Wachs addresses reasons why substantial differences persist between men's and women's travel (13). He describes how men secured the domain of the automobile, beginning with its introduction to society. Men were associated with driving to their jobs in central cities from their suburban homes. Women, he explains, were associated with the home in the suburbs. If women became employed, it was limited basically to clerical or service-oriented work that was located in the suburbs. Thus, women worked closer to the home, where they still retained primary responsibility. Referring to a literature review and 1983 NPTS data, Wachs predicts that this tendency will continue. He also cites data that show that lower paid workers make shorter trips to work, again supporting that shorter trips are made by women. Similarly, the premise of Rosenbloom's article attributes the disparity between men's and women's travel patterns to the woman's primary role in child care and other household duties (7). She concludes that this disparity will not significantly lessen until major social changes concerning gender roles in the household occur.

Grieco, Pickup, and Whipp relate how women are "invisible" in transportation issues (14). The authors denounce current decision models that they feel ignore women's issues. Women reportedly suffer significant transportation disadvantages, especially when taking into account personal security issues, and they have much lower mobility than men but have more transportation needs. While women are less likely to be able to afford private means of transportation, they also find it more difficult to use public transit when small children and/or large shopping trips are included. Travel time budgets of women are affected by the changing needs of growing children (14, 11), yet men's time budgets remain relatively constant at a high level until they retire. The authors believe it is time for transportation policy to take serious note of the different travel needs of women.

Other studies investigate travel time budgets as well. Prendergast and Williams analyze the hypothesis that daily travel time budgets have stabilized (15). However, their work shows little support for this theory. At an individual level, the data collected from a National Travel Survey and two surveys from Reading,

England, completed in the 1970s, illustrate very little correlation among daily travel times. However, as mentioned above, along with many other researchers, they find that men travel much longer distances than women, and that married women tend to allocate the least amount of time to travel. Another study by Prendergast and Williams using similar data concludes with similar results (16), but also maintains that households generally trade off the woman's travel in favor of other household responsibilities.

Pas and Koppelman study the day-to-day variabilities in travel behavior using several data sources, including surveys, interviews, and questionnaires (17). They detect little difference in variability between single men and women; however, married women were found to exhibit greater variability than married men. Other characteristics that influence travel variability include education, social status, and employment status. Interestingly, children have an ambiguous effect on the day-to-day variability of their parents' travel patterns.

Many researchers believe that the demand for travel will continue to increase at rates similar to those observed in the past decade or two. This notion is based strongly on informally observed increases in auto ownership and traffic congestion. However, Lave reveals that most estimates of increased travel tend to overlook structural changes such as the impending saturation of automobile demand (18, 19). He evaluates vehicle saturation by measuring the ratio of vehicles to all potential drivers—those who are of driving age.

Data from the 1977 NPTS suggest that saturation in the number of vehicles per person is already occurring, according to Mitchell (20). Similarly, Reno observes saturation levels being reached in vehicle availability for adults, using NPTS data from 1969, 1977, and 1983 (21). This saturation level is reached at less than one vehicle per adult.

Another study determines that, for those who commute by auto, average travel times are remaining the same or declining; thus, the "commuting paradox" between increasing congestion and stabilizing commute times is observed (22). Gordon, Richardson, and Jun conclude that congestion will not substantially worsen, due to the discontinuation of the trends that caused it to rise so remarkably. They see the baby-boomers' contribution to the growth in those of driving age at an end, the numbers of women entering the workforce at their peak, and the ratio of vehicles to the population (of driving age) at its saturation point. Lave (18, 19) and Myers (23) recognize these trends as well.

Myers observes another trend, household size is decreasing as many more people are living without children or a spouse. Kumar and Saccomanno share this conclusion as well in their study to assess major changes in population structure and the implications of these changes. Employing demographic and other travel data from Toronto, Canada, they note that decreasing household size, along with other structural changes in the population, will sizably impact future travel needs (24). The decrease in household size is also noted by Hartgen, who reports that trips per household are subsequently declining (25).

Prevedouros and Schofer believe that many factors—social, economic, technological, and cultural—combine to influence travel behavior, as well as auto ownership and use (1). They also see household characteristics and how they change as important elements. In their work, Hanson and Hanson examine many of the same factors as Prevedouros and Schofer (26). In addition, however, they note the importance of gender role factors in determining individual travel patterns.

Jager and Scheltes recognize that travel behavior is clearly influenced by auto ownership, and that gender has a considerable impact on such ownership (27). The difference in auto ownership between men and women, even among high-income members of both sexes, is extraordinary to Jager and Scheltes. They attribute this to the status of both men and women in the household and the workplace. Almost all of these researchers agree that until this status truly changes, the disparity between travel patterns of men and women will not disappear.

Trends

Prior research on this topic has used vehicle saturation as one indicator of the stabilization of travel demand. Since personal auto use dominates mode choice in the United States (87 percent of all person trips in the United States in 1990 were made in personal vehicles), it is reasonable to believe that a slowdown in the growth of the number of vehicles available per person (or per licensed driver or person eligible for a driver's license) may indeed indicate a similar saturation in the total demand for travel. However, vehicle supply is not the only factor that should be considered; changes over time in personal trip-making characteristics must also be analyzed.

Population and Total Travel

According to the 1990 NPTS data, there were approximately 93.3 million households and 222.1 million persons (age five and older) in the United States. Since 1977, the number of households has increased 24 percent and the population age five and older has increased almost 12 percent. These trends are shown in Figures 1 and 2. The fact that the number of households increased at a rate twice that of population indicates that household size (persons per household) has declined during this time.

The trend lines for population growth by gender are relatively parallel, as exhibited by the dotted and dashed lines in Figure 2. The number of men has increased 11 percent since 1977, and the number of women has increased about 13 percent. Women still comprise approximately 52 percent of the total population in the United States.

Figures 3 through 6 illustrate the trends for the four basic indicators of total travel that are available in the NPTS databases: vehicle trips, vehicle miles of travel, person trips, and person miles of travel. Each

Indicator	Percent Change		
	1977-83	1983-90	1977-90
Households	13.2%	9.3%	23.8%
Persons, 5 years & older	7.5%	4.2%	11.9%
Male	7.6%	3.2%	11.0%
Female	7.4%	5.0%	12.7%
Vehicle Trips	16.6%	25.2%	46.0%
Male	12.7%	25.7%	41.6%
Female	21.0%	24.7%	50.9%
Vehicle Miles of Travel	10.5%	40.6%	55.3%
Male	7.3%	49.9%	60.8%
Female	14.8%	28.5%	47.6%
Person Trips	6.0%	11.2%	17.8%
Male	1.8%	7.3%	9.3%
Female	10.3%	14.9%	26.7%
Person Miles of Travel	3.6%	18.9%	23.2%
Male	0.5%	17.9%	18.5%
Female	7.4%	20.0%	28.9%

Source: 1977, 1983, and 1990 data tapes; "Summary of Travel Trends: 1990 Nationwide Personal Transportation Survey," FHWA, March 1992.

Figure 1 Households (000)

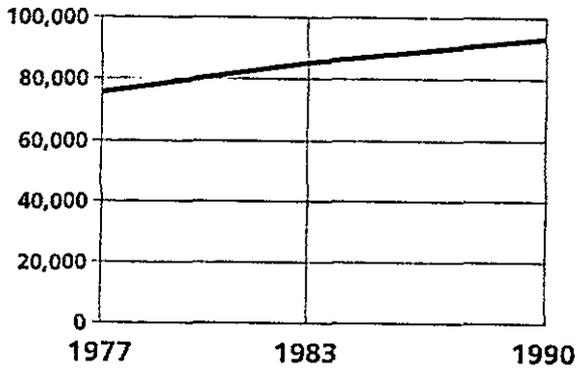


Figure 2 Persons, 5 Years + (000)

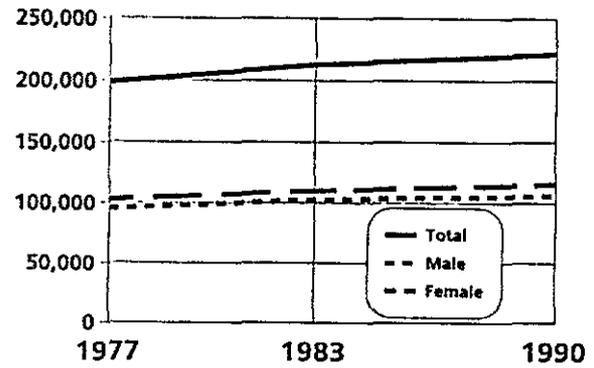


Figure 3 Vehicle Trips (000,000)

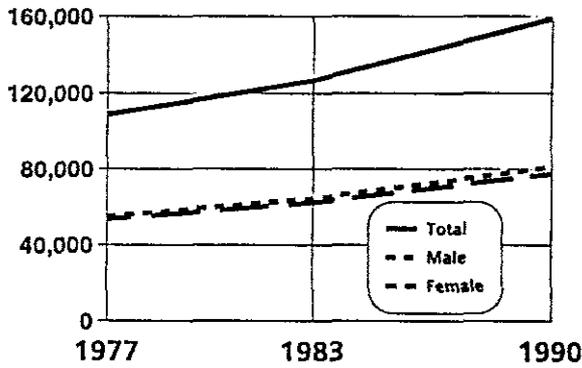


Figure 4 Vehicle Miles of Travel (000,000)

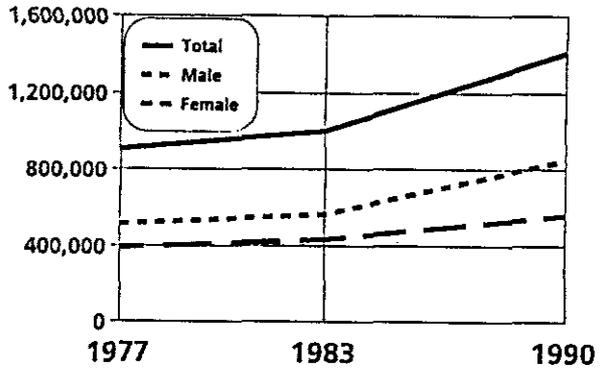


Figure 5 Person Trips (000,000)

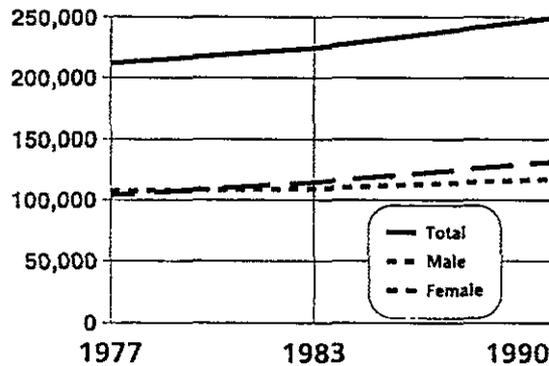
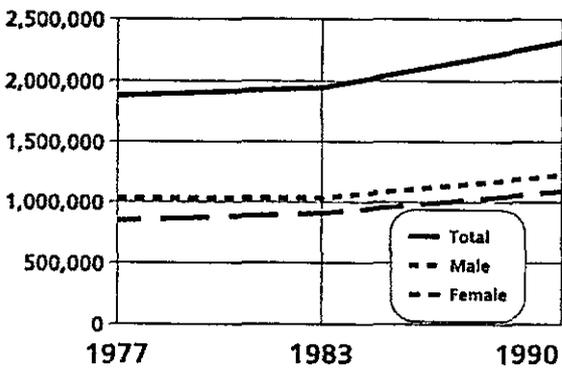


Figure 6 Person Miles of Travel (000,000)



graphic also depicts the gender-based trends for these travel measures. Table 2 presents the percentage rates of change associated with the trends depicted in Figures 1 through 6. From these data, it is possible to determine comparative magnitudes of change between travel measures as well as whether the changes over time are occurring at increasing or decreasing rates.

It is evident that all four travel measures have increased between 1977 and 1990. However, the vehicle-related travel measures (trips and miles made by a personal vehicle regardless of the vehicle's occupancy) have increased more significantly than the person-related travel measures (trips and miles made by a person regardless of the mode of transportation utilized), especially between 1983 and 1990. This finding further evidences the trend of increased use of personal vehicles such as autos, vans, and light trucks for personal travel over the use other modes such as public transportation.

It is interesting to note that all four travel measures have grown at increasing rates, as evidenced by the fact that their growth rates between 1983 and 1990 are greater than those between 1977 and 1983.² This is particularly important because this accelerated growth in travel has occurred despite the declining, or decelerating, growth in population and households, as evidenced by their smaller percent growth rates between 1983 and 1990. The "concave downward" shapes of the trend lines in Figures 1 and 2 more clearly illustrate the stabilization in the growth in these two variables.

While there are a number of reasons for overall travel to increase despite stability in the growth of the population, an in-depth discussion is not necessary in the scope of this work. It is important to know, however, that among the more important causal factors are the changing age structure of the population in the United States, specifically the aging of the baby-boom generation; the increase in the number of women entering the labor force; the increase in the availability of the automobile; and the changes in urban development.

Gender-Based Travel

Each of the four travel measures have increased for both men and women. However, women have exhibited greater increases since 1977 in three of the four measures. Only in the number of vehicle miles of travel did men show a larger increase, 61 percent versus 48 percent for women. Despite the significant increases in the measures of women's travel, men still made more vehicle trips and accumulated more miles of travel (both vehicle and person miles) in 1990 in absolute terms.

As was the case for the total travel trends, the growth rates for both male and female travel have also accelerated, especially for men. For example, the number of vehicle trips made by men and women between 1977 and 1990 increased 42 and 51 percent, respectively. Between 1977 and 1983, the percent growth rate for female vehicle trips was 21 percent, while male vehicle trips only increased 13 percent. However, since 1983, female vehicle trips have grown 25 percent and male vehicle trips have increased nearly 26 percent, a rate double that which occurred between 1977 and 1983.

Without accounting for population distribution effects, it would appear from the accelerated growth of the men's total travel data that the possibility of the saturation of men's travel is unlikely. Nevertheless, other variables and data should be considered prior to drawing any conclusions on the matter. In the following section, licensed driver and vehicle availability data are examined.

²The trend lines in the figures display this increasing rate as a "concave upward" shape; conversely, a decreasing rate would be manifested as a "concave downward" shape to a trend line.

Licensed Drivers and Vehicle Availability

The total number of licensed drivers in the United States increased approximately 28 percent between 1977 and 1990, as shown in Table 3. This percentage increase translates into more than 35 million new licensed drivers during this time. Of the new licensed drivers, 60 percent were women, an indication of the need of those women entering the labor force for the travel freedom afforded by the personal vehicle. Also evident from the data presented in the table is that the growth rates for both male and female licensed drivers have decelerated. In fact, the rate of growth between 1983 and 1990 for male licensed drivers was less than half that of the growth in this variable between 1977 and 1983. Similar to the population and household trends examined previously, this trend is interesting since all four travel measures exhibited accelerated growth patterns despite the apparent stabilization in the growth of those persons who travel the most—licensed drivers.

**Table 3: LICENSED DRIVERS, ELIGIBLE PERSONS, AND HOUSEHOLD VEHICLES
1977, 1983, and 1990 NPTS**

Indicators	Percent Change					
	1977	1983	1990	1977-83	1983-90	1977-90
Licensed Drivers (000)	127,552	147,205	163,025	15.4%	10.8%	27.8%
Male	66,199	75,737	80,289	14.4%	6.0%	21.3%
Female	61,353	71,467	82,707	16.5%	15.7%	34.8%
Eligible Persons ¹ (000)	158,263	175,995	185,113	11.2%	5.2%	17.0%
Male	74,542	83,854	87,167	12.5%	4.0%	16.9%
Female	83,721	92,141	97,876	10.1%	6.2%	16.9%
Household Vehs. (000)	120,098	143,714	165,221	19.7%	15.0%	37.6%

¹Persons eligible to receive a driver's license, i.e., age 16 and older.

Source: 1977, 1983, and 1990 data tapes; "Summary of Travel Trends: 1990 Nationwide Personal Transportation Survey," FHWA, March 1992.

The decelerated growth trend for licensed drivers is also evident for those persons eligible to receive a driver's license, i.e., persons age 16 years and older. While both males and females eligible to receive licenses have increased 17 percent since 1977, the majority of these increases have occurred between 1977 and 1983. Overall, the growth in eligible persons is approximately 26.8 million since 1977, a 17 percent increase. Since the increase in total licensed drivers has exceeded that of total eligible persons during this time, it is clear that a greater proportion of eligible persons are now getting licenses. This trend is illustrated in Figure 7, for all eligible persons as well as by gender.

While it is difficult to ascertain the direction of concavity from the trend lines in Figure 7, analysis of the percent changes for the ratios of licensed drivers to eligible persons indicates that the ratios for both men and women have grown at accelerated rates. However, given that the 1990 NPTS data indicate that 92 percent of eligible males and 85 percent of eligible females have already received licenses, it does not appear that a significant amount of additional future growth in licensed drivers will be possible. As such, it would seem that this particular "supply" of potential travelers is approaching a saturated condition.

As for the availability of household (or personal) vehicles, the total number of household vehicles in the United States increased by 45.1 million between 1977 and 1990, an increase of nearly 38 percent. Figure 8 details the trends for the ratios of household vehicle per licensed driver and per person eligible to receive a license. The data in this graphic seem to support the assertions of a number of previous studies that have characterized the saturation of demand for the auto (18, 19, 20, 21). In 1990, an average of one household vehicle was available for each licensed driver in the United States, while persons eligible to receive a driver's license had an average of 0.89 household vehicles available for their use.

Figure 7 Percent of Eligible Persons Licensed to Drive

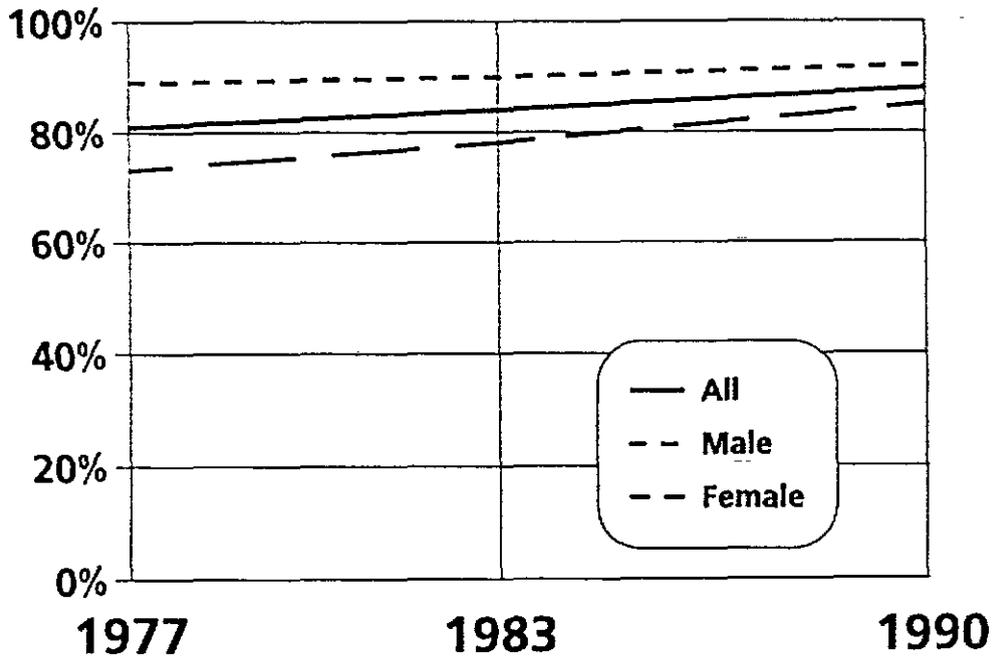
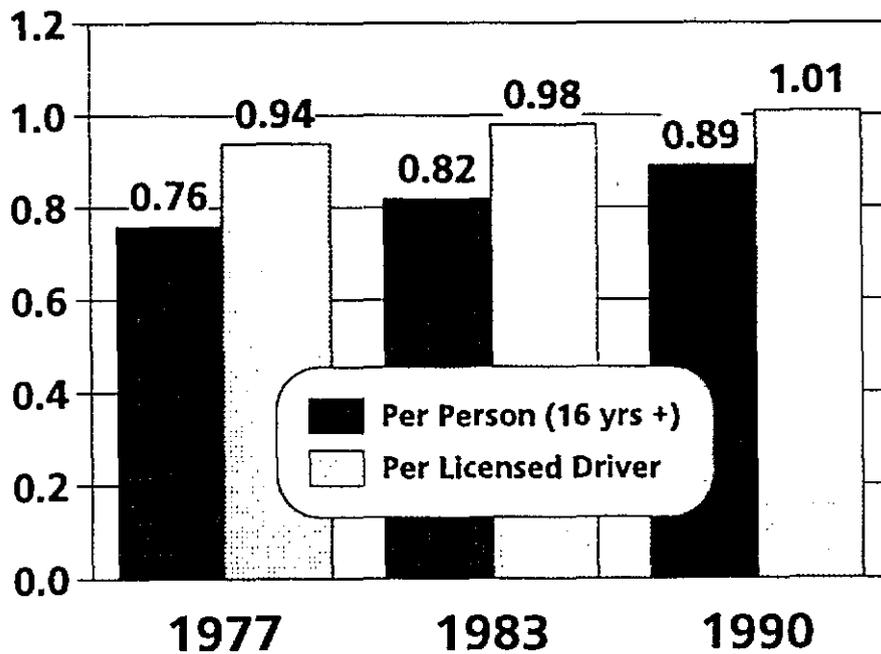


Figure 8 Household Vehicle Availability



Average Daily Travel Characteristics

Thus far, most of the examination of travel trends has centered on total vehicle trips, vehicle miles of travel (VMT), person trips, and person miles of travel (PMT). To account for population distribution effects and analyze travel characteristics on their most basic level, average daily per person travel measures are shown in Table 4. These data provide the best trend lines and rates of change from which to evaluate the potential saturation in men's travel.

