Public Transit in America: Results from the 2001 National Household Travel Survey

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Public Transit in America: Results from the 2001 National Household Travel Survey

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16. Abstract

Understanding transit ridership has become a critical research interest and policy goal.

This document updates the popular report titled: “Public Transit in America - Evidence from the 1995 National Personal Transportation Survey” with data from the 2001 National Household Travel Survey. This new data provides a unique opportunity to develop a richer understanding of travel behavior and provide a resource to the industry in terms of specific analyses relevant to public transit. It characterizes public transit as it is today from a number of perspectives that are believed to be useful to planners and policy makers and it provides trend data for several critical variables that are important to public transportation.

This analysis describes transit travel, users, and markets. Topics analyzed include: trends in demographics, vehicle ownership, and personal travel between 1969 and 2001, transit mode share trends, extent of transferring, trip characteristics, and market penetration. Results are presented in descriptive terms with the authors providing observations and interpretation relevant for a better understanding of transit market shares and transit sub-markets.

The report concludes by outlining the challenges and opportunities for transit in light of revealed information about by whom and how transit is being used.

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CHAPTER 1

INTRODUCTION

During the past several decades, the share of personal trips carried by public transportation has steadily declined reaching its lowest level in the mid 1990's before reversing course and showing a positive trend in the later part of the 1990's. Recently, ridership growth has resumed, however, the share of travel on transit appears to be continuing a slight decline. In the 2001 to 2004 time period, the slowing economy and financial pressures on transit agencies resulted in fare increases and service cuts that contributed to a resumption of declining transit shares in aggregate but with acknowledged variations in trends between urban areas. Growing frustrations with congestion, transportation legislation reauthorization, interest in understanding the impacts of significant investment in public transit in the past decade, and a growing interest in seeing public transit play a more significant role in helping meet the growing demands for travel collectively contribute to a strong interest in developing a better understanding of transit use and users.

Understanding transit ridership has become a critical research interest and policy goal. The Transit Cooperative Research Program (TCRP) has carried out numerous studies targeting understanding transit demand such as "Building Transit Ridership: An Exploration of Transit's Market Share and the Public Policies that Influence It" (Charles River Associates, 1997); "Transit Markets of the Future: The Challenge of Change," (Rosenbloom, 1998); and "A Handbook: Using Market Segmentation Strategies to Increase Transit Ridership" (Northwest Research Group, 1998). The Federal Transit Administration (FTA) has challenged the industry with a top priority goal of increasing ridership and the American Public Transportation Association (APTA), the industry trade association, has indicated ridership growth as its top strategic goal. Growing transit ridership is highly dependent on understanding the travel behavior of the traveling public, especially those who are current users of public transportation. The objective of this report is to help build on that foundation of knowledge to enable planners and policy makers to more fully understand public transportation travel and travelers.

This document updates the report titled: "Public Transit in America - Evidence from the 1995 National Personal Transportation Survey" with data from the 2001 National Household Travel Survey (NHTS). This report carries out a similar analysis with the NHTS data. This new data provides a unique opportunity to develop a richer understanding of travel behavior and provides a resource to the transit industry in terms of specific analyses relevant to public transit. It characterizes public transit as it was in 2001 from a number of perspectives that are useful to planners and policy makers and it provides trend data for several critical variables that are important to public transportation.

The characterization of public transit in America is based on an analysis of the NHTS database and the former Nationwide Personal Transportation Survey (NPTS), which includes information from five surveys conducted in 1969, 1977, 1983, 1990, and 1995. The NHTS was developed as a follow on to the 1995 NPTS and 1995 ATS (American Travel Survey). The NHTS database provides an opportunity to develop current and useful information to aid in public transit planning and analysis. While the NHTS data base is a relatively small sample of public transit trips in the nation and inappropriate for service planning in a specific geography, it does provide an understanding of travel behavior that can be used to shape the transit industry's understanding of customer needs and behavior.

The analysis is focused on the 2001 NHTS. While some information is included that provides information on how travel behavior has evolved over time, changes in survey method, especially between the 2001 and earlier surveys, required caution in drawing conclusions when comparing data across surveys. The 2001 NHTS is the most recent and includes a number of enhancements to survey content, survey method, and the resulting data set over previous surveys. The next scheduled survey of this type is currently anticipated in 2007/8. This analysis describes transit travel, users, and markets. Results are presented in descriptive terms with the authors providing observations and interpretation. However, the reader is also able to interpret the findings directly from the wealth of descriptive data provided.

Information provided in this document complements other data sources at the national level related to public transit in America, such as the decennial censuses from the U.S. Bureau of the Census, the American Housing Survey from the Department of Housing and Urban Development, and the National Transit Data Base from the Federal Transit Administration. Both the decennial censuses and the American Housing Survey focus on commuting trips. The National Transit Data Base provides an important information base on the physical system of public transit services provided and consumed, and financial characteristics of service provision.

This document is presented in six chapters. This chapter introduces the topics in the document. Chapter 2 describes the statistical sources used in the study, issues in using the data sources, and the major terms used to aggregate and present data. Chapter 3 places public transit in proper context with trends in demographics, vehicle ownership, and personal travel over the 32 years between 1969 and 2001. Chapter 4 shows the results. Chapter 5 provides a detailed discussion of mode share trends for transit use and Chapter 6 provides an overall summary and observations.

CHAPTER 2

DATA RESOURCES

Two of the challenges in developing a better understanding of public transit are 1) fully understanding the context and nuances of the data sources, and 2) understanding the technical terminology used by analysts in characterizing public transit. The principal data sources for this report are the Nationwide Person Transportation Surveys from 1969 to 1995 and the National Household Travel Survey from 2001. The main body of this document relies most heavily on the 2001 NHTS, which is the focus of the following description. The earlier surveys are briefly discussed in terms of differences between them and the 2001 NHTS. Technical terms include definitions of personal, household, and geographical areas that are used to assemble and present the statistics.

Transit is a minor mode with less than two percent of trips on transit. Transit is also a mode more frequently used by segments of the population that may be less likely or able to participate in government sponsored data collection. These conditions influence the quality and statistical confidence in various data items, particularly for smaller sub-segments of the market. This makes it important that the reader understand the constraints of the data. Additional information about the surveys is available on the NHTS web site: http://nhts.ornl.gov/2001/index.shtml. Details on the sample weighting procedures are explained in Appendix F and details of non-response weighting are in Appendix H.

2001 NHTS

The 2001 NHTS is a sample survey of the nation's daily personal travel. It is the only authoritative source of national data on daily trips including, but not limited to:

- purpose of the trip (e.g., work, shopping),
- means of transportation used (e.g., car, bus),
- how long the trip took (i.e., travel time),
- time of day the trip took place; and
- day of week the trip took place.

These data were collected for all trips, all modes, all purposes, all trip lengths, and all areas of the country.

The 2001 NHTS was conducted from March 2001 through May 2002. Like all large-scale sample surveys, it involved several stages of data collection. First, a stratified random sample of telephone numbers was obtained. Second, the sample of telephone numbers was screened to identify residential households. People living in college dormitories, nursing homes, other medical institutions, prisons, and on military bases were excluded from the sample. Third, a member of the household was asked a series

of questions by phone about the persons and vehicles of the household. Following this household interview, the household was assigned a travel day for trip reporting. Then, travel diaries were prepared and mailed to the household. Following the household's travel day, interviewers called to conduct the person interview for each eligible household member. A six-day window was established to obtain the travel day data. During the person interviews, travel diary information was recorded on a computer, along with responses to a number of additional questions. The 2001 NHTS survey represented a survey designed to replace the NPTS and the American Travel Survey (ATS). The ATS, which had been conducted in 1995 by the Bureau of Transportation Statistics (BTS), was a survey of trips of 100 miles or more taken over the course of a calendar year. There were problems in trying to use 1995 NPTS and the 1995 ATS together to form a picture of total household travel by the American public. The combined survey approach for the 2001 NHTS was designed to give one data source for the full continuum of person travel.