	1977	1983	1990	Percent Change		
				1977-83	1983-90	1977-90
Daily Vehicle Trips Per Person¹						
All	1.84	1.98	2.35	7.24%	19.10%	27.72%
Male	1.96	2.11	2.55	7.68%	20.94%	30.23%
Female	1.74	1.86	2.18	6.79%	17.20%	25.36%
Daily Vehicle Miles of Travel Per Person¹						
All	15.36	15.61	20.87	1.57%	33.73%	35.83%
Male	18.28	18.52	26.70	1.35%	44.16%	46.11%
Female	12.71	12.95	15.67	1.88%	21.01%	23.28%
Daily Person Trips Per Person²						
All	2.92	2.88	3.08	-1.36%	6.74%	5.29%
Male	3.08	2.92	3.03	-5.32%	3.98%	-1.56%
Female	2.78	2.85	3.12	2.73%	9.41%	12.39%
Daily Person Miles of Travel Per Person²						
All	25.95	25.02	28.56	-3.56%	14.14%	10.08%
Male	29.56	27.63	31.56	-6.54%	14.22%	6.75%
Female	22.58	22.59	25.83	0.06%	14.31%	14.38%

¹Persons age 16 years and older.

²Persons age 5 years and older.

Source: 1977, 1983, and 1990 data tapes; "Summary of Travel Trends: 1990 Nationwide Personal Transportation Survey," FHWA, March 1992.

According to the data in Table 4, average daily vehicle trips and VMT per person (16 years and older) both increased significantly between 1977 and 1990, as would be expected given the growth in total vehicle trips and VMT and the stabilization in population discussed previously. Average daily vehicle trips per person increased 27 percent while average daily VMT increased nearly 36 percent. The fact that average daily VMT increased at a greater rate than did average daily vehicle trips indicates that average vehicle trip lengths (VMT per vehicle trip) have also increased during this time. Additionally, the incremental percent changes for these two travel measures show that their growth rates have increased since 1983. These accelerated trends are illustrated in Figures 9 and 10.

From the trend lines presented in these figures, it is evident that average daily vehicle trips and VMT for both men and women have also increased since 1977, and at accelerated rates.

Figures 11 and 12 present the trend lines for the average daily person trips and PMT per person (5 years and older) travel measures.³ The data in Table 4 indicate that average daily person trips per person, regardless of gender, increased 5 percent while average daily PMT per person increased 10 percent. The "concave upward" shapes of the trend lines for these measures signify accelerated growth, even though average daily person trips and PMT per person both exhibited slight declines between 1977 and 1983.

Interestingly, the gender-based trends for these two travel measures featured some differences that were not evident in previously discussed trends, especially in average daily person trips per person. For example, this particular measure is the only one in which men's travel actually showed an overall decline, from 3.08 average daily person trips per person in 1977 to 3.03 trips in 1990 (a decrease of less than two percent). Despite this slight overall decline, there was a four percent increase in this measure between 1983 and 1990, indicating a deceleration of the negative trend. Considered alone, the changes in this measure could possibly signify the beginning stabilization in men's average total daily trip-making. However, additional future data would need to be analyzed to determine whether the four percent increase between 1983 and 1990 was an anomaly or an indication of renewed growth.

Another difference indicated by the data was the significant growth in women's average daily person trips per person between 1977 and 1990, which exceeded the increase in this measure for all persons. As a result, women were making more person trips per day in 1990, on average, than men (3.12 trips versus 3.03 trips, respectively). Finally, contrary to what was evident in the average daily person trip and PMT trends for all persons and for men, the trend lines for women did not exhibit declines between 1977 and 1983 in either measure, although the increase in average daily PMT per person was only 0.06 percent during this time.

³The y-scale for Figure 11 has been adjusted in order to facilitate analysis of the changes in the trend lines. The trend lines cannot be distinguished from one another when the y-scale begins at zero.

Figure 9 Average Daily Vehicle Trips Per Person (16+)

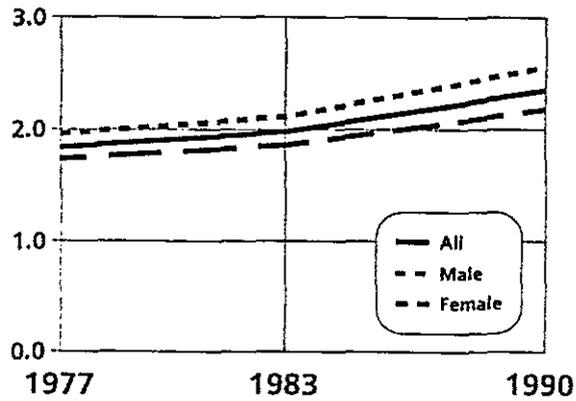


Figure 10 Average Daily VMT Per Person (16+)

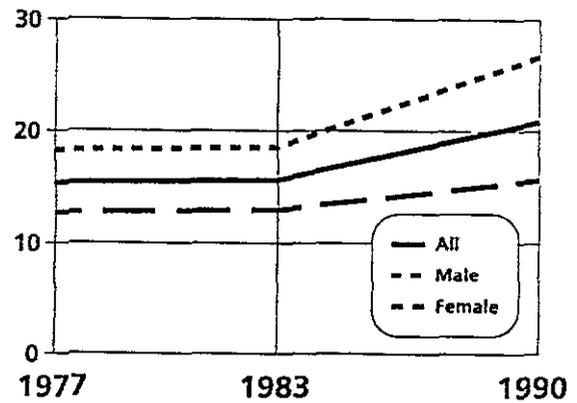


Figure 11 Average Daily Person Trips Per Person (5+)

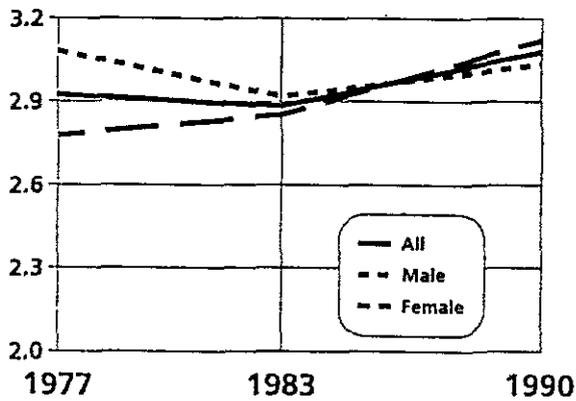
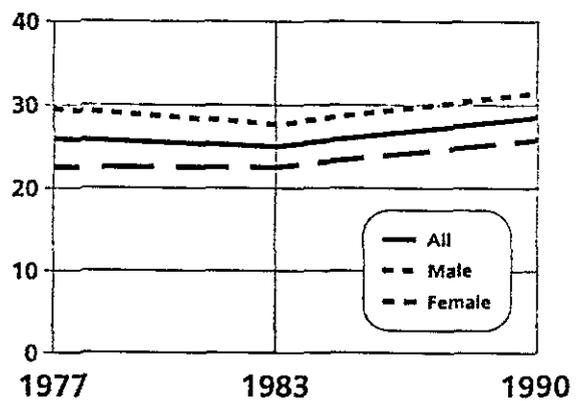


Figure 12 Average Daily PMT Per Person (5+)



Travel by Segments of the Male Population

The trends presented thus far suggest that the NPTS data do not evidence saturation in men's travel. In fact, all of the trends that were examined grew at greater rates between 1983 to 1990 than between 1977 to 1983, actually indicating an acceleration in the rates of male travel during this time. Since overall male travel has not exhibited signs of stabilization, several demographic, economic, and geographic variables were examined to determine whether saturation of travel was evident for specific segments of the male population. These characteristics were compared for 1983 and 1990 to document the changes in each segment. In addition, the extent to which specific cohorts of each variable indicated signs of stabilization was also analyzed. For purposes of this study, no change, a decline, or a five percent or less increase between 1983 and 1990 in the male travel measures for any category of a characteristic were used to define stabilization of travel growth within the category.

The characteristics of men that were examined include age, income, race, licensed driver status, worker status, household size, household vehicle availability, life cycle status, household location, mode choice, and trip purpose. Urban area size was also examined, but was not included herein for two reasons: first, the size categories used were not consistent between the 1983 and 1990 surveys; second, there were no significant differences between the impacts of urban size and household location.

It should be noted that the data exhibited in Tables 5 through 13 have been adjusted to reflect the fact that the 1990 data for these characteristics included responses of "not determined." This was necessary due to the lack of a comparable response in the 1983 data. Specifically, the "not determined" responses were re-distributed proportionally among the remaining cohorts.

Age

From 1983 to 1990, the total number of men (5 years and older) in the United States increased approximately 3 percent, from 102.9 million to 106.2 million. As shown in Table 5, the largest change was in the age category of 40-49, which increased by 23 percent. Other significant changes included the 16 percent increases evidenced in both the 30-39 and 65 years and older age categories. The number of men in the 16-19, 50-59, and 60-64 age categories decreased by 12, 4, and 13 percent, respectively.

Age	Total Men		% Distribution		% Change
	1983	1990	1983	1990	1983-1990
5-15 years	19,026,299	19,132,048	18.5%	18.0%	0.6%
16-19 years	7,693,294	6,774,768	7.5%	6.4%	-11.9%
20-29 years	20,445,164	18,602,353	19.9%	17.5%	-9.0%
30-39 years	17,239,815	19,962,496	16.8%	18.8%	15.8%
40-49 years	12,314,146	15,141,460	12.0%	14.3%	23.0%
50-59 years	10,905,225	10,473,485	10.6%	9.9%	-4.0%
60-64 years	5,394,748	4,682,109	5.2%	4.4%	-13.2%
65 years & older	9,861,947	11,395,500	9.6%	10.7%	15.6%
Total	102,880,638	106,164,219	100.0%	100.0%	3.2%

Source: 1983 and 1990 data tapes.

Figure 13 Average Daily Vehicle Trips: Men (16+) by Age

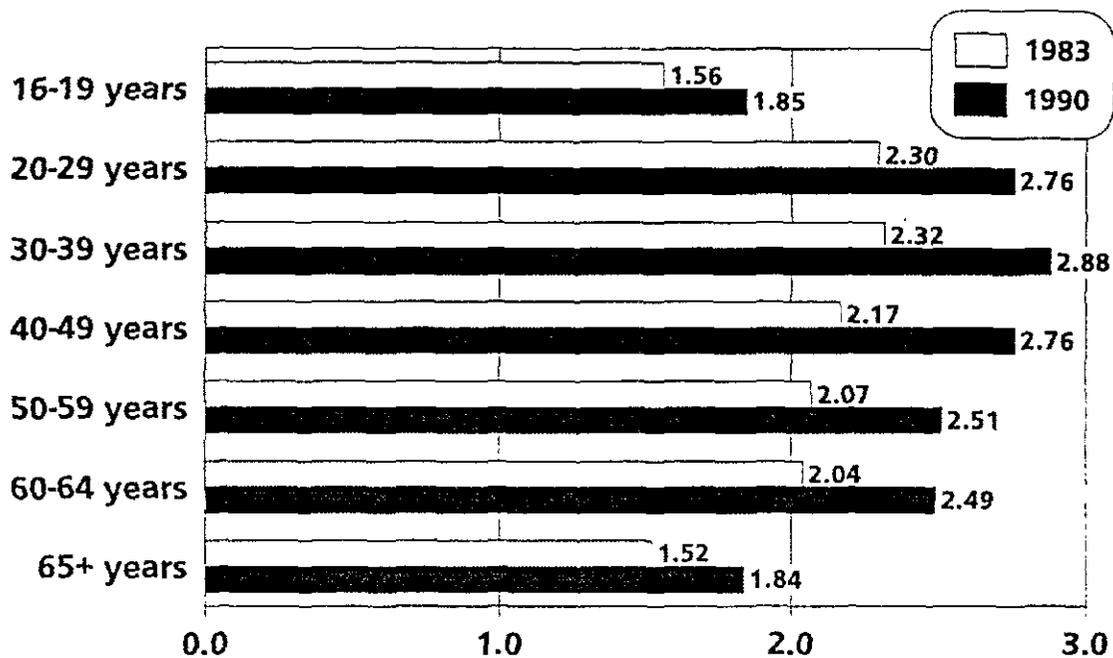


Figure 14 Average Daily Vehicle Miles of Travel: Men (16+) by Age

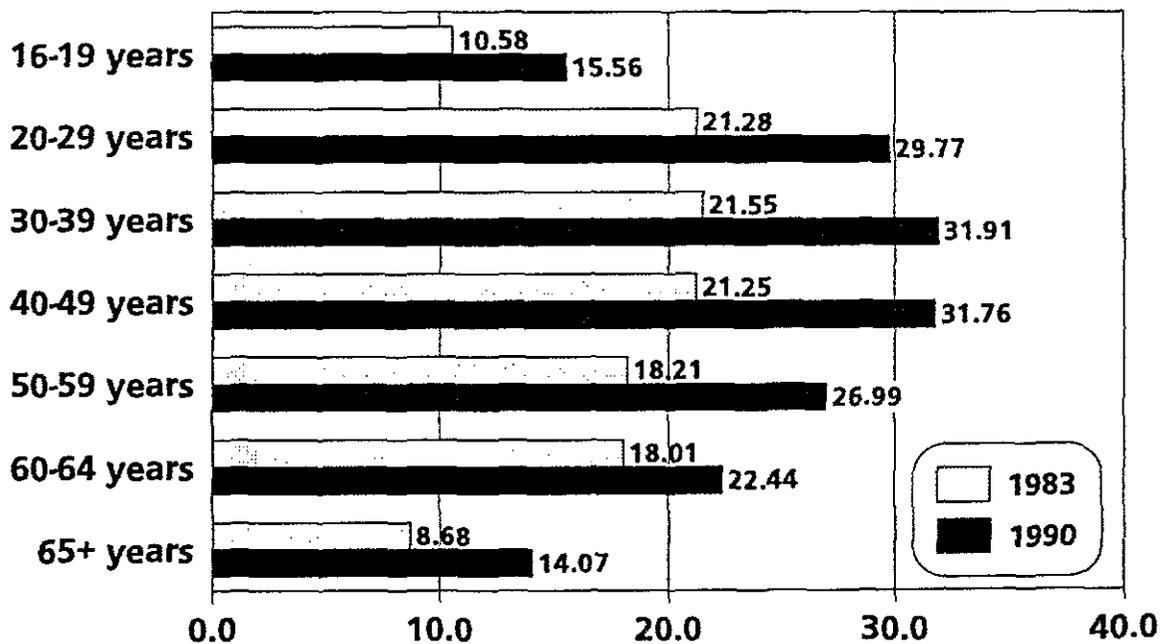


Figure 15 Average Daily Person Trips: Men (5+) by Age

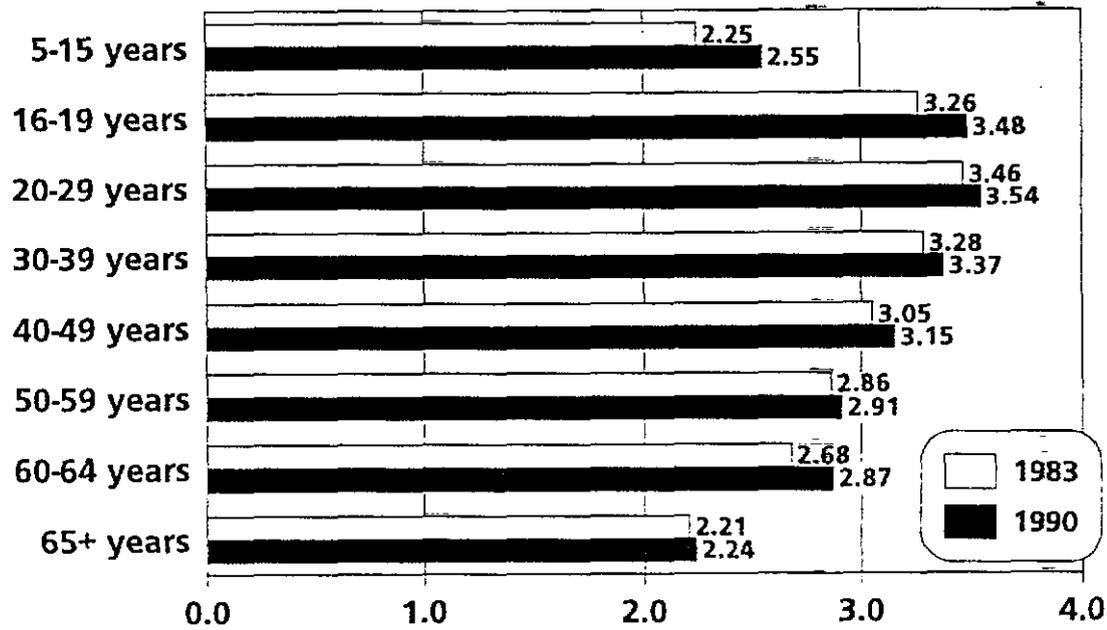
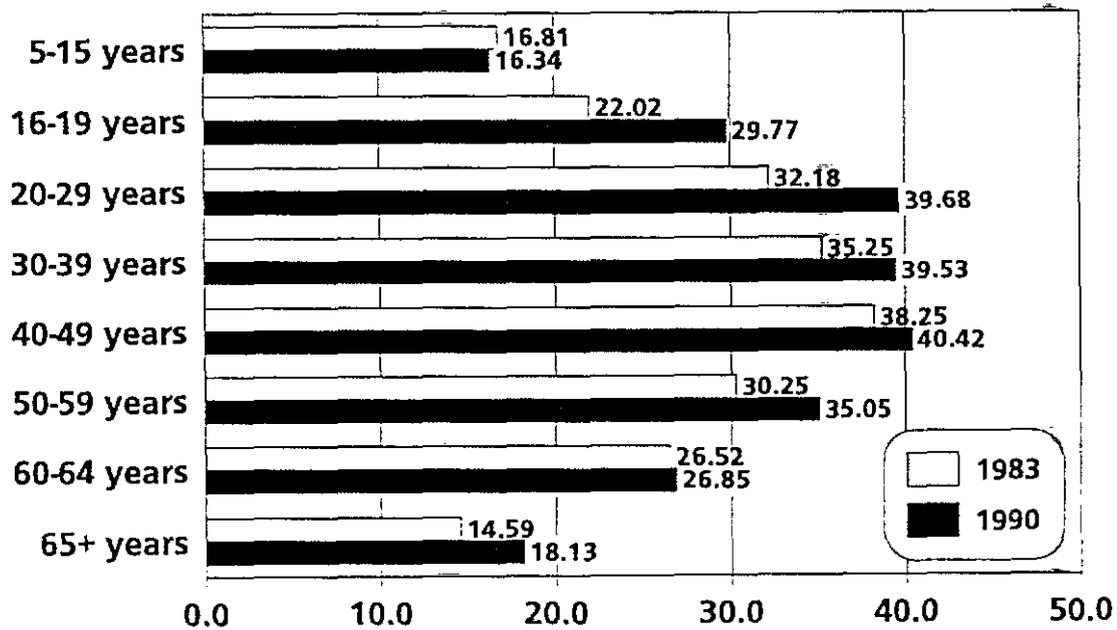


Figure 16 Average Daily Person Miles of Travel: Men (5+) by Age



In 1990, males between the ages of 20 and 49 years were associated with the "baby boom" generation. They comprised more than 50 percent of all men age five and older. According to the data in Figures 13 through 16, men in this age group have the highest average daily travel characteristics. It is also evident that average daily travel declines for men age 50 and older. Therefore, it is possible that, as the baby boomers approach retirement, changes in total male travel may become more stable.

Average daily vehicle trips and vehicle miles of travel increased between 1983 and 1990 for all age categories, as shown in Figures 13 and 14. Average daily person trips exhibited signs of stabilization for men between the ages of 20 and 59, and 65 and older. However, stability in the trends for these age cohorts was not evident for average daily person miles of travel.

For both average daily vehicle trips and VMT per person in 1983 and 1990, men ages 30-39 made the most trips and traveled the most miles. Men in the 65 years and older (65+) age category made the least number of trips and traveled the fewest miles. The most significant change in average daily vehicle trips occurred in the 40-49 age category, which increased 27 percent between 1983 and 1990. The largest change in average daily VMT occurred for men in the 65+ age category, an increase of 62 percent. While none of the age categories have shown declines in either of the two measures, it is evident from the figures that men between the ages of 20 and 49 are the biggest contributors to the increasing total trends of these measures between 1983 and 1990.

The changes from 1983 to 1990 in average daily person trips and PMT per person were not significant, as shown in Figures 15 and 16. Stabilization of growth in average daily person trips was indicated for men between the ages of 20 and 59, and 65 years and older. The largest increase in this person travel measure (13 percent) occurred for men in the 5-15 age group. For average daily PMT per person, the 5-15 and 60-64 age categories showed signs of stabilization.

Household Income

From 1983 to 1990, there appears to have been a shift in total household incomes indicated by men. However, caution should be used in interpreting these changes since the incomes were not adjusted to

Table 6: DISTRIBUTION OF MEN (5+) BY HOUSEHOLD INCOME

Household Income	Total Men		% Distribution		% Change 1983-1990
	1983	1990	1983	1990	
Less than \$5,000	6,537,690	2,392,118	6.4%	2.3%	-63.4%
\$5,000-9,999	11,131,766	6,548,982	10.8%	6.2%	-41.2%
\$10,000-14,999	13,439,512	7,382,079	13.1%	7.0%	-45.1%
\$15,000-19,999	12,268,803	9,054,007	11.9%	8.5%	-26.2%
\$20,000-24,999	13,111,149	8,567,264	12.7%	8.1%	-34.7%
\$25,000-29,999	11,583,090	10,156,497	11.3%	9.6%	-12.3%
\$30,000-39,999	15,250,134	19,596,244	14.8%	18.5%	28.5%
\$40,000-49,999	9,067,596	13,117,477	8.8%	12.4%	44.7%
\$50,000-59,999	4,601,354	11,232,398	4.5%	10.6%	144.1%
\$60,000-69,999	2,327,350	6,427,740	2.3%	6.1%	176.2%
\$70,000-79,999	1,351,575	3,946,334	1.3%	3.7%	192.0%
\$80,000 or more	2,210,618	7,743,077	2.1%	7.3%	250.3%
Total	102,880,637	106,164,217	100.0%	100.0%	3.2%

Source: 1983 and 1990 data tapes.

account for inflation. Given the 1983 U.S. median family income (\$24,580) and its value in 1990 dollars (\$32,378) as reported by the Bureau of the Census, it would not be unreasonable to expect a 31.7 percent increase in household income between 1983 and 1990.

In 1983, over 80 percent of men lived in households with total incomes of less than \$40,000, as shown in Table 6. This decreased to 60 percent in 1990. In addition, from 1983 to 1990, the number of men in households earning at least \$50,000 more than doubled. It is interesting to note that these apparent increases in total household incomes have occurred during a time in which average household size has decreased.

The average daily vehicle trip and VMT per person data illustrated in Figures 17 and 18 indicate that the travel measure rates increased as household family income increased. This relationship is also evident for average daily person trips and person miles of travel; however, the changes between 1983 and 1990 for these travel measures were not as significant.

Men with higher household incomes not only made more vehicle trips and traveled more VMT, their income groups also exhibited the largest increases in these measures between 1983 and 1990. In fact, the only income groups that indicated signs of stabilized travel growth for either measure included men in households with incomes of less than \$5,000 or between \$15,000-19,999. Since these travel measures include only trips made in personal vehicles, it is logical to expect those least able to afford an auto or other personal vehicle to have the most modest travel characteristics.

Men with lower household incomes had the smallest average daily person travel rates, as shown in Figures 19 and 20. Stabilization of both average daily person trips and PMT was evident between 1983 and 1990 for men in households with incomes of \$10,000-24,999; \$30,000-39,999; and \$50,000-59,999. In addition, other income categories indicating possible saturation in these travel measures included the \$80,000+ category (three percent decline in average daily person trips) and the less than \$5,000 category (17 percent decline in average daily PMT).

Race

As shown in Table 7, 82 percent of all men in the United States were white, non-Hispanic, and 10 percent were black, non-Hispanic in 1983. In 1990, the number of men in the white and black categories remained relatively stable. However, the number of Hispanic males increased by 34 percent during this time. This increase seems reasonable since Census data show that the Hispanic population in the U.S. increased more than 50 percent, from 14.6 million persons in 1980 to 22.3 million in 1990.

It is also possible that this increase may have been influenced by a change in the ethnic origin question on the questionnaire. In 1983, ethnic origin encompassed a broad range of nationalities and was determined via the use of a number of ethnic codes (e.g., German, Irish, Mexican, etc.). Accordingly, assumptions were necessary to determine whether persons were of Hispanic origin. However, in the 1990 survey, the ethnic origin question was changed to ask respondents only whether they were of Hispanic origin (no other nationalities were considered). For purposes of this analysis, the responses to these two questions were combined to create four "race" categories: white, non-Hispanic; black, non-Hispanic; Hispanic (persons of Hispanic origin regardless of indicated race); and other, non-Hispanic.

Figure 17 Average Daily Vehicle Trips: Men (16+) by Income

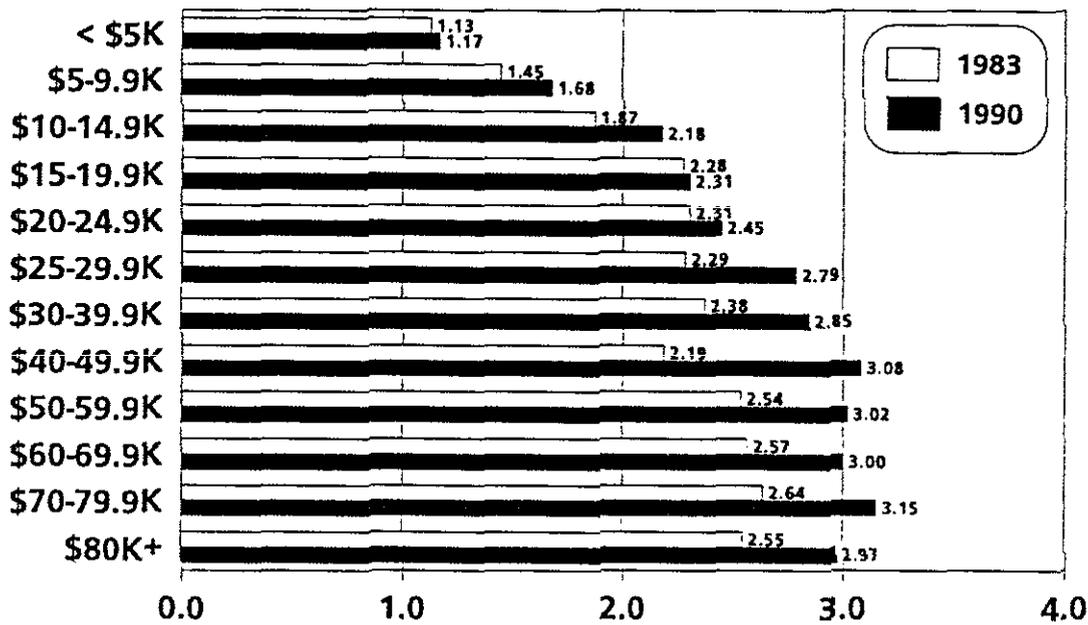


Figure 18 Average Daily Vehicle Miles of Travel: Men (16+) by Income

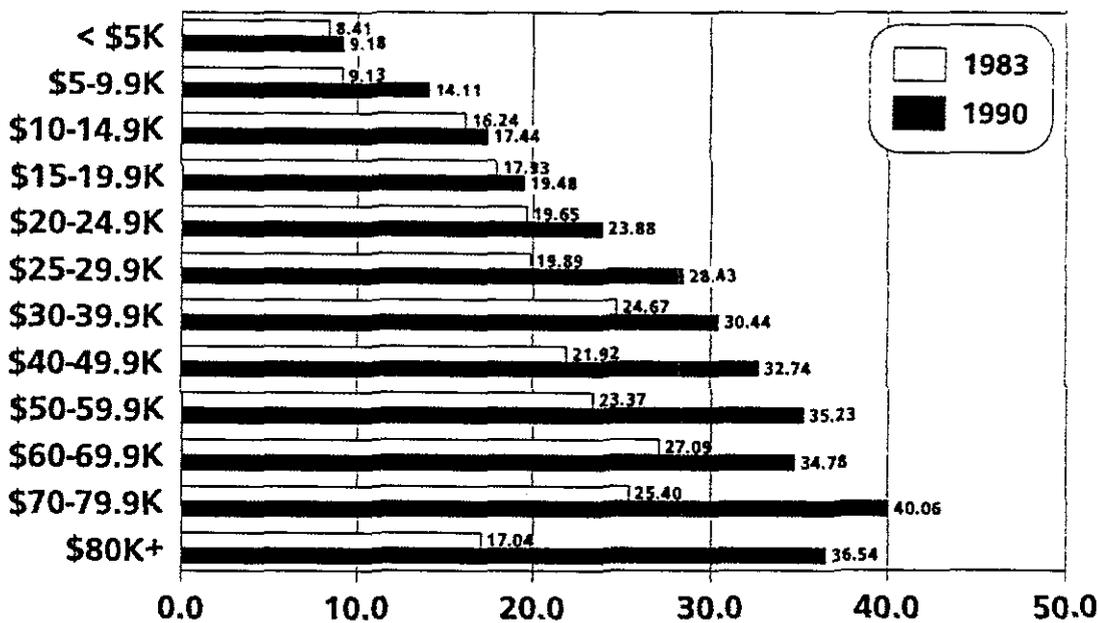


Figure 19 Average Daily Person Trips: Men (5+) by Income

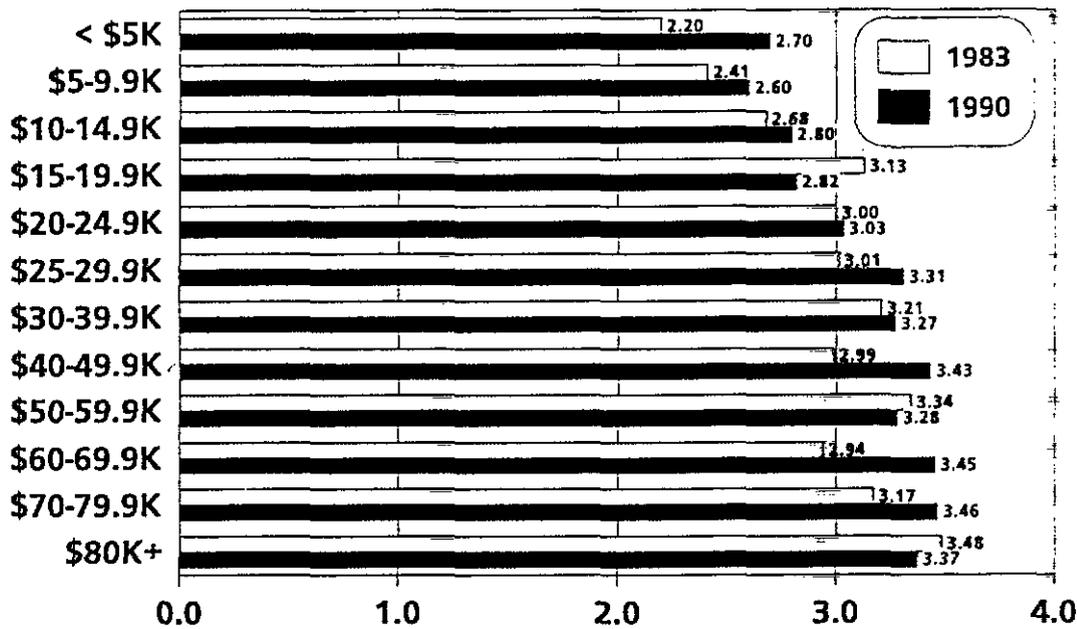


Figure 20 Average Daily Person Miles of Travel: Men (5+) by Income

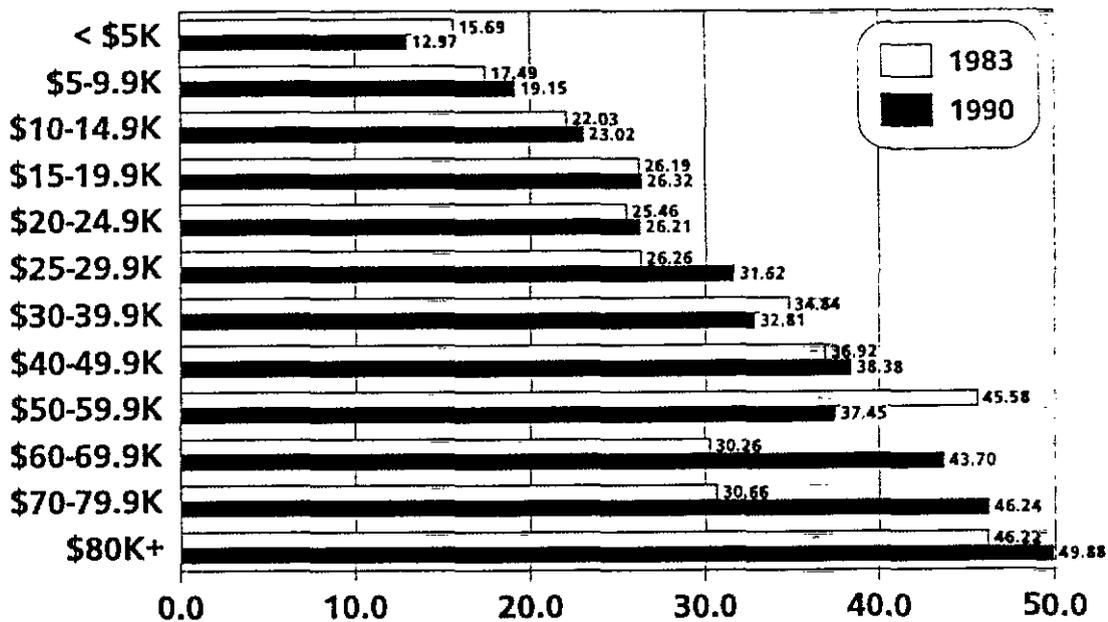


Table 7: DISTRIBUTION OF MEN (5+) BY RACE

Race	Total Men		% Distribution		% Change 1983-1990
	1983	1990	1983	1990	
White, Non-Hispanic	83,903,435	83,470,511	81.6%	78.6%	-0.5%
Black, Non-Hispanic	10,369,779	10,747,961	10.1%	10.1%	3.6%
Hispanic	6,137,844	8,247,807	6.0%	7.8%	34.4%
Other, Non-Hispanic	2,469,579	3,697,940	2.4%	3.5%	49.7%
Total	102,880,637	106,164,219	100.0%	100.0%	3.2%

Source: 1983 and 1990 data tapes.

Average daily vehicle trips and vehicle miles of travel by race did not show signs of stabilization between 1983 and 1990. While average daily vehicle travel characteristics increased significantly for all race categories, average daily person trips showed stable trends for men in the white, non-Hispanic and other, non-Hispanic categories.

As shown in Figures 21 and 22, average daily vehicle trips and VMT per person were highest for white, non-Hispanic men in both 1983 and 1990. The most significant growth in these travel measures among the race categories occurred for Hispanic males. Average daily vehicle trips for Hispanic men increased 105 percent between 1983 and 1990, and average daily VMT increased 156 percent. Black, non-Hispanic males also experienced significant increases in the vehicle travel measures. As a result, the vehicle travel characteristics of these two race categories in 1990 have approached those of white, non-Hispanic males.

The trends in average daily person trips and PMT per person were quite similar to those for the vehicle travel measures, as evidenced in Figures 23 and 24. White, non-Hispanic men had the highest average daily person trips and PMT of all the race categories in both 1983 and 1990. Additionally, Hispanic men had the most significant increases in these two measures during this time: a 96 percent increase in average daily person trips and a 177 percent increase in average daily PMT. As a result of these changes in the person travel characteristics of Hispanic men, black, non-Hispanic men had the lowest person travel rates of the race categories in 1990. Similar to the average daily vehicle travel measures, the person travel characteristics of black, non-Hispanic and Hispanic men have approached those of the white, non-Hispanic race category.

Licensed Driver Status

In 1983, 91 percent of all men age 16 and older in the United States were licensed drivers. Between 1983 and 1990, the total number of men possessing licenses increased by more than 4.2 million, a percent-age increase of more than five percent. By 1990, the percent of total males who were licensed to drive com-prised 92 percent of all men age 16 and older. The number of men age 16 and older who did not have dri-ver's licenses declined 11 percent during this time.

Table 8: DISTRIBUTION OF MEN (16+) BY LICENSED DRIVER STATUS

Licensed Status	Total Men		% Distribution		% Change 1983-1990
	1983	1990	1983	1990	
Yes	76,206,354	80,389,720	90.9%	92.2%	5.5%
No	7,647,985	6,777,584	9.1%	7.8%	-11.4%
Total	83,854,339	87,167,304	100.0%	100.0%	4.0%

Source: 1983 and 1990 data tapes.