For the first time in the NPTS/NHTS series, travel data were collected for household members including persons less than four years old not surveyed in prior surveys. All previous surveys had collected travel data only from household members aged five and older, on the dated assumption that younger children made trips only with other household members. However, this ignored the trips of this young group that were made with a day care provider, as part of a preschool activity, or with non-household members and thus altered the overall statistics when presented in per capita terms.

The 2001 NHTS response rates are summarized in Table 2-1, which includes the partial response rate obtained at each stage of the survey, and the cumulative response rate up to that stage in the process. More than 152,000 telephone numbers were sampled initially for household screening. Of these numbers, 90.6 percent were from residential households. Of these, 57,506 were contacted and confirmed as eligible households. Household interviews were completed for 64.0 percent of the residential households. Of these, 70.7 percent were classified as useable for the 2001 NHTS. Within the useable households, person interviews were completed with 90.6 percent of the eligible persons. The overall response rates were 58.0 percent for household interviews and 37.1 percent for person interviews.

Table 2-1 Response Rates for the 2001 NHTS

Stages	Responses	Single Stage Rate	Cumulative Rate (%)
Total Sample of Telephone Numbers	152,191	N/A	N/A
Eligible Confirmed Residential Households	57,506	N/A	N/A
Household Interviews Completed	36,810	64.0	58.0
Usable Households	26,038	70.7	41.0
Person Interviews Completed	60,282	90.6	37.1

Source: 2001 NHTS User's Guide Version 1, Table 4-1/ 4-6.

Table 2-2. Sample Size of 2001 NHTS Files

Data Files	Sample Size
Household File	26,038
Person File	60,282
Travel Day File (trips)	248,517

Source: 2001 NHTS User's guide Version 1- Chapter 4 Survey response rates.

Data from the 2001 NHTS are available from the U.S. Department of Transportation in separate files, which are used for this study. These files include Household File, Person File, and Travel Day File, (Table 2-2). The Household File contains data on household demographic, socio-economic, and residence location characteristics for 26,038 households. The Person File contains data on personal and household characteristics, attitudes about transportation, and general travel behavior characteristics such as usual modes of transportation to travel to work for 60,282 persons. The Travel Day File contains trip-based data on trip purposes, modes, trip lengths in terms of time and distance, and trip start times for 248,517 trips. Each data record in each file has its own weighting variable to expand the sample to provide national estimates in the case of the Household and Person Files, and annualized national estimates in the case of the Travel Day File. Most of the work in this report is based on analysis of the national survey results released in early 2003. A subsequent release included the supplemental samples in selected areas where various governmental areas purchased additional "add-on" surveys. This more recent data, released in January 2004, is reweighted by the NHTS contractor to produce national totals but provides slightly different values for some tabulations as a result of the larger sample from regions that did add-on surveys. After the release of the 2004 data, various measures were recalculated to understand the nature of the changes in transit use as a result of the add-on sample.

Comparability with Earlier NPTS

The 2001 NHTS data set includes a number of enhancements to earlier NPTS's in survey methodology, survey content, and the resulting database. The most notable

enhancements are listed in Table 2-3. In addition, there was additional attention to non-motorized modes and new classifications for race and ethnicity. Table 2-4 shows the changes in survey methodology.