Figure 21 Average Daily Vehicle Trips: Men (16+) by Race

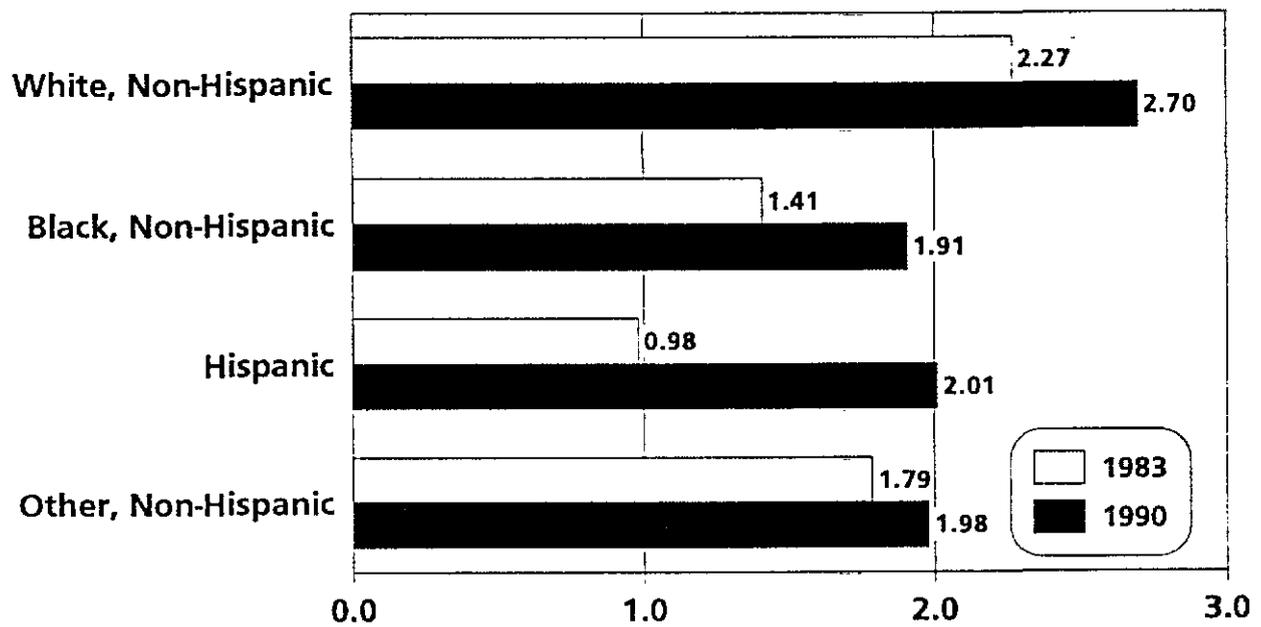


Figure 22 Average Daily Vehicle Miles of Travel: Men (16+) by Race

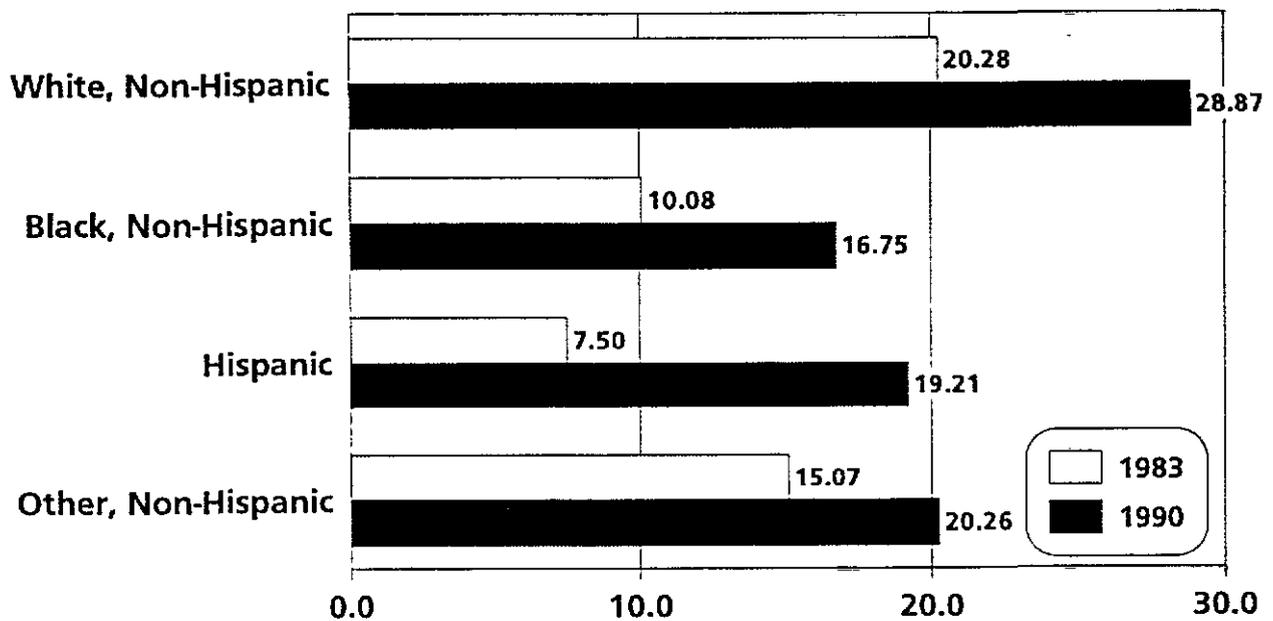


Figure 23 Average Daily Person Trips: Men (5+) by Race

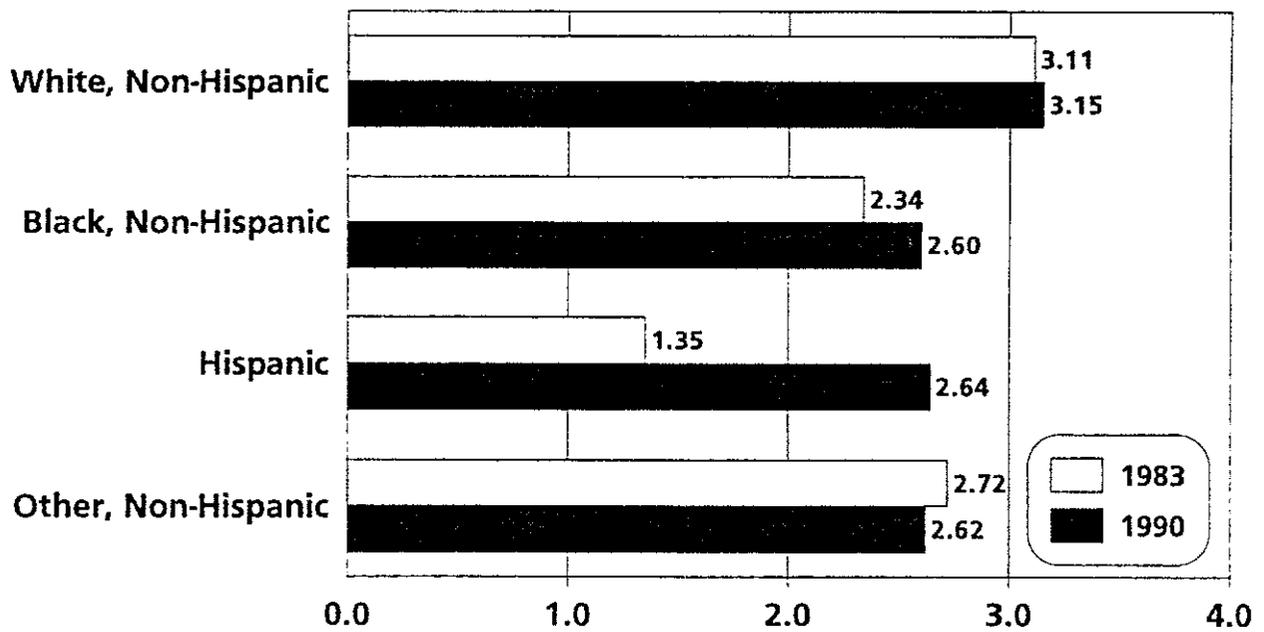
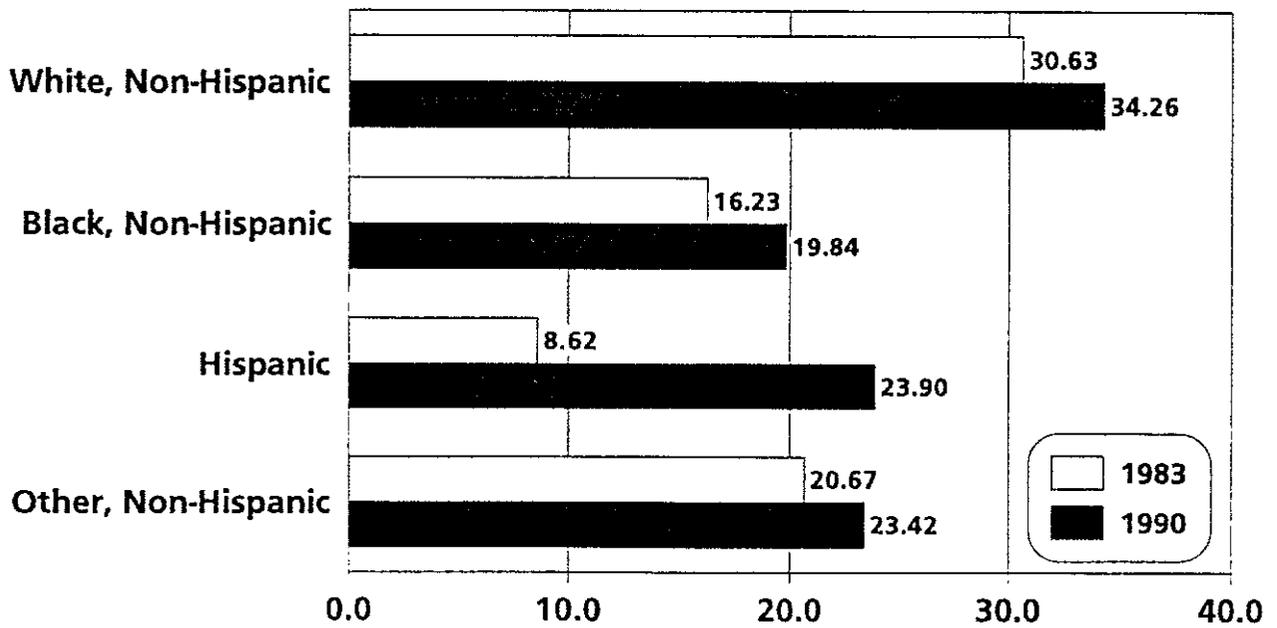


Figure 24 Average Daily Person Miles of Travel: Men (5+) by Race



Since most men age 16 and older are licensed drivers and average daily vehicle trips and VMT per person increased significantly between 1983 and 1990, it would appear that men's travel may not be stabilizing. However, the data for average daily person trips per licensed driver suggests otherwise.

Figures 25 and 26 present the comparative trends for average daily vehicle trips and VMT per licensed driver. Average daily vehicle trips for men with licenses rose 20 percent between 1983 and 1990; average daily VMT for this group also increased significantly, 44 percent. Average daily vehicle trips and VMT for men without driver's licenses were negligible for both 1983 and 1990. Since total vehicle trips and VMT were accumulated only for persons who were indicated as drivers on the trips, it is expected that non-licensed males would not have had an opportunity to accrue vehicle trips and miles.

Despite a 14 percent increase in average daily PMT per person, licensed males exhibited signs of stability in their average daily person trips, which increased less than one percent from 1983 to 1990. The relative changes in these measures indicate that these men were, however, making longer trips in 1990. The data in Figures 27 and 28 also show that average daily person trips and PMT for unlicensed males increased 19 percent and 40 percent, respectively, during this time.

Worker Status

Presented in Table 9 are the male worker status distributions for 1983 and 1990. The data indicate that 70 percent of all men age 16 and older worked during 1983. By 1990, the percent share of men who worked increased to 73 percent of total. This increase in employment may be one reason for the increase in the number of men receiving driver's licenses during this time. With jobs, men who did not drive previously may have found it necessary to begin doing so to facilitate getting to and from work. These two particular trends also may have had a considerable influence on the increasing trend of total male travel discussed previously in this report.

Worker Status	Total Men		% Distribution		% Change
	1983	1990	1983	1990	1983-1990
Yes	59,011,873	63,996,299	70.4%	73.4%	8.4%
No	24,842,466	23,171,005	29.6%	26.6%	-6.7%
Total	83,854,339	87,167,304	100.0%	100.0%	4.0%

Source: 1983 and 1990 data tapes.

The data in Figures 29 and 30 indicate that there have been significant increases in both average daily vehicle trips and VMT per person regardless of employment status. The increase in average daily person miles of travel for workers was also significant. However, average daily person trips per worker stabilized from 1983 to 1990, as did average daily PMT per person for non-workers.

Working males made more vehicle trips and accumulated more VMT on an average daily basis than did their non-working male counterparts for both 1983 and 1990. This is a logical result, given that workers would not only have additional trips for work purposes (commuting to/from work, work-related business travel), but the income derived from their jobs possibly would provide the means with which they could purchase an auto or other personal vehicle. Regardless of the travel differences between working and non-working men, neither category exhibited any real signs of stabilization in average daily vehicle trips or VMT between 1983 and 1990.

It is evident in Figures 31 and 32 that working males also made more person trips and traveled more PMT on an average daily basis than non-working men during this time. However, the person travel rates

Figure 25 Average Daily Vehicle Trips: Men (16+) by Licensed Driver Status

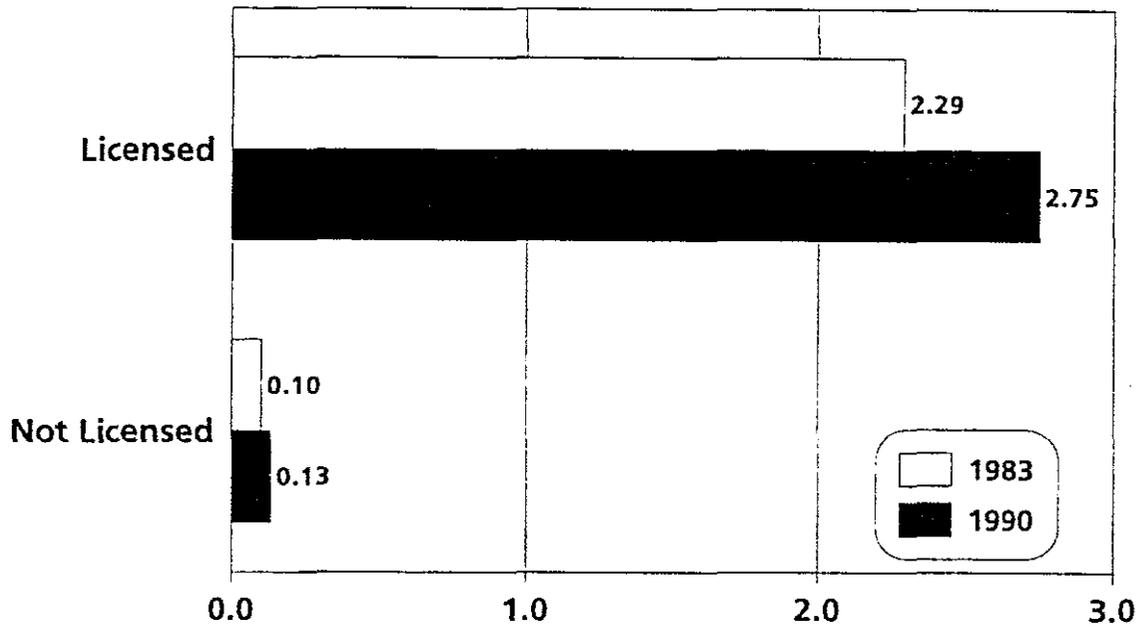


Figure 26 Average Daily Vehicle Miles of Travel: Men (16+) by Licensed Driver Status

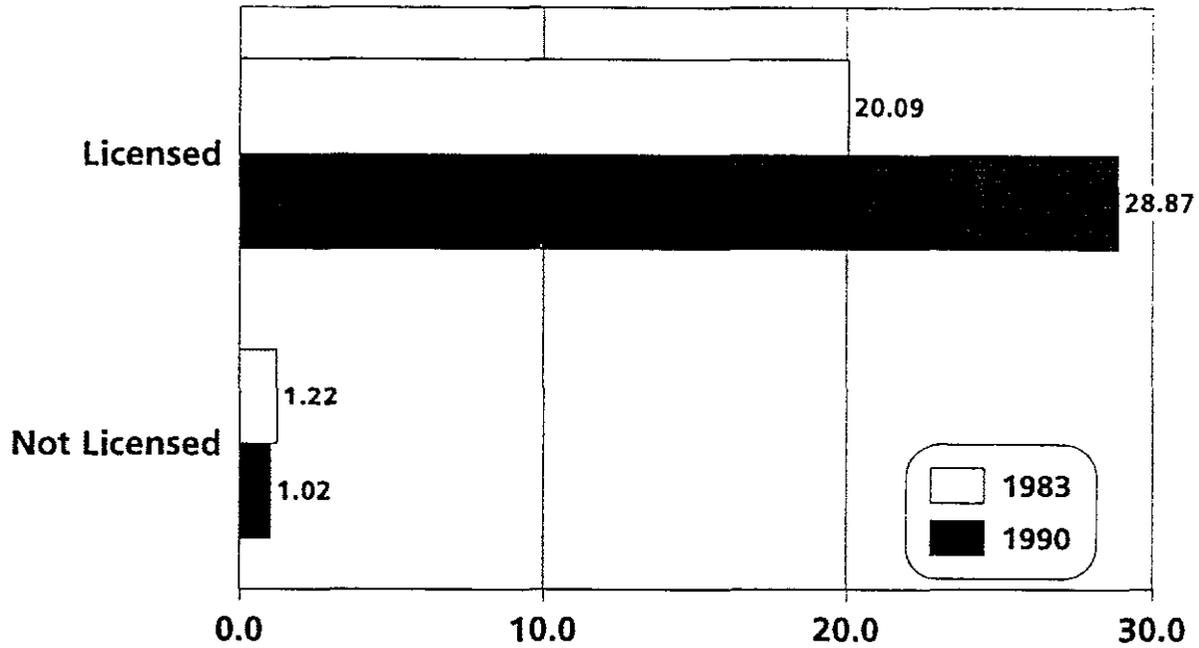


Figure 27 Average Daily Person Trips: Men (5+) by Licensed Driver Status

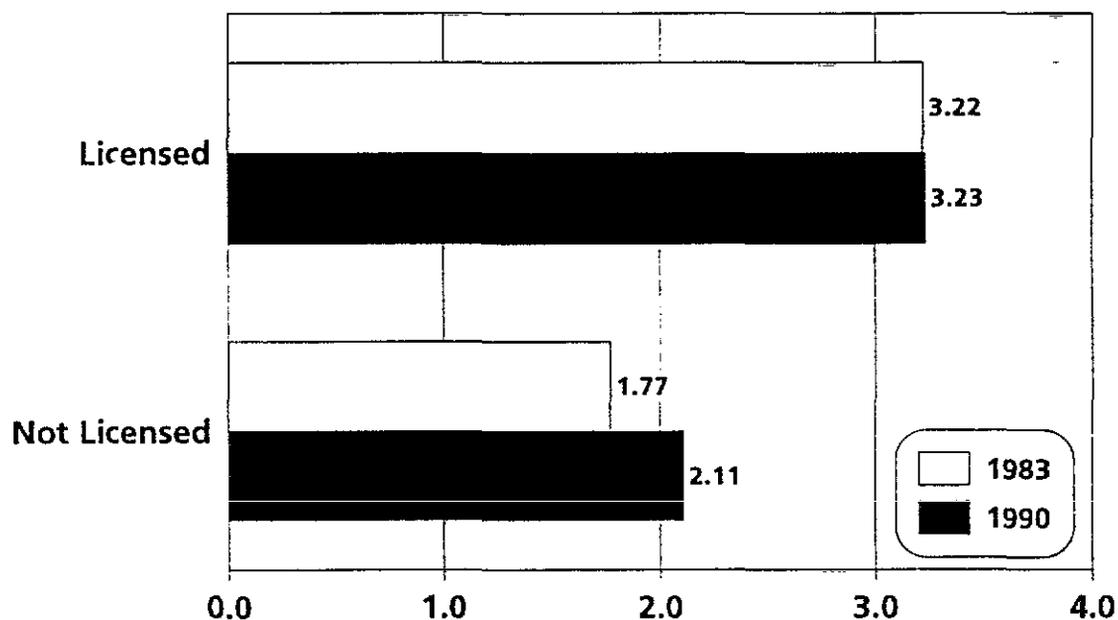


Figure 28 Average Daily Person Miles of Travel: Men (5+) by Licensed Driver Status

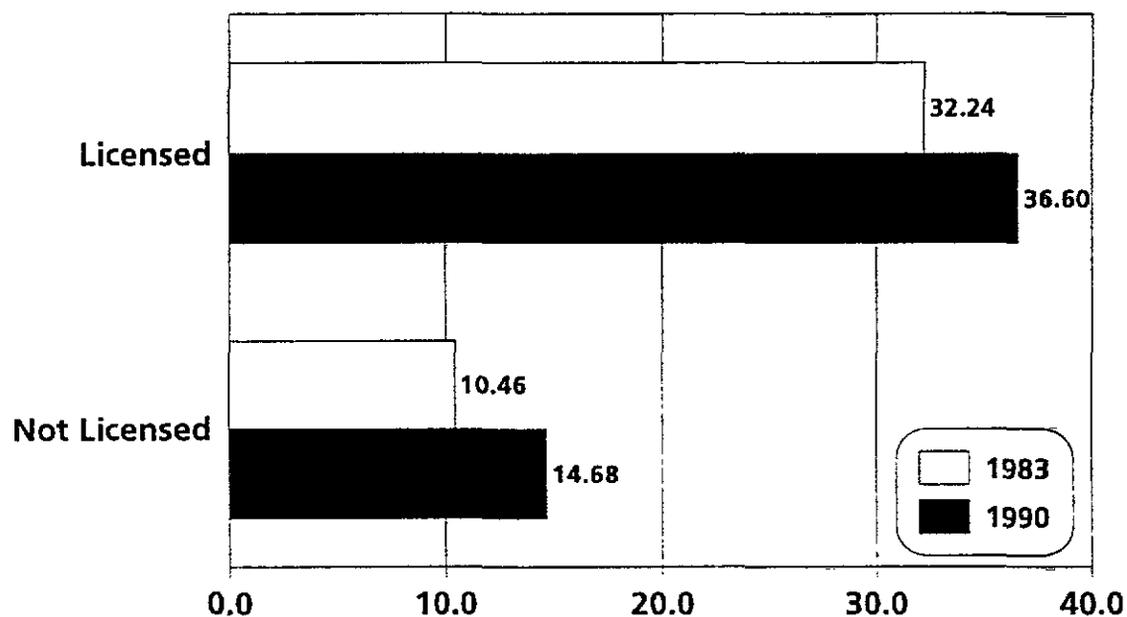


Figure 29 Average Daily Vehicle Trips: Men (16+) by Worker Status

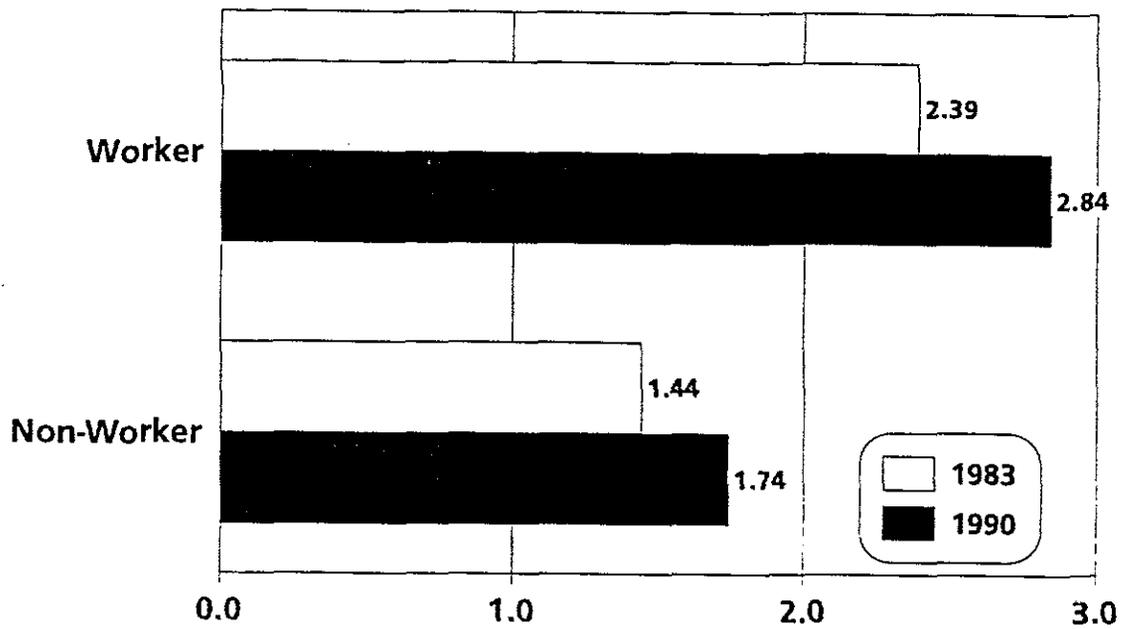


Figure 30 Average Daily Vehicle Miles of Travel: Men (16+) by Worker Status

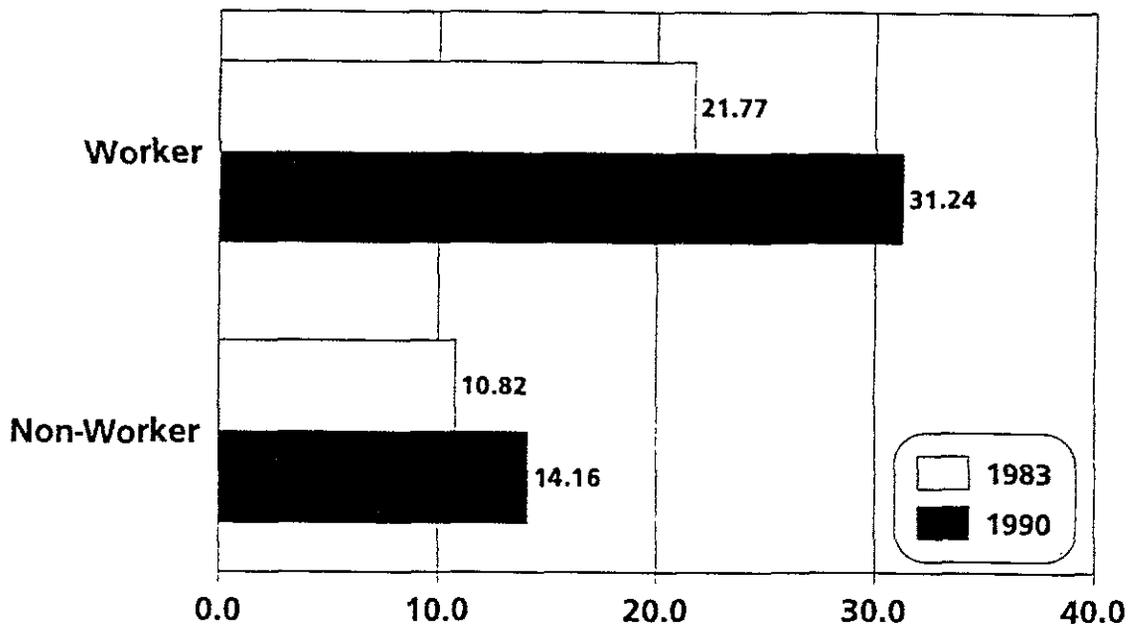


Figure 31 Average Daily Person Trips: Men (5+) by Worker Status

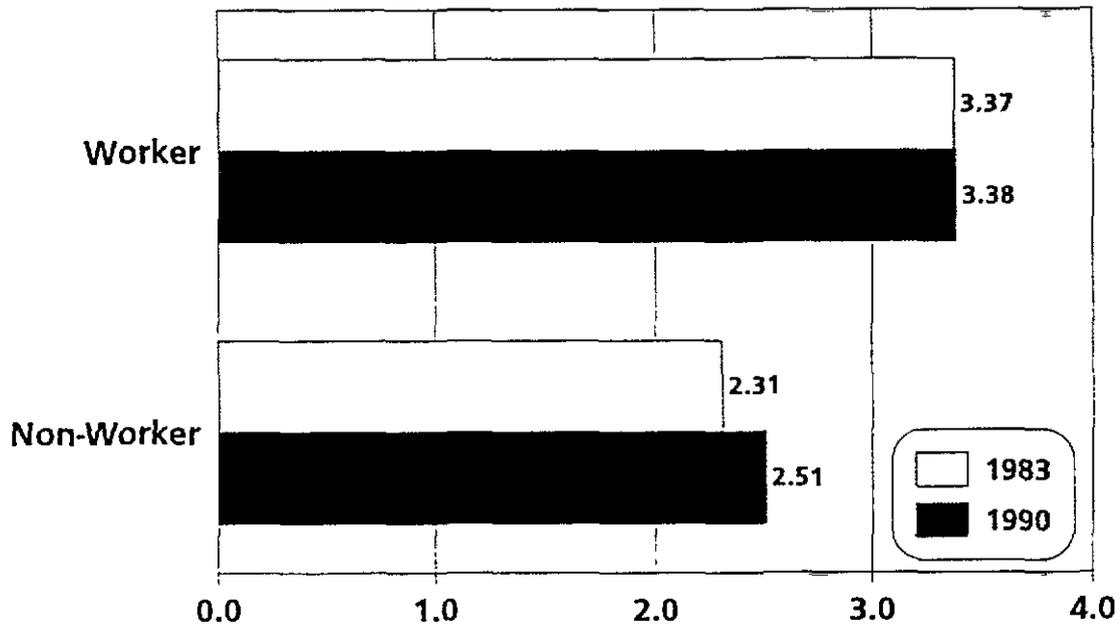
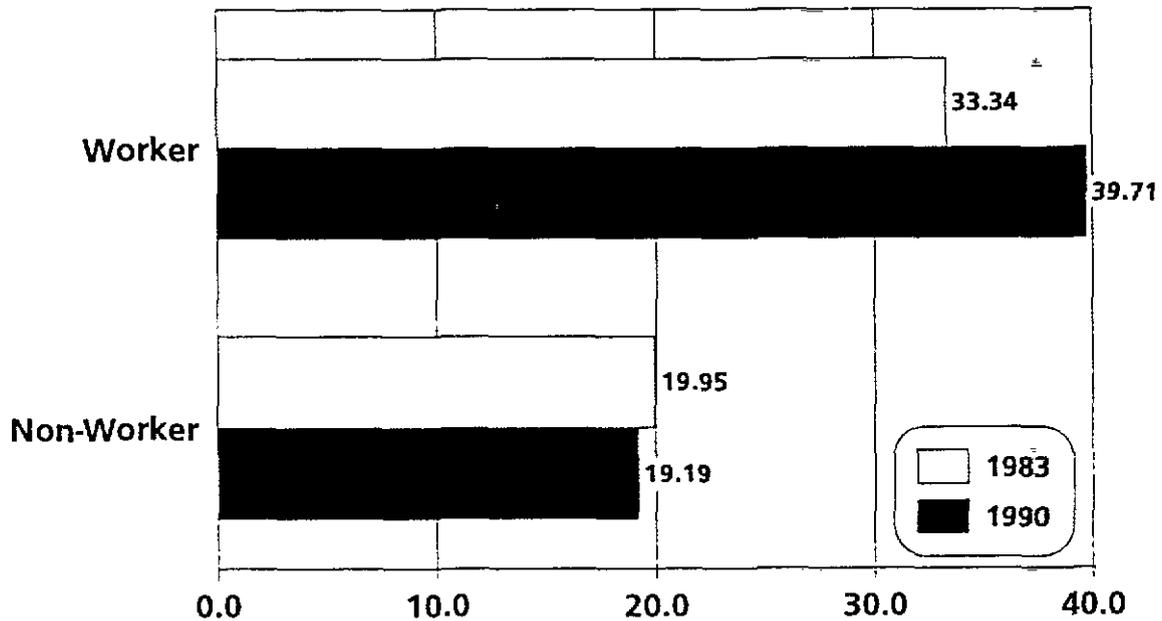


Figure 32 Average Daily Person Miles of Travel: Men (5+) by Worker Status



for the work status categories were not as disparate as were those for the vehicle travel rates. This may be due to the mode choice possibilities assumed for the different travel measures. The vehicle travel measures consider only trips and miles for personal vehicles while the person travel measures include travel on all modes. As a result, non-workers would be expected to have significantly lower vehicle travel rates since they probably have less access to personal vehicles.

Household Size

The distributions of men by household size for 1983 and 1990 are shown in Table 10. The most dramatic increase was in the one-person category, which increased 26 percent between the two years. In contrast, the number of men in household sizes of six or more persons decreased by 21 percent over the same time period. This is not surprising, however, given that average household size has declined for the last several decades, as evidenced by NPTS trend data (3.16 persons per household in 1969; 2.56 in 1990).

Household Size	Total Men		% Distribution		% Change 1983-1990
	1983	1990	1983	1990	
1	7,920,844	9,984,799	7.7%	9.4%	26.1%
2	26,181,823	28,637,896	25.4%	27.0%	9.4%
3	19,457,293	20,931,752	18.9%	19.7%	7.6%
4	24,563,263	23,929,298	23.9%	22.5%	-2.6%
5	13,773,943	14,019,426	13.4%	13.2%	1.8%
6 or more	10,983,472	8,661,048	10.7%	8.2%	-21.1%
Total	102,880,638	106,164,219	100.0%	100.0%	3.2%

Source: 1983 and 1990 data tapes.

From 1983 to 1990, average daily vehicle trips and VMT per person increased significantly, regardless of household size. Significant increases were also evident for average daily person trips and PMT per person for a number of household size categories. Only men in two- to four-person households exhibited signs of stabilization in average daily person trips.

The average daily vehicle trip and VMT per person data presented in Figures 33 and 34 indicate that men in three-person and four-person households made the most trips and traveled the most miles on an average daily basis in 1983 and 1990. However, one-person households exhibited the largest increases in the two travel measure rates between 1983 and 1990. It is possible that the overall declining trend in average household size in the United States discussed previously may have contributed to the changes in travel by household size.

Unlike the trends for the vehicle travel measures, the relationship between household size and the average daily person travel measures was not clearly discernable. Figure 35 indicates that men in one-person households had the largest increase in average daily person trips per person from 1983 to 1990. However, as shown in Figure 36, the largest increase in average daily person miles of travel occurred in the two-person household category. The only household size category to show signs of stabilization in average daily person miles of travel per person was the six-person+ category.

Figure 33 Average Daily Vehicle Trips: Men (16+) by Household Size

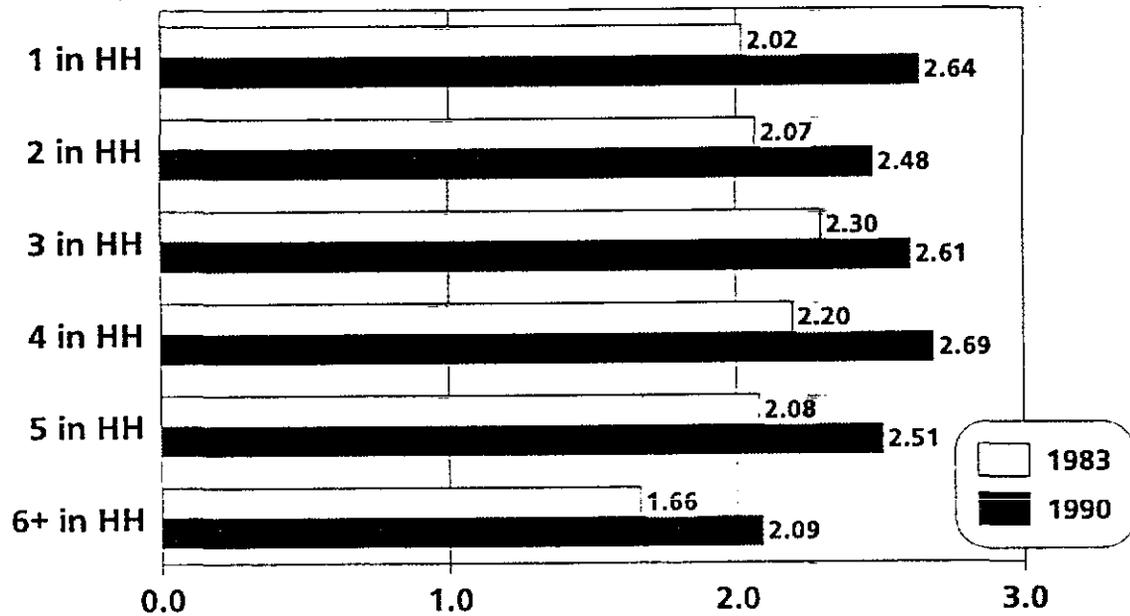


Figure 34 Average Daily Vehicle Miles of Travel: Men (16+) by Household Size

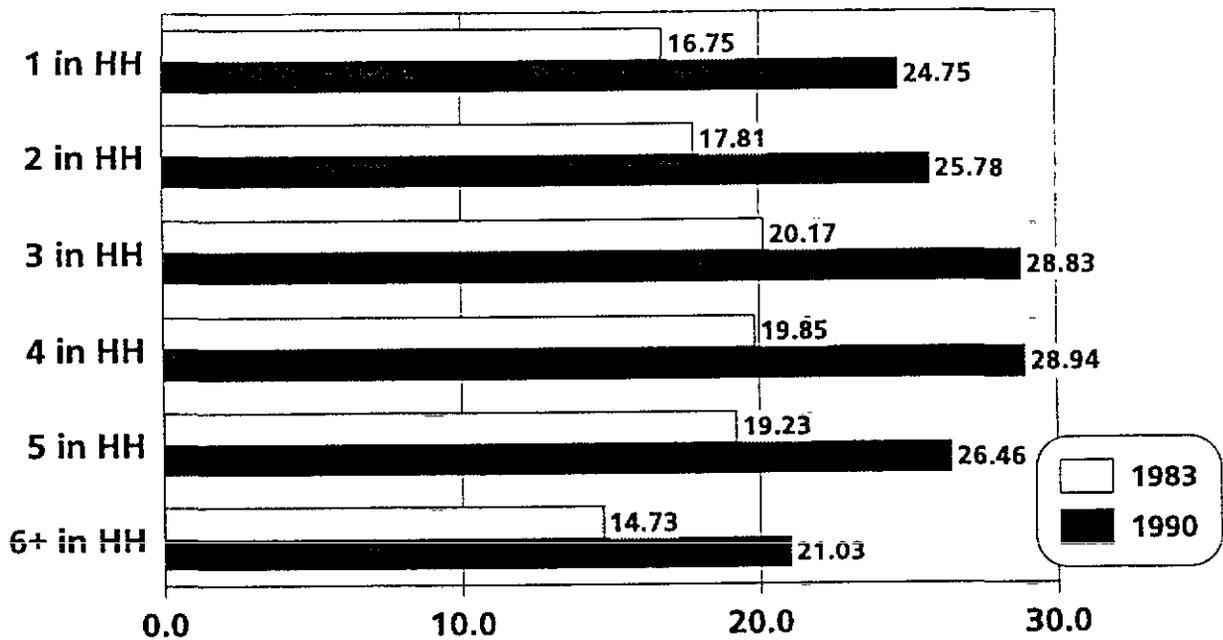


Figure 35 Average Daily Person Trips: Men (5+) by Household Size

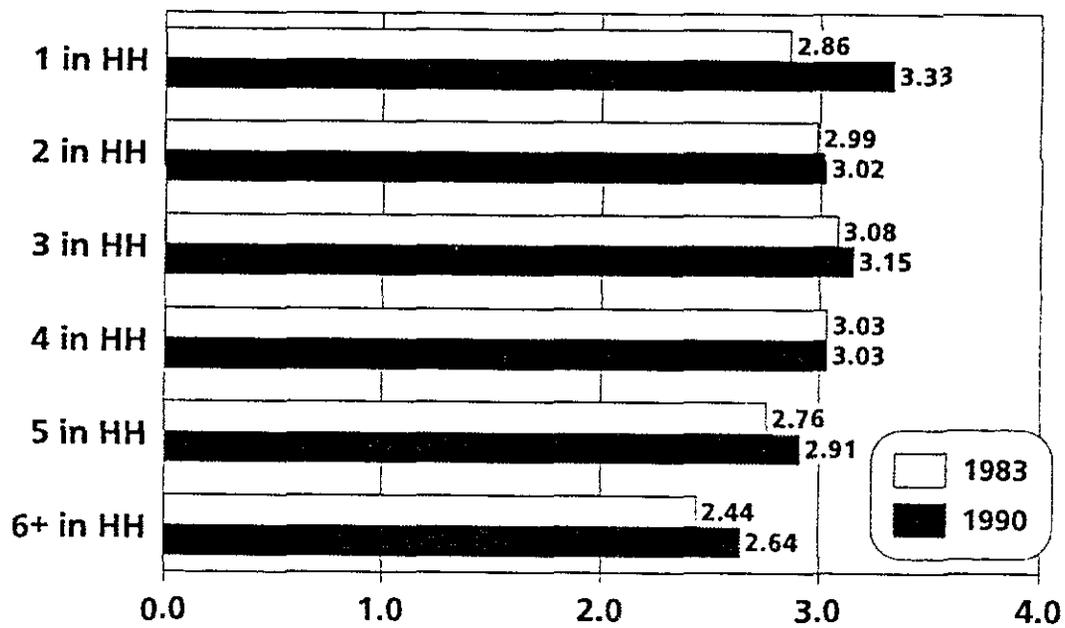
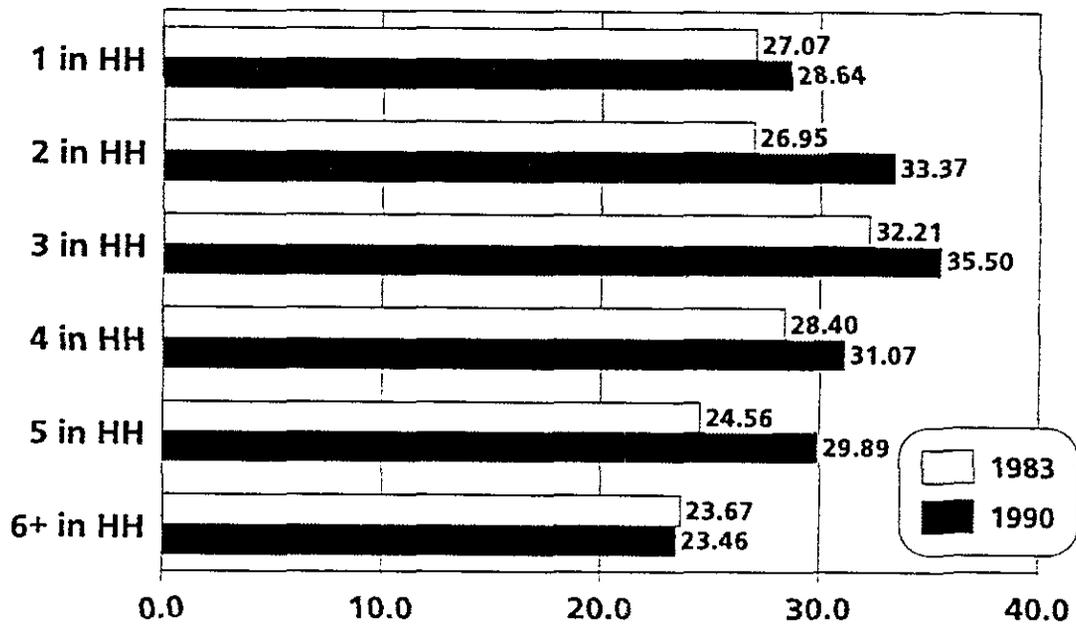


Figure 36 Average Daily Person Miles of Travel: Men (5+) by Household Size



Household Vehicle Availability

From 1983 to 1990, there was a 33 percent decrease in the number of men in households with zero vehicles available. In addition, there was a five percent decline in the number of men in one-vehicle households. However, there was an 18 percent increase in the number of men in two-vehicle households, and an 8 percent increase in men in three-vehicle households. These changes are shown in Table 11. As was the case for the changes in household size, these changes are not surprising. According to NPTS data, the average number of vehicles available per household in the United States has increased 53 percent, from 1.16 to 1.77 vehicles per household, between 1969 and 1990.

No. of Household Vehicles Available	Total Men		% Distribution		% Change 1983-1990
	1983	1990	1983	1990	
0	7,471,904	5,000,048	7.3%	4.7%	-33.1%
1	25,654,993	24,317,964	24.9%	22.9%	-5.2%
2	39,983,946	47,253,238	38.9%	44.5%	18.2%
3	18,117,591	19,692,012	17.6%	18.5%	8.7%
4	7,255,522	6,650,441	7.1%	6.3%	-8.3%
5 or more	4,396,683	3,250,516	4.3%	3.1%	-26.1%
Total	102,880,639	106,164,219	100.0%	100.0%	3.2%

Source: 1983 and 1990 data tapes.

The average daily vehicle trip and VMT per person data illustrated in Figures 37 and 38 indicate that travel measure rates increased as household vehicle availability increased. This relationship was also evident for average daily person trips and person miles of travel. However, the changes between 1983 and 1990 for these travel measures were less significant.

Men in households with more vehicles not only made more average daily vehicle trips, but their rates of travel also increased more significantly between 1983 and 1990, especially for average daily VMT. Since vehicle trips and VMT are accumulated by the drivers of personal vehicles, it is logical that a larger number of available household vehicles would result in more vehicle trips and VMT. This is also the reason why the travel rates for the zero-vehicle households were negligible. None of the household vehicle availability categories indicated any signs of stabilization for either of these two travel measures.

Several of the vehicle availability categories for average daily person trips and PMT per person exhibited signs of stabilization that were not evident in the vehicle travel measures, as shown in Figures 39 and 40. Specifically, the increases in average daily person trips per person for men in households with at least one vehicle available were relatively small. The largest increase in this travel measure occurred for men in households with zero vehicles available, 28 percent growth between 1983 and 1990. In comparison, the only category to show signs of stabilization in average daily PMT was in households with one vehicle available, which increased three percent between 1983 and 1990.