Table 2-3. Additions to the 2001 NHTS Content

Survey Content Addition	Description
Medical conditions	Person file: Medical condition limits driving to daytime (CONDNIGH) Medical condition limits use of public transit (CONDPUB) Medical condition results in asking for rides (CONDRIDE) Medical condition requires giving up driving (CONDRIVE) Medical condition requires special transport (CONDSPEC) Medical condition results in less travel (CONDTRAV) Having a medical condition that makes travel difficult (MEDCOND) Length of time with medical condition (MEDCOND6)
Long distance travel	The threshold for longer trips was lowered to 50 miles or more, to obtain a better sample of those often overlooked 50 – 100 mile trips.
Emigration	With the question asking when the respondent entered U.S. we have an indicator about emigration status (variable: YRTOUS in the person file)
More add-ons	9 areas – Baltimore, Des Moines, Hawaii, Kentucky (4 counties), Lancaster PA, New York State, Oahu (Honolulu), Texas, Wisconsin
Household members 0-4 years old	Travel was collected for household members 0-4 years old. All previous surveys collected travel only from household members age 5 and older.

Source: 2001 NHTS User's Guide preliminary release.

Certain factors, such as the state of the economy and the price of oil are known to have significant effects on how, when, and the amount that people travel. Variations in these factors are expected and are often accounted for in travel trend analysis. However, during the 2001 NHTS data collection period, several extraordinary events occurred that undoubtedly affected travel in the United States. The first occurred on September 11, 2001, when terrorists attacked the World Trade Center Towers in New York City and the Pentagon near Washington, D.C. using commandeered commercial aircraft. The attacks and the intense security measures imposed on commercial air travel and major transportation facilities of all types that followed, severely disrupted travel in the United States for months, changing the amount and modes of travel during that period, particularly for longer distance trips. The second series of events occurred during the period from mid-September through mid-November 2001, when letters containing anthrax were sent to various recipients in Florida, New York, and the District of Columbia. This resulted in a number of deaths and widespread concern regarding

Table 2-4. Changes in the 2001 NHTS Survey Methodology and Content

Topic	Change From	Change To	Probable Impacts
Respondent contact	Advance letters	Advance letters, $5 incentive, brochure	Improved response, legitimizes the survey with respondents
Use of a diary for long trips	The ATS used a diary to record long-distance trips	No travel period diary included	Long-distance trip rates may be lower, lowers respondent burden and reduces the possibility of confusion due to having both a travel day and travel period diary
Travel day trip definition	Any stop from one address to the next is a separate trip	Basically the same – stop only to change a mode of transportation excluded	May improve reporting of trips by public transportation as subjects were specifically reminded about these trips. No change mode trips were recorded except where public transportation was involved
Travel period length and travel period trip definition	No specific mention of walk and bike trips	Reminder to include walk, bike, and trips that started and ended in the same place	Will increase the reporting of walk and bike trips
	NHTS included trips of 75 miles or more, 2-week recall. ATS included trips of 75 miles or more over a full year (4 interviews)	Travel period was a four-week period, trips of 50 miles or more from home were defined as long-distance	Four-week travel period and shorter criterion distance provides information on a larger sample of long-distance trips than NPTS and better recall of trips than ATS (if not recorded in ATS diary), but a smaller sample of trips and greater difficulty estimating annual long-distance trip rates than ATS
Travel day trip purpose	17 trip purpose categories	36 trip purpose categories	The new categories more accurately capture responses
Most recent long-distance trip	Not collected	Collected	Facilitate the imputation of trips for persons with no reported long-distance trips in travel period
Odometer readings	Readings collected from respondent by phone or mail	Data collection included phone, the internet, fax, and a toll-free number	Improved response
Geocoding	Limited use of manual geocoding	Extensive use of manual geocoding	Higher geocoding success rates and more accurate geocoding
Splitting walk and bike trips at the end of travel day	Not conducted	Conducted	Walk and bike trips rates may be higher than on past NPTS surveys
Adding trips not reported by household members earlier	Not conducted	Conducted	More complete trip reporting
Weighting	Raking to control totals	Several stages of separate weighting to control totals (raking) and trimming to minimize sampling error	Presently unknown, an evaluation is to be conducted

Source: 2001 NHTS User's Guide Version 1- Chapter 3 Exhibit. Note: Raking and trimming are terms used to describe the development of sample weights for survey purposes.

public health and safety of U.S. mail. This created public suspicion and fear of receiving unanticipated mail packages. Although the impact of this on travel is yet to be determined, it may have affected NHTS response rates, since there was a mail component of the survey.