Life Cycle

Table 12 shows the distribution of men by their appropriate household life cycle category. From 1983 to 1990, the proportion of all life cycle categories of households without children increased. Specifically, the number of single men with no children increased 20 percent and men in two-adult households with no children increased 3 percent. For the one- and two-adult household categories where at least one person

Figure 37 Average Daily Vehicle Trips: Men (16+) by Household Vehicle Availability

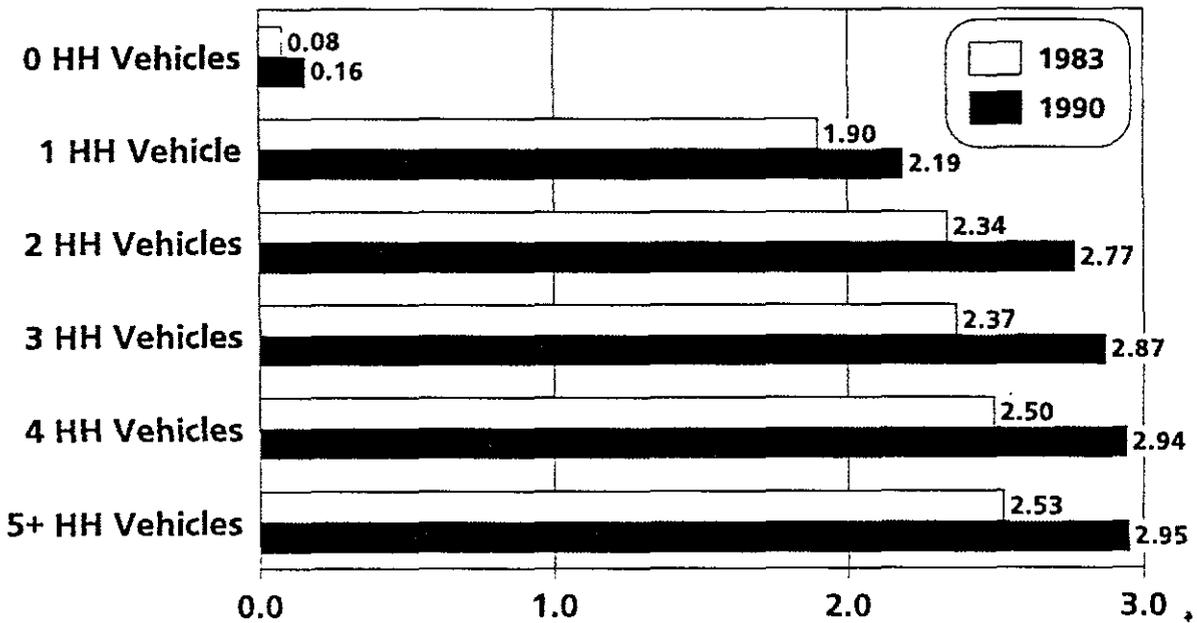


Figure 38 Average Daily Vehicle Miles of Travel: Men (16+) by Household Vehicle Availability

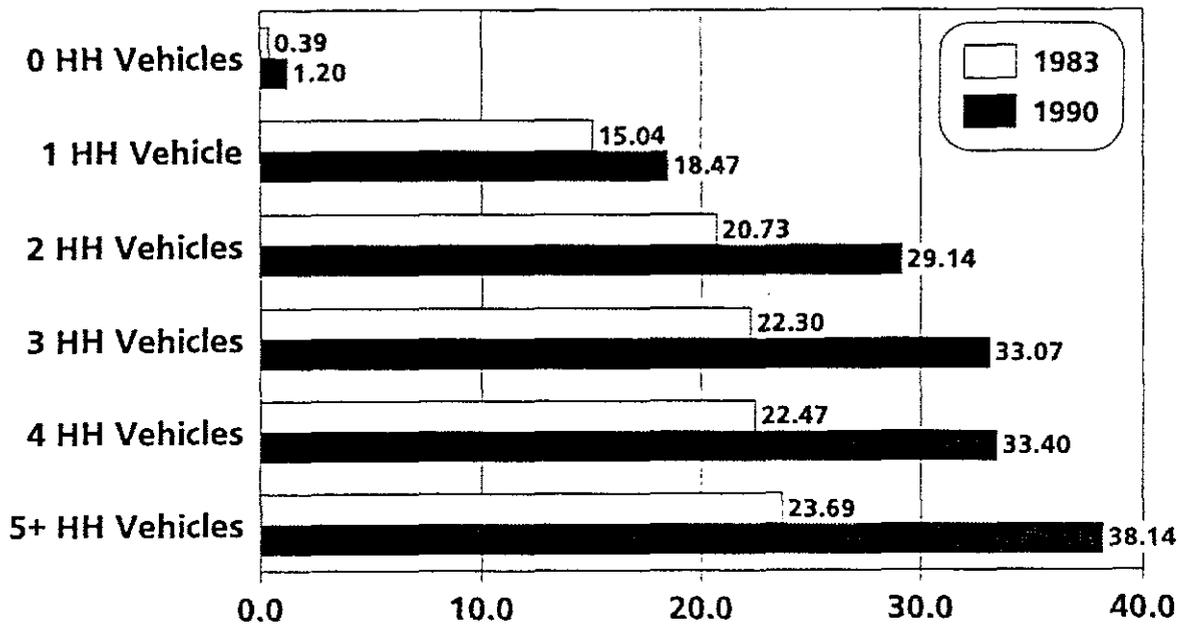


Figure 39 Average Daily Person Trips: Men (5+) by Household Vehicle Availability

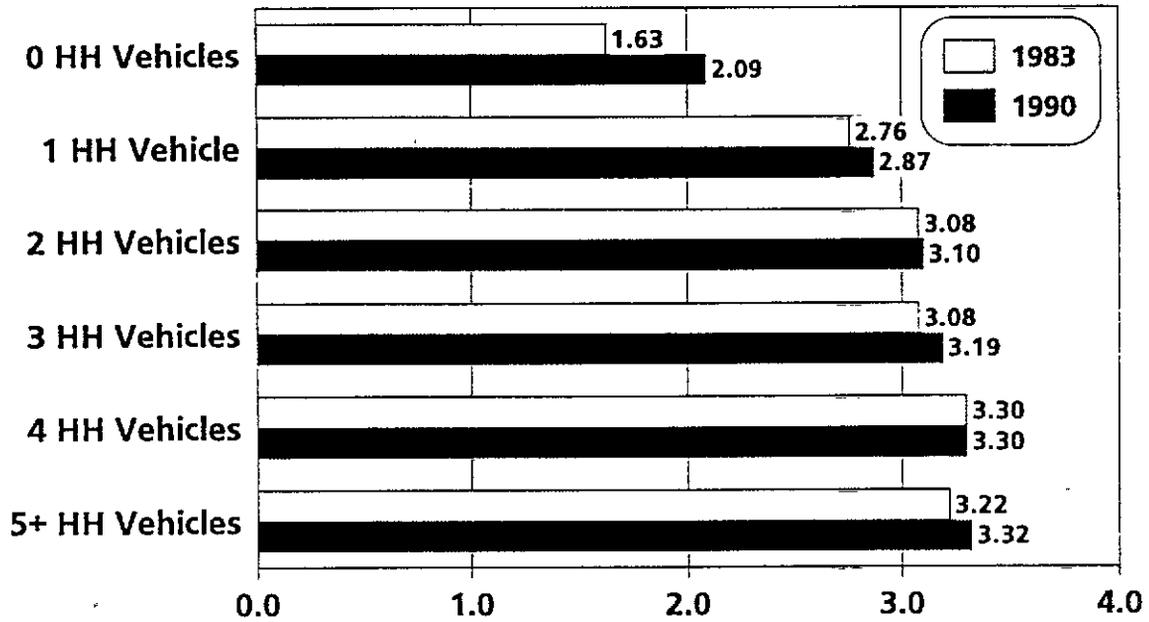
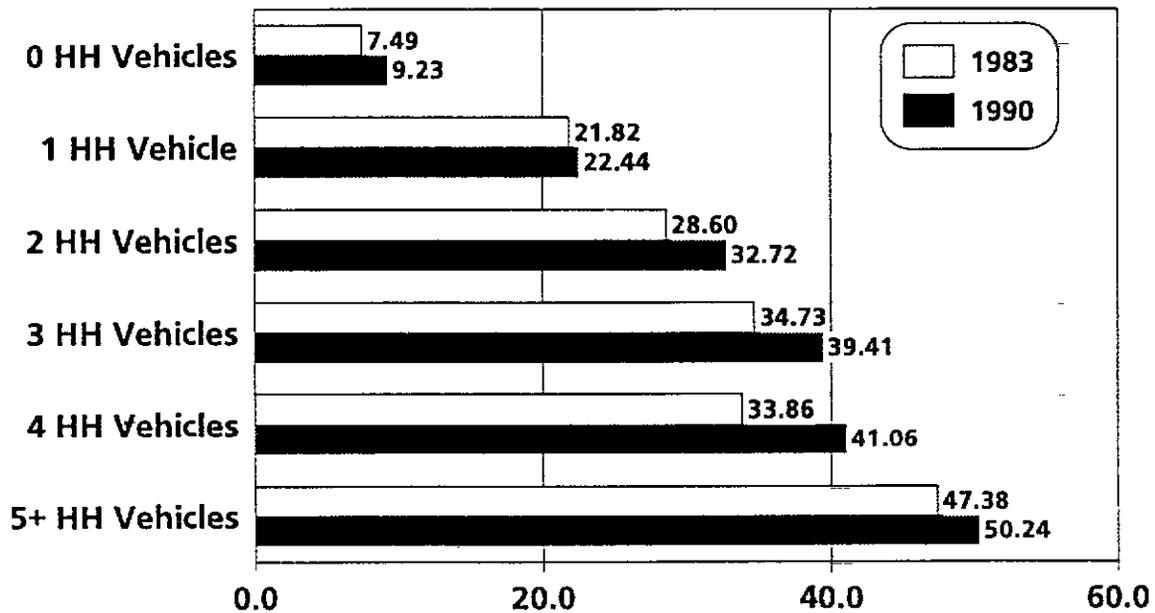


Figure 40 Average Daily Person Miles of Travel: Men (5+) by Household Vehicle Availability



was retired, the increases were 89 percent and 54 percent, respectively. Conversely, the proportion of households with children declined during this time.

Table 12: DISTRIBUTION OF MEN (5+) BY LIFE CYCLE

Life Cycle	Total Men		% Distribution		% Change 1983-1990
	1983	1990	1983	1990	
1 adult, 0 kids	6,630,526	7,928,354	6.4%	7.5%	19.6%
2 adults, 0 kids	25,555,771	26,407,367	24.8%	24.9%	3.3%
1 adult, kids 0-5	1,337,969	1,055,130	1.3%	1.0%	-21.1%
2 adults, kids 0-5	21,970,862	21,098,531	21.4%	19.9%	-4.0%
1 adult, kids 6-15	3,703,810	2,548,357	3.6%	2.4%	-31.2%
2 adults, kids 6-15	25,341,202	25,123,603	24.6%	23.7%	-0.9%
1 adult, kids 16-21	838,695	773,381	0.8%	0.7%	-7.8%
2 adults, kids 16-21	8,928,974	7,604,776	8.7%	7.2%	-14.8%
1 adult, ret., 0 kids	1,290,317	2,439,191	1.3%	2.3%	89.0%
2 adults, ret., 0 kids	7,282,512	11,185,529	7.1%	10.5%	53.6%
Total	102,880,638	106,164,219	100.0%	100.0%	3.2%

Source: 1983 and 1990 data tapes.

From 1983 to 1990, there were significant increases in average daily vehicle trips and VMT per person, regardless of life cycle category. This trend is not evident in the data for average daily person trips per person, as most of the household categories with at least two adults showed signs of stabilization. Only one life cycle category indicated a stable trend for average daily PMT per person: households with two or more adults and children age 0-5.

On average for both 1983 and 1990, men in households with two or more adults tended to make more daily vehicle trips and VMT per person than men in one-adult households. According to the data in Figures 41 and 42, men in the "1 adult, retired, 0 kids" and "2+ adults, retired, 0 kids" life cycle categories have continued to accumulate the fewest vehicle trips and VMT on an average daily basis for this period. None of the life cycle categories indicated any signs of stabilization for either measure.

The person travel measure trends are presented in Figures 43 and 44. As with the vehicle travel measures, men in the "1 adult, retired, 0 kids" and "2+ adults, retired, 0 kids" life cycle categories made the fewest person trips and PMT in both 1983 and 1990. However, men in one-adult households with kids age 0-5 also exhibited lower rates of average daily person travel. Despite most of the households with two or more adults showing signs of stabilization in average daily person trips per person, the "2+ adults, kids age 16-21" category indicated an increase in this measure.

Household Location

Three categories were used to describe household location: inside the MSA/SMSA (metropolitan statistical area/standard metropolitan statistical area) within the central city (CC), inside the MSA/SMSA but not in the central city, and not in the MSA/SMSA. The data in Table 13 indicate that there was a 22 percent increase in the number of men living within the MSA/SMSA central city and a 14 percent decline in the number of men living outside the MSA/SMSA. However, from this data it is not possible to determine whether this change is due to an actual shift in the household locations of males; these trends may, in fact, reflect changes in the MSA/SMSA boundaries during this time period.

Figure 41 Average Daily Vehicle Trips: Men (16+) by Life Cycle

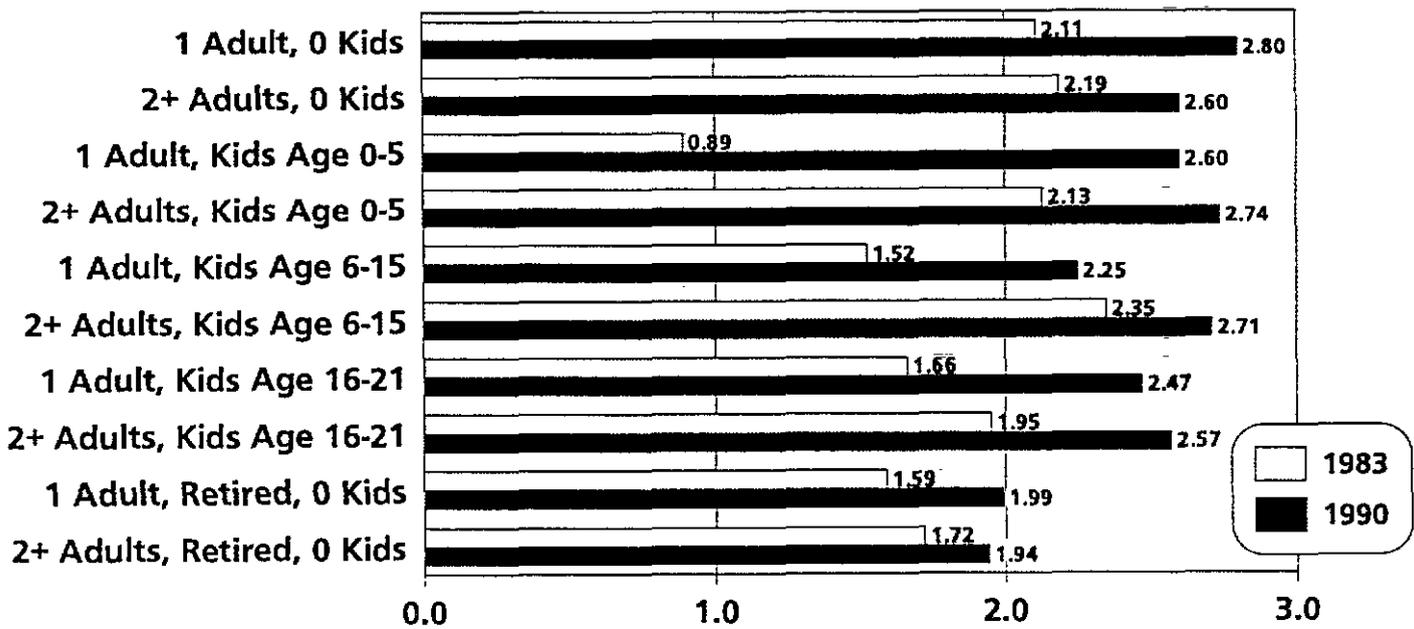


Figure 42 Average Daily Vehicle Miles of Travel: Men (16+) by Life Cycle

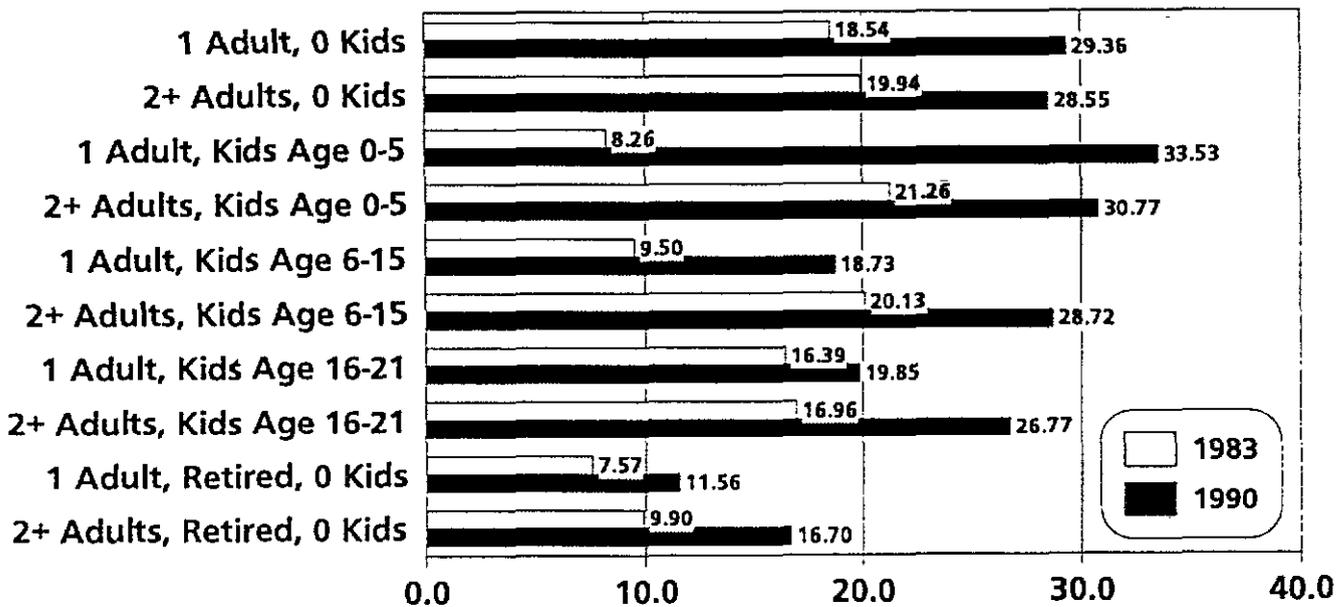


Figure 43 Average Daily Person Trips: Men (5+) by Life Cycle

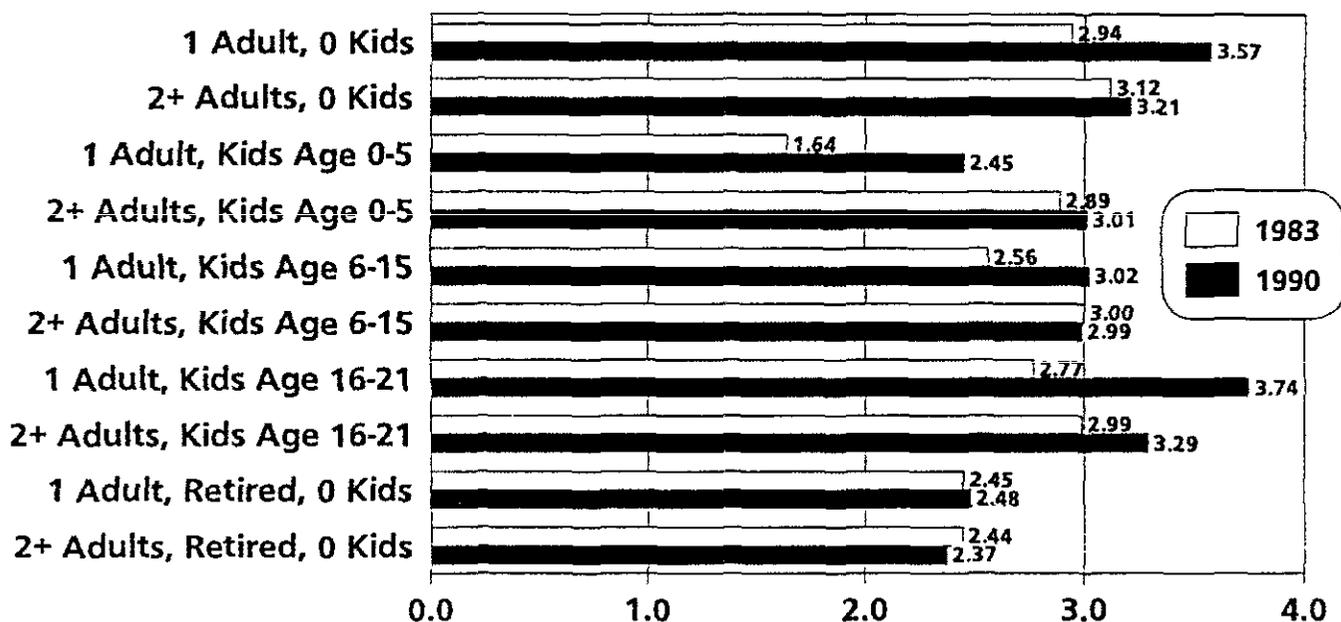
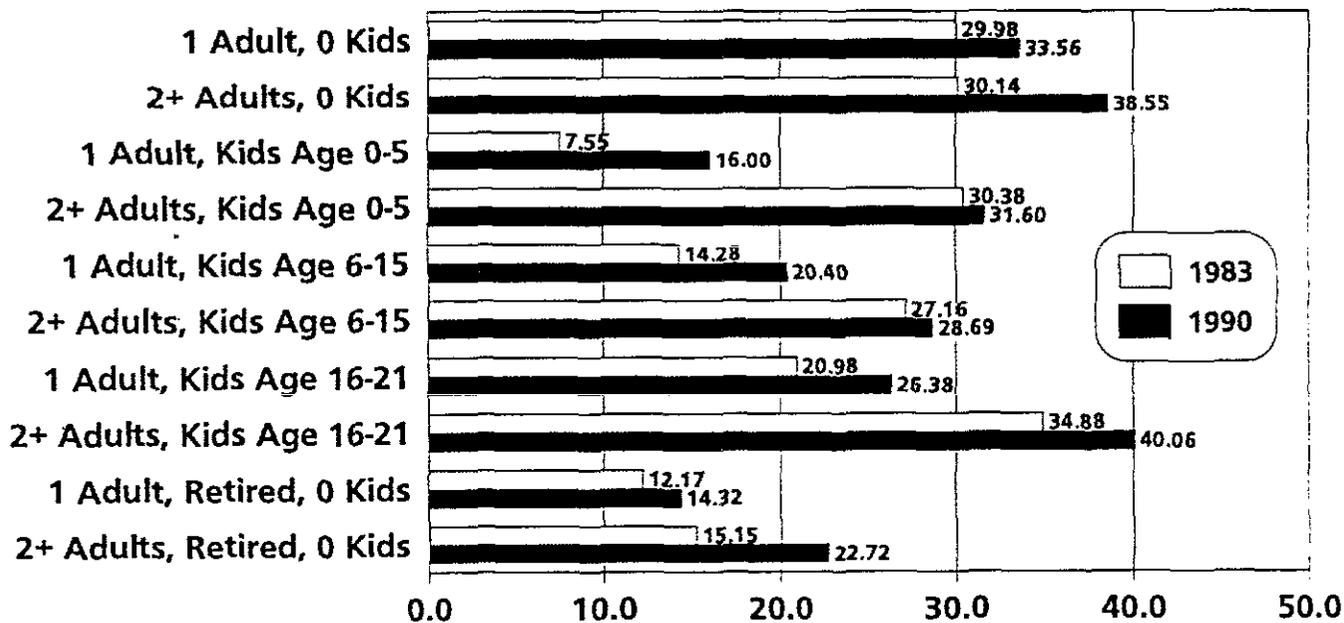


Figure 44 Average Daily Person Miles of Travel: Men (5+) by Life Cycle



According to the Census Bureau, metropolitan areas are redefined after each decennial census, and additional ones may be established between censuses. Through the 1980 Census, SMSA was one of the statistical geographic terms used to designate metropolitan areas. In June 1983, this term was changed to MSA. The 1980 census included 323 SMSAs; however, after the definition change, there were 257 MSAs. As of June 1990, there were 268 MSAs and in June 1993 these areas were redefined again.

Table 13: DISTRIBUTION OF MEN (5+) BY HOUSEHOLD LOCATION

Household Location	Total Men		% Distribution		% Change 1983-1990
	1983	1990	1983	1990	
MSA/SMSA, in CC	30,972,633	37,782,214	30.1%	35.6%	22.0%
MSA/SMSA, not CC	44,398,330	44,778,083	43.2%	42.2%	0.9%
Not in MSA/SMSA	27,509,676	23,603,921	26.7%	22.2%	-14.2%
Total	102,880,638	106,164,218	100.0%	100.0%	3.2%

Source: 1983 and 1990 data tapes.

As shown in Figures 45 and 46, average daily vehicle trips and VMT per person increased significantly from 1983 to 1990, regardless of household location. Increases were also evident for average daily PMT per person. However, average daily person trips indicated stable trends for men in two of the household location categories.

The average daily vehicle trip and VMT per person data indicated that men living within a MSA/SMSA but outside its central city had the highest travel rates for these measures in both 1983 and 1990. Nevertheless, it appears from the data that the location of a man's household with respect to a MSA/SMSA and its central city has not influenced his travel rates significantly. The only exception was for men living within the central city, who traveled fewer VMT on an average daily basis than either men living outside the central city or men living outside the MSA/SMSA.

The trends in average daily person trips and PMT per person between 1983 and 1990 also showed the modest influence that the location of a man's household with respect to a MSA/SMSA and its central city has had on his travel, especially for average daily person trips. However, the changes in travel rates during this time for the household location categories were not as significant as was evident for the vehicle travel measures, as shown in Figures 47 and 48. The data indicate that men living within a MSA/SMSA but outside its central city and men living outside a MSA/SMSA showed some stability in their average daily person trips between 1983 and 1990.

Mode Choice and Trip Purpose

The discussion of each of the previous contributing factors focused on the distribution of the total number of men within each factor's categories. However, in the case of mode choice and trip purpose, it is not possible to determine the distribution of all males by mode or purpose since most men utilized more than one mode for their travel needs, which may have encompassed several different purposes. To resolve this problem, total male person trips were used, instead, to analyze changes in mode choice and trip purpose distributions between 1983 and 1990.

The distribution of male person trips by mode choice is shown in Table 14. The data indicate that total male person trips increased approximately 11 percent between 1983 and 1990. Private, or personal, vehicles maintained their status as the dominant mode of choice. In 1983, 85 percent of total male person trips were made in private vehicles. The number of male person trips made using this particular mode increased

Figure 45 Average Daily Vehicle Trips: Men (16+) by Household Location

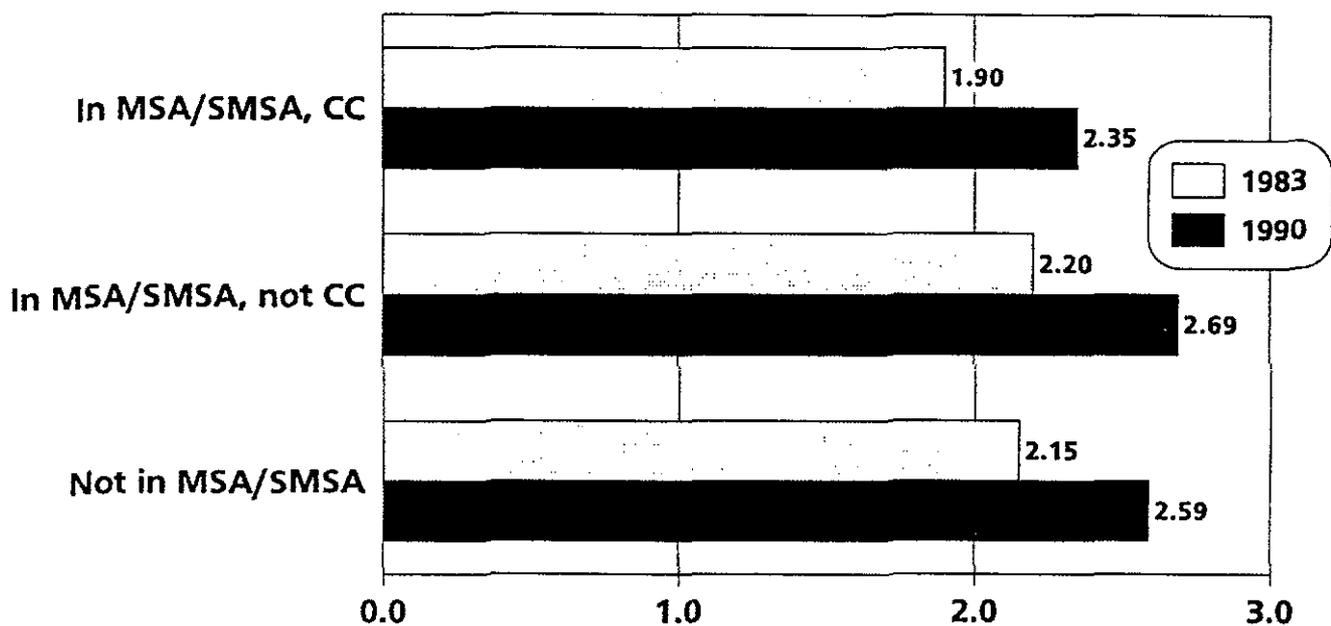


Figure 46 Average Daily Vehicle Miles of Travel: Men (16+) by Household Location

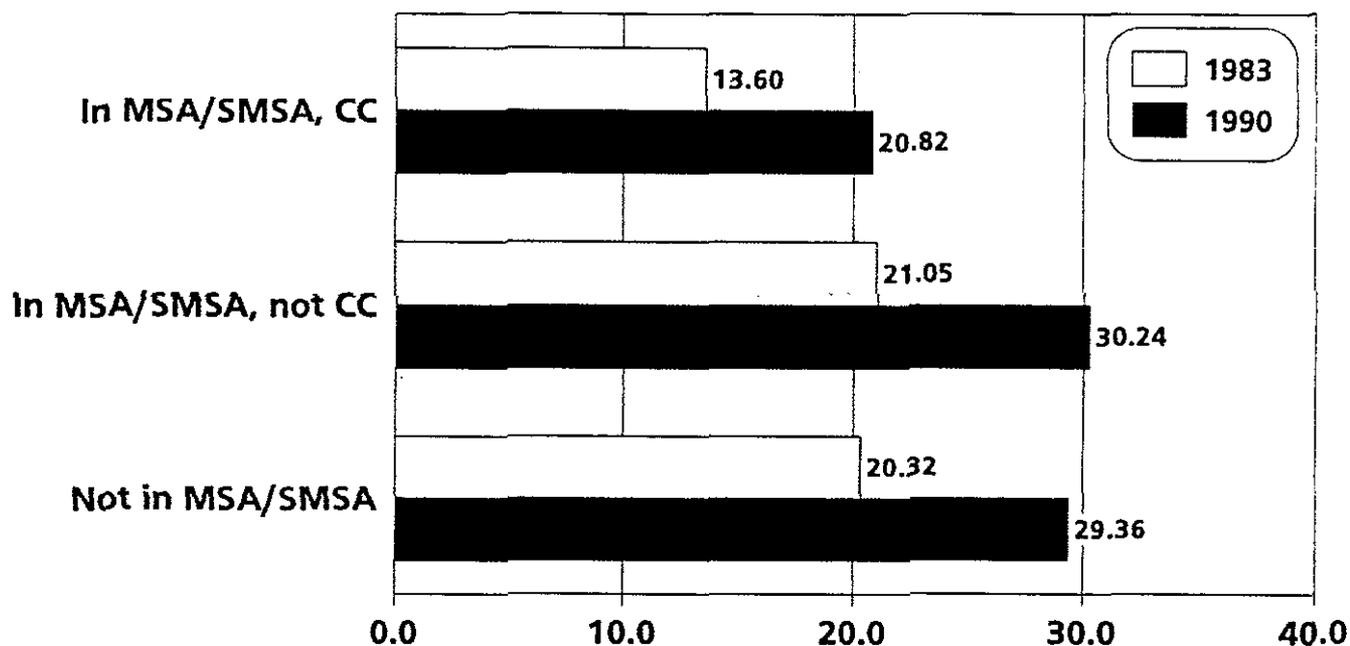


Figure 47 Average Daily Person Trips: Men (5+) by Household Location

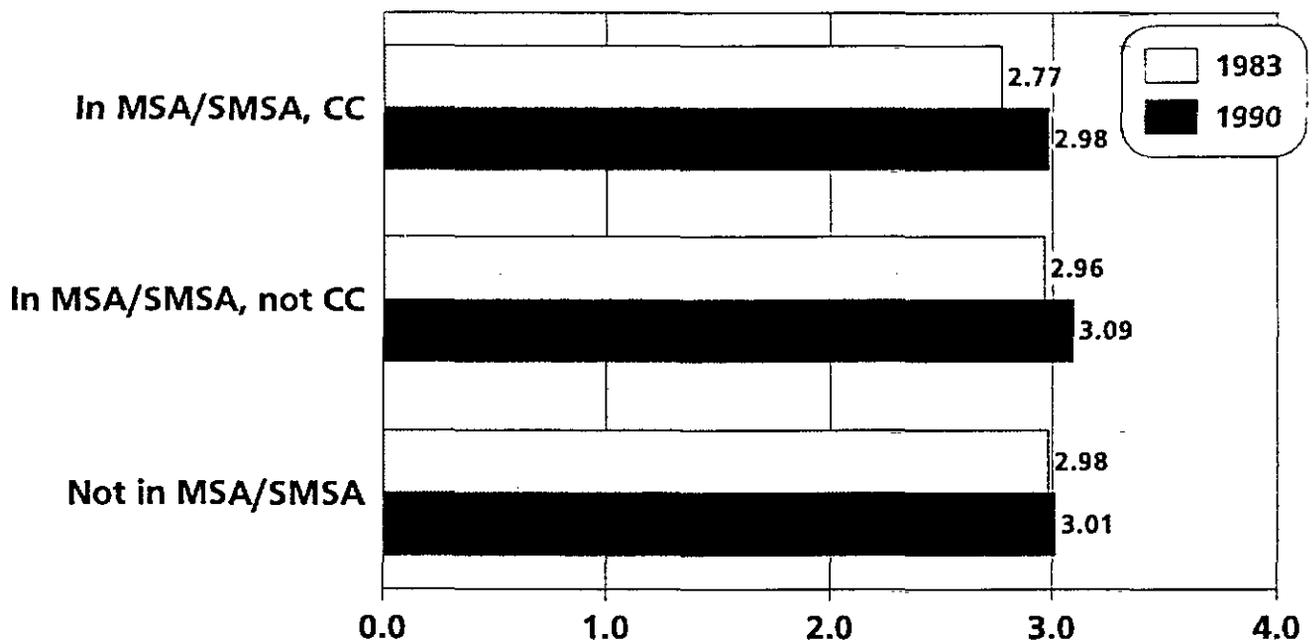
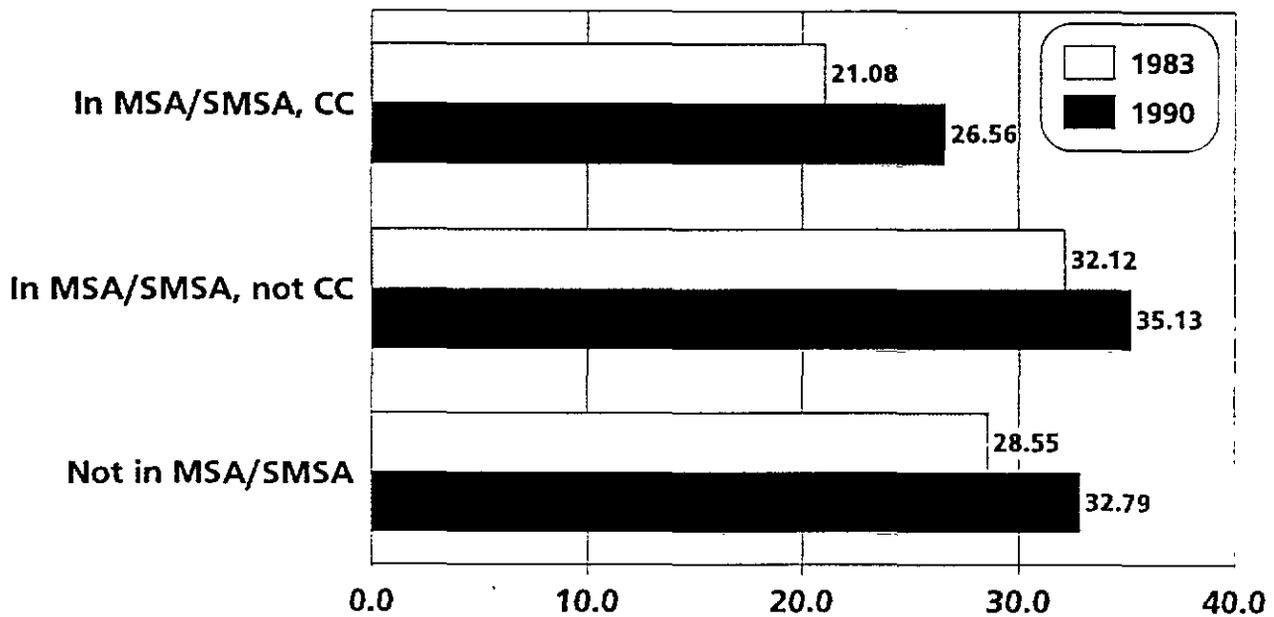


Figure 48 Average Daily Person Miles of Travel: Men (5+) by Household Location



to 87 percent in 1990. Total male person trips by private vehicle increased 13 percent between 1983 and 1990; trips by bicycle exhibited the largest increase, 17 percent. In addition, public transit usage declined approximately 3 percent during this time, and walking declined by 2 percent.

Table 15 presents the distribution of male person trips by trip purpose. For both 1983 and 1990, the to/from work and social/recreational trip purposes comprised approximately 50 percent of all men's person trip travel. The distribution of total male person trips for the other purposes remained relatively stable during this time, as well. The largest change between 1983 and 1990 occurred for family/personal business trips, which increased 39 percent. Male travel for work-related business exhibited the most significant decline during this time, 34 percent, while travel to/from work showed a slight increase.

Table 14: DISTRIBUTION OF MALE (5+) PERSON TRIPS BY MODE CHOICE

Mode Choice	Total Male Person Trips (000) ¹		% Distribution		% Change 1983-1990
	1983	1990	1983	1990	
Private Vehicle	90,253,802	101,818,645	85.1%	86.7%	12.8%
Public Transit	2,286,889	2,227,298	2.2%	1.9%	-2.6%
Bicycle	1,085,265	1,266,471	1.0%	1.1%	16.7%
Walk	8,627,514	8,445,837	8.1%	7.2%	-2.1%
Other	3,813,433	3,708,422	3.6%	3.2%	-2.8%
Total	106,066,903	117,466,673	100.0%	100.0%	10.7%

¹Does not include person trips made by an undetermined mode.
Source: 1983 and 1990 data tapes.

Table 15: DISTRIBUTION OF MALE (5+) PERSON TRIPS BY TRIP PURPOSE

Trip Purpose	Total Male Person Trips (000) ¹		% Distribution		% Change 1983-1990
	1983	1990	1983	1990	
To/From Work	26,891,510	27,474,322	24.5%	23.4%	2.2%
Work-Related	3,376,069	2,215,751	3.1%	1.9%	-34.4%
Shopping	17,284,444	19,458,379	15.8%	16.6%	12.6%
Family/Personal	17,372,465	24,094,515	15.8%	20.5%	38.7%
Civic/Educational	12,112,916	13,072,576	11.1%	11.1%	7.9%
Social/Recreational	30,148,623	30,334,062	27.5%	25.8%	0.6%
Other	2,375,389	870,836	2.2%	0.7%	-63.3%
Total	109,561,416	117,520,441	100.0%	100.0%	7.3%

¹Does not include person trips made for an undetermined trip purpose.
Source: 1983 and 1990 data tapes.

Figure 49 indicates that most men used private vehicles for their traveling needs in both 1983 and 1990. Possibly as a result of the slight increase in private vehicle use between these years, men's use of public transit declined slightly during this time, as did their number of walking trips. The "other" mode category included person trips made on school buses, airplanes, and taxicabs, among other modes.

In both 1983 and 1990, most male person trips were for social/recreational or commuting to/from work purposes, as shown in Figure 50. These two trip purposes encompassed approximately half of the total male person trips in these years. Other significant changes in men's travel between 1983 and 1990

included declines in the number of trips made for work-related business and other purposes, as well as an increase in the number of trips made for family/personal business.

Findings and Conclusions

Notable among the many theories about travel trends and congestion levels is the contention that current "trend-based" thinking does not take into account the changing demographics of automobile use (18, 19). The effective saturation of automobile ownership is indeed evident in the NPTS total trend data, as is the approaching saturation of licensed drivers (3, 4, 5, 6). However, a number of these analyses have provided insight into only one half of the equation: the trends in the supply of persons able to travel and the number of vehicles at their disposal. Additional analysis is needed to evaluate the equation's other half, i.e., the trends in the individuals' demand for travel.

This study shows that all four measures of total personal travel (vehicle trips, VMT, person trips, and PMT) have increased between 1977 and 1990. Not only have the four travel measures increased, but they have done so at an accelerated rate. These accelerated growth trends are also apparent for the total and gender-based travel measures on an average daily per person basis. The only average daily travel measure to indicate a negative growth trend between 1977 and 1990 was men's average daily person trips per person, which declined less than two percent. Despite the decline, however, this measure did exhibit an increase between 1983 and 1990, indicating the deceleration of the negative growth trend.

Therefore, it would appear that trends in the demand for travel are continuing to increase for both men and women. The lack of evidence indicating the possible future stabilization of these total trends suggests that the saturation in men's travel (or women's travel, for that matter) is not yet evident in the NPTS data. Unfortunately, this means that predictions of increasing congestion and gridlock may not be exaggerated, despite stabilization in the growth of licensed drivers and personal vehicle availability. Persons may be able to drive only one vehicle at a time, but it appears that they want to drive it more often and for longer distances. Perhaps planners and decisionmakers truly are facing a bleak future in the management of traffic in the United States. Fortunately, analysis of the demographic, economic, and geographic characteristics contributing to the overall travel trends indicates otherwise.

While total male travel trends have exhibited increasing growth between 1977 and 1990, analysis of the contributing elements indicates that specific segments of the male population have shown signs of stabilization in their travel measure rates. However, it does not seem reasonable to expect the stabilization of current male travel trends in the near term unless the segments that have indicated stabilized travel rates happen to be major contributors to total male travel.

On an aggregate level, for all characteristics analyzed, the data indicated that men's average daily vehicle trips and VMT per person did not show signs of stabilization. This result may have been due to the definition used for these measures: trips and miles accumulated by persons who were indicated as drivers on trips in personal vehicles. Since the NPTS total trend data indicated increases in both household vehicle availability and male licensed drivers between 1983 and 1990, it is logical to assume that more men were able to drive and actually did so, thereby increasing their vehicle trips and VMT. The only segment of the male population to show stable trends for the vehicle travel measures was men in low income households (less than \$5,000; \$15,000-19,999). This is a reasonable finding, since lower household incomes would afford these men less of an opportunity to purchase personal vehicles in which to accrue the vehicle trips and miles.