The changes in survey methodology require caution in comparing the 2001 NHTS to earlier surveys. In addition, small sample sizes for cross tabulations involving small sub-segments of the population can have very modest sample sizes of transit users.

Definition of Public Transit

Public transit in this report includes four categories of transit mode: bus, commuter train, streetcar/trolley, and subway/elevated rail.

Bus: The bus category includes local buses and commuter buses that are available to the general public. However, shuttle buses operated by a government agency or private industry for the convenience of employees; contracted or chartered buses (for example tourist charter or sight seeing buses), city-to-city buses, and school buses are excluded. Data on these modes are available but analysis of public transit use in this report does not include them.

Commuter Train: The commuter train category includes commuter trains and passenger trains other than elevated rail transit and subways. Amtrak intercity service is excluded.

Streetcar/Trolley: The streetcar/trolley category includes trolleys, streetcars, and cable cars.

Subway/Elevated: The subway/elevated rail category includes elevated railways and subway trains in a city.

One might note that experience with the data suggests that questionnaire respondents do not necessarily have an understanding of these terms and may use them in ways different than a transit professional would. The changes in survey methodology require caution in comparing the 2001 NHTS to earlier surveys.

Nature of NHTS Trips

To understand the nature of NHTS trips, one needs to understand how trips that involve multiple modes are reported. Consider an example: You are dropped off at a bus stop to take a bus, transfer to rail, and finally walk to work. For you, this entire sequence of home to work is viewed as one trip for the sole purpose of reaching the work destination. For the FTA National Transit Database, it is counted as two transit trips as you boarded two transit vehicles as part of the travel. For the transportation planner, it is viewed as one linked trip composed of four unlinked trip segments. For the 2001 NHTS, it is recorded as one travel day trip.

This approach requires that the analyst fully understand how the various data files are used. For example, if a linked trip that started with a bus ride to a car rental site and continued with a drive, the bus ride would not be counted in the Travel Day File if the drive segment of the trip is longer in distance.

Comparability with FTA and APTA Data

As shown in Table 2-5, the total number of unlinked transit trips derived from the 2001 NHTS is lower than that from either the Federal Transit Administration (FTA) or the American Public Transportation Association (APTA). The 2001 NHTS number is 7,673 million, compared with 9,653 million from APTA and 9,008 million from FTA.[1]

Table 2-5 Comparison of Trips among 2001 NHTS, FTA, and APTA Estimates

Source	Trips (millions)
2001 NHTS (Unlinked)	7,673
2001 NHTS (Linked)	6,409
2001 APTA (Unlinked)	9,653
2001 FTA/NTD (Unlinked)	9,008

Sources: 2001 NHTS daytrip file, variable trptrans; 2001 APTA from Fact book 2002 – unlinked passenger trips in millions Calendar Year 2001 (revised in 2004 by APTA): 2001 FTA-2001 National Transit Summaries and Trends, p. 62.

It is not possible to completely reconcile the numbers; however, all are estimates and several reasons for differences are known to exist. One possible reason is that the three sources cover different periods of time. FTA's number is based on data for individual transit agencies' fiscal years ending during the calendar year 2001. Individual transit agencies' fiscal years vary. Thus, a portion of the trips included in FTA's number took place during calendar year 2000. Not all transit agencies file National Transit Database (NTD) reports thus, the NTD/FTA number is not a full national total. FTA's number is an account of unlinked trips for agencies in the nation. All applicants and direct beneficiaries of Federal assistance under USC 5307 (formerly Section 9 of the Federal

[1] This analysis was carried out with the 2003 release of the NHTS data before the add-on samples were available. When reanalyzed with the add-ons, there was a slight increase of transit trips and mode share.

Transit Act, as amended) are subject to the National Transit Database Reporting System. FTA received data from 602 transit agencies for 2001.

The APTA number is based on farebox count data submitted to APTA for the calendar year. This number is estimated based on agency submitted count data then factored up to account for ridership at agencies that do not have farebox counts and for other non-reporting agencies. In 2004 the APTA estimation methodology was updated and the 2001 value was increased from 9,505 to 9,653 million for 2001. The NHTS number is approximately 21 percent below that of the APTA number and approximately 15 percent below the FTA/NTD number.

More detailed comparison of NTD and APTA data has revealed significant differences between these numbers for individual properties and for the set of properties for which both numbers are available (Chu, 2004). Differences of over 10 percent in aggregate appear consistently over time and are not clearly attributable to any single factor. Methodology biases, farebox undercounts and perhaps incorrect NTD sampling may explain some of these differences.

On the other hand, the 2001 NHTS number is based on sampled trips that took place during the period from March 2001 to May 2002. Several factors may partially explain the differences. As transit use is relatively stable over time and all the cited sources cover a 12 month period of travel, temporal differences are not believed to explain differences.[2] It has been speculated that non-response may be more prevalent for those persons who are likely to be more inclined to use transit. As a telephone survey, NHTS may under-represent those households that do not have phones, have literacy problems, or are unwilling to participate perhaps for fear or revealing illegal immigrant status or other conditions. Thus, it has been speculated that transit use may be underreported. However, aggressive sampling strategies and sample weighting have been designed to compensate for these conditions. It is impossible to know the actual impact of non-response on the total NHTS transit sample and subsequent transit user characteristics.

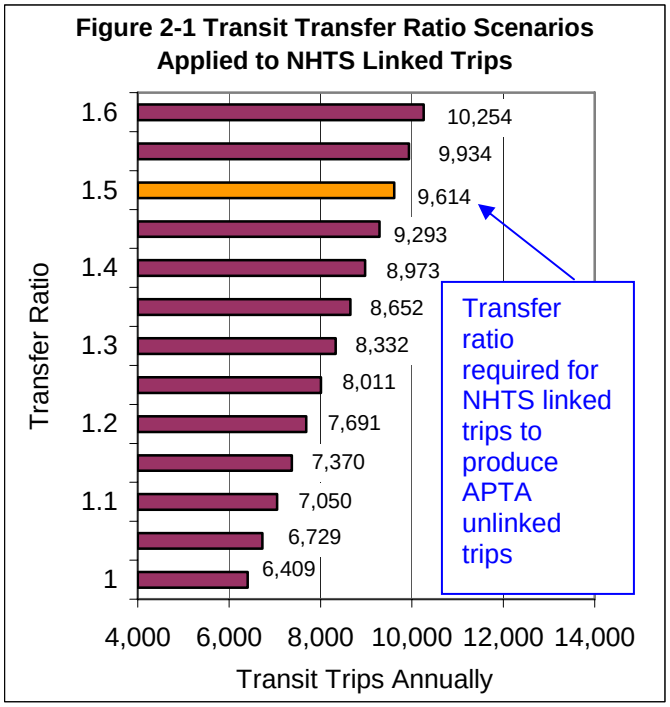
The single largest factor appears to be the underreporting of transferring in the 2001 NHTS (as well as prior NPTS surveys). NTD and APTA sources are a sample or hard counts of persons boarding transit vehicles. Thus, every boarding, even those that involve transferring between buses or trains within a station, are counted as a trip. It is probable that a number of transfer trips, especially by persons who might be making a routine cross-platform or within-station transfer between public transit vehicles, are not perceived and reported as transfers when reporting trips