From the analysis of contributing elements it is clear that the majority of the instances in which stabilization of travel was evident occurred for the average daily person travel measures: person trips and PMT. This is fortuitous since these measures included trips and miles for all modes regardless of trip purpose. To truly evaluate the overall travel trends of the various segments of the male population, it would make sense

Figure 49 Distribution of Male Person Trips by Mode Choice

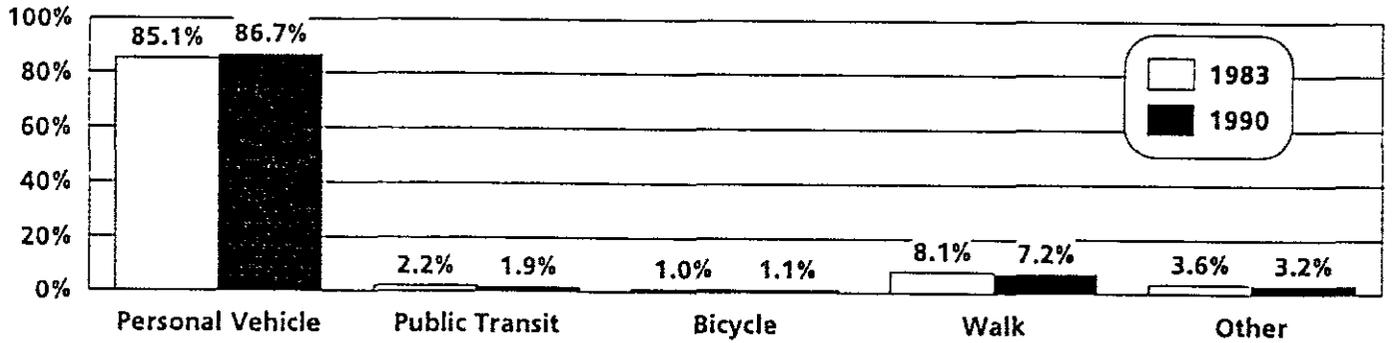
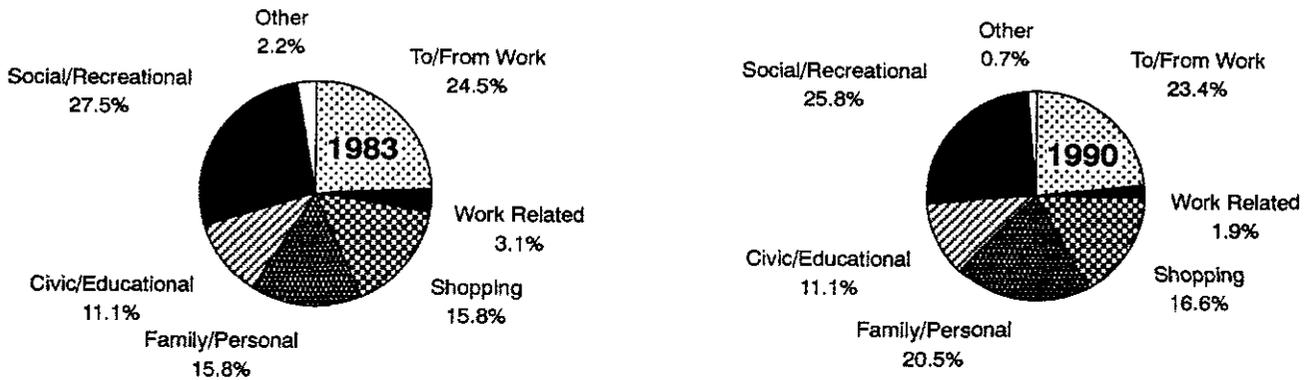


Figure 50 Distribution of Male Person Trips by Trip Purpose



to include all of their travel, and not just trips made in their personal vehicles. Therefore, it is surmised that person travel measures would be the best indicators from which to ultimately determine saturation.

As such, the age distribution data indicated that men between the ages of 20 and 59 and those 65 years and older all showed signs of stability between 1983 and 1990 in their average daily person trip rates. This is significant since the person trips for these age groups accounted for 73 percent of all male person trips in 1990. Two of the age groups that did not exhibit signs of stability in trip-making (5-15, 60-64) did indicate saturation in the number of person miles traveled. Stabilization in male travel was also evident for a number of the household income categories. For example, average daily person trip rates either remained constant or declined for six of the twelve household income categories between 1983 and 1990; these six categories comprised 59 percent of the total person trips made by men whose household incomes were indicated in the NPTS data.

The stabilization of trends in person travel were evident in other important characteristic categories, as well. White, non-Hispanic men, men with driver's licenses, and working men all indicated stable trends for average daily person trip rates between 1983 and 1990. For each of the characteristics, these categories represented the largest portion of total person trips for men. Household size, household vehicle availability, life cycle, and household location all indicated similar findings for male person travel. In most of these cases, the segments of male population that traveled most frequently were the same segments that showed some indications of stabilizing travel trends.

Considered in aggregate, the results of the analysis of the demographic, economic, and geographic characteristics contributing to men's travel trends between 1983 and 1990 seem to conflict with the findings determined from the total travel data presented earlier. Has men's travel really become saturated or not? Well, the answer is not that simple. The differences between the relative changes in vehicle and person travel measures indicate, however, that their trends should be evaluated separately.

The apparent lack of stabilization in average daily vehicle trips and VMT for most of the segments of the male population along with the increases in total male vehicle trips and VMT between 1983 and 1990 seem to indicate that the historical trends of increasing numbers of licensed drivers and household vehicle availability were still having an effect on male travel in 1990. Now that the licensed driver and vehicle availability trends have shown stability in growth, it is expected that the vehicle travel measures as well as total male vehicle trips and VMT will also begin to show declining growth rates. Currently, however, the data do not indicate that men's vehicle travel (i.e., driving personal vehicles) is saturated. Instead, future stabilization can only be assumed based on the stability of the growth rates for the number of eligible persons receiving licenses and for household vehicle availability.

As for total male person trips and PMT, their increases between 1983 and 1990 were significantly smaller than those for the total vehicle travel measures (see Table 2). In fact, total male person trips exhibited the smallest increase during this time of any of the total travel measures. Nevertheless, this increase was greater than that shown for total male person trips between 1977 and 1983, indicating an accelerated growth rate between 1977 and 1990. These trends indicate that men's person travel (i.e., travel on all modes) is not truly saturated, either. However, unlike vehicle travel, the stability shown by the various segments of the male population for average daily person trips and PMT indicate that the stabilization in total male person travel has already begun, and it is anticipated that the effects of this indicator of saturation will be more evident in the results of the 1995 NPTS survey.

While it may be apparent that male travel saturation is looming on the horizon, one must recognize that a number of other factors could influence the extent to which this saturation is evidenced in the future. Real income growth, changes in the relative cost of travel, roadway congestion levels, changes in the male's role regarding household travel responsibilities, and concepts such as telecommuting all may influence the time frame for reaching saturation.

Additional Analyses

In reviewing the findings related to the four measures of male travel utilized in this study, it became evident that for aggregate total travel and per capita data, there was limited evidence of saturation. In an effort to further explore the prospect of saturation in greater detail, some additional analyses were conducted. The two areas that were examined included (1) the extent to which travel may be indicating signs of stabilization for more narrowly-defined groups of the population, and (2) the trends in total daily travel time. The trends in travel for groups that might be characterized as possibly experiencing saturated travel behavior were examined. This analysis included reviewing the tripmaking characteristics for persons and households that have sufficient income, household vehicles, and employment in order to eliminate these traditional constraints to travel.

In Figures 51 and 52, males within specifically-defined segments of the population have been distributed by the number of travel day person trips made. The first segment examined included males 16 years and older (working age) in households earning at least the median income and having at least one vehicle available per adult. As shown in Figure 51, the peak tripmaking for men in this segment was between two and three person trips for the travel day, in both 1983 and 1990. When this segment is redefined to include only single, working males with these characteristics, the peak tripmaking in 1983 was 0-2 person trips for the travel day. By 1990, the peak shifted to 3-5 person trips for the travel day.

The next two figures show the distribution of household travel day person trips, delineated by life cycle category. Figure 53 illustrates the variation in household person trips for men in households with two or more adults, again earning at least the median household income and having at least one household vehicle available per adult, with an additional constraint of all adults in the household being employed. The peak tripmaking for households in this category was 4-6 person trips for both 1983 and 1990. Figure 54 shows the distribution for household person trips for single adult men, with this same criteria. In 1983, the peak tripmaking for these households was between one and three person trips. This increased to 4-6 person trips in 1990.

The data in these figures indicate that there were no signs of stabilization for any of the specific segments examined. Indeed, the trends indicate that from 1983 to 1990, the distributions of travel day person trips have increased, regardless of the segment examined.

Finally, total travel time was examined for both men and women. Total travel time was calculated by summing the reported trip lengths for all trips made by each person on their specified travel day. As a result, the total time spent traveling by an individual is actually an estimate of real travel time based on the individual's perception. Therefore, the distributions indicated in Figures 55 and 56 should be interpreted with this in mind. In both figures, it is apparent that total travel time for both men and women has remained relatively stable between 1983 and 1990. In addition, there appears to be little difference in the total time spent traveling by either gender. The distributions suggest that, at least with respect to travel time, both men and women may be reaching some level of saturation. However, factors such as increased travel speeds, shorter trips, and varied modes, among others, may explain why stability is evident in total travel time but not in the other travel measures analyzed in this study.

Figure 51 Travel Day Trip Distribution for Men
 16-64 Years, Median HH Income+, Vehicle Ratio >= 1

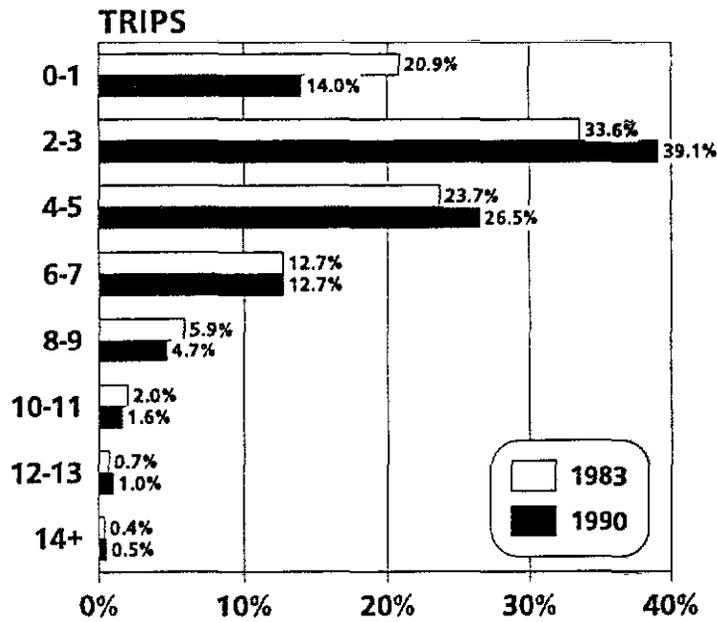


Figure 52 Travel Day Trip Distribution for Men
 Single, Employed, Median HH Income+, Vehicle Ratio >= 1

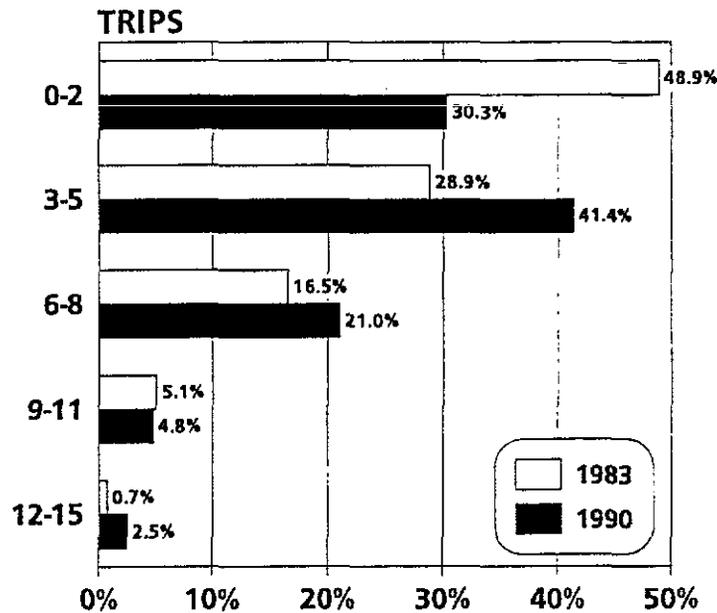


Figure 53 Travel Day Trip Distribution for Households
 2+ Adults, 0 Children, Median HH Income+, Vehicle Ratio ≥ 1 ,
 Worker Ratio = 1

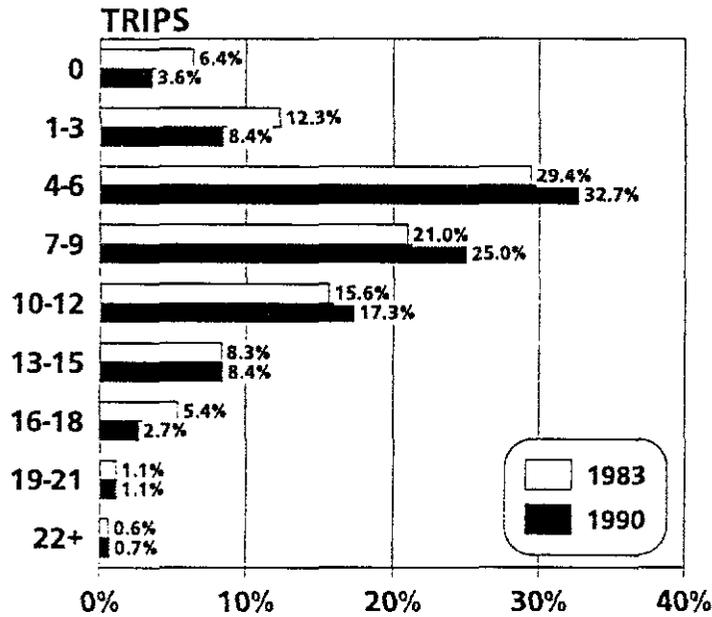


Figure 54 Travel Day Trip Distribution for Households
 1 Adult, 0 Children, Median HH Income+, Vehicle Ratio ≥ 1 ,
 Worker Ratio = 1

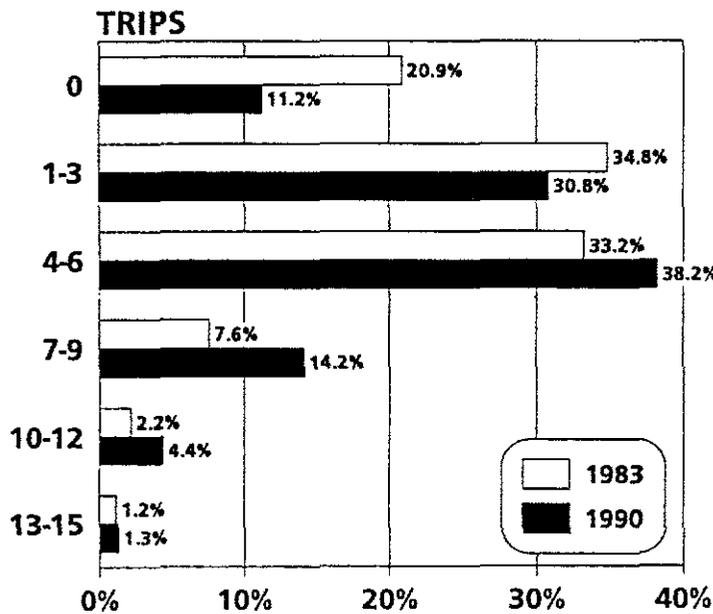


Figure 55 Total Travel Time Distribution for Men

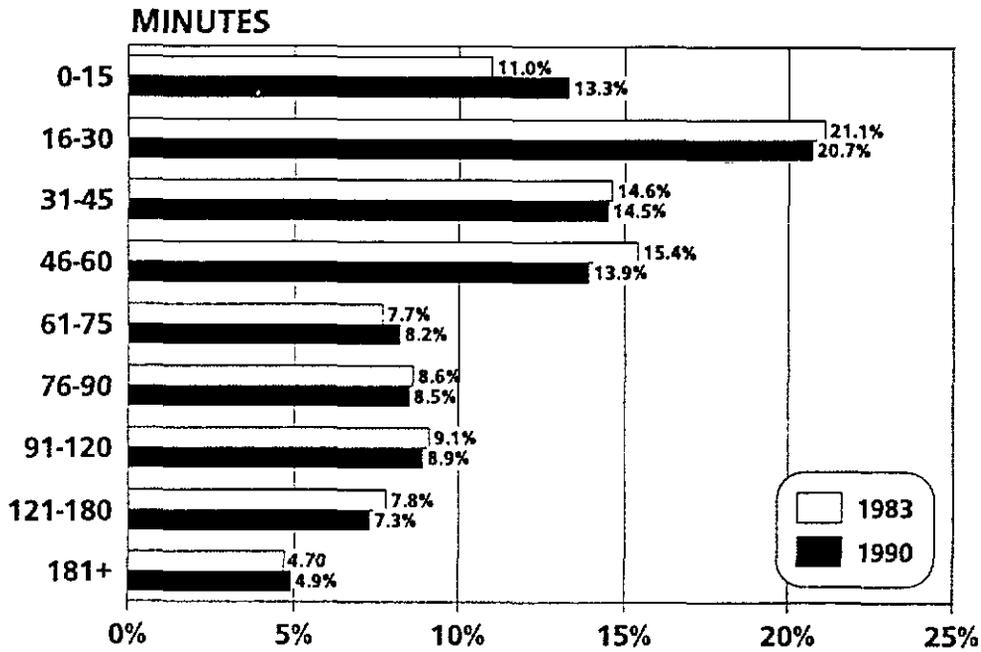
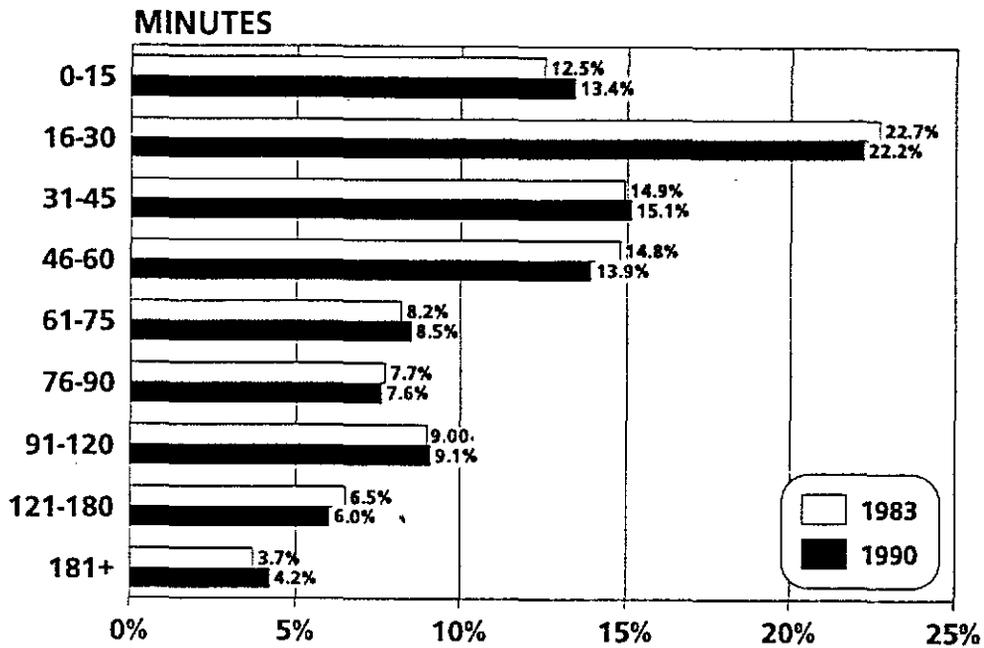


Figure 56 Total Travel Time Distribution for Women



Other Research

According to the results of this study, while saturation is not yet apparent, signs are indeed evident of the beginning stabilization in the average daily travel patterns of men in the United States. By no means, however, have these analyses exhausted the treatment of this particular topic. Other research efforts could help to more fully understand the issue of the potential saturation in men's travel demand. Several areas where additional analysis might further shed light on current travel behavior are presented in this section.

One target area for further study would be to perform analyses similar to those included in this study as additional NPTS data become available in subsequent years, specifically upon conclusion of the 1995 NPTS survey. Like most other studies that utilize historical data to analyze/estimate current and future trends, the evaluation of saturation in men's travel would greatly benefit from additional data points in the trend lines. In addition, greater consistency is expected between the 1990 and 1995 data sampling and collection methodologies, which may result in increased accuracy of the data and an overall improved confidence in the subsequent analyses of the data.

Additional comparisons of travel saturation by trip purpose might also be useful in understanding travel stabilization trends. This effort did not find a manageable way to link trip record data to individuals to analyze trip purpose saturation. However, other efforts might find a way to better analyze and understand whether men's travel saturation is evident for selected trip purpose types. Aggregate data analyzed in this study suggest that dramatic increases have occurred for male travel in the family/personal business category.

Additional investigation into the travel behavior of more narrowly-defined segments of the male population, such as those examined in the previous section, may also be beneficial in the continuing study of saturation in men's travel. For example, is travel saturated for single working males age 20 to 30 who have incomes greater than \$70,000? One element that would be advantageous to this sort of additional research is the presence of a larger data sample. It was determined through preliminary analysis that, in some cases, specific segments did not include enough respondents from which to draw statistically-significant conclusions. This was especially apparent in the 1983 NPTS database. Perhaps with a larger sample in 1995, analysis of that database may uncover additional, more specific male segments where a saturation level has been reached.

Another area of travel demand that may require further analysis is the travel behavior of the household unit. Analysis of household travel data might be prove useful in evaluating the extent to which saturation may be occurring at the household level, which in turn may improve understanding of gender-based travel behavior and overall travel demand.

It is also apparent that improved knowledge concerning a number of other behavioral reactions that travelers may have to social, technological, and economic trends might provide further insight into the speculation of travel saturation. A multitude of questions exist whose answers might influence the extent to which we can anticipate a stabilization of travel for particular modes, trip purposes, households, or segments of the population. Examples of these questions for which analysis of current and future NPTS (and other) data may provide answers include:

- Will lower interest rates and stable housing prices enable households to optimize their locations in order to reduce travel, especially for work commute purposes?
- Will retailing trends in both total space and in specialization, as well as the movement to "mega-stores," result in more or fewer, shorter or longer, shopping trips?
- Will telecommuting and/or electronic access to video, information, and retail opportunities reduce overall travel demands?

- Will overall economic conditions and, specifically, the cost of travel impact future overall travel trends?

Finally, it is possible that additional analysis of the distributions of travel by individuals might give further indication of the presence of some maximum probable levels of travel likely within specific segments of the population. From the indicators of stabilized travel for these segments, then, it may be possible to identify the necessary conditions for maximum travel demand by all segments of the population. This information would give planners and decisionmakers the necessary knowledge with which to better provide for future levels of demand for travel.

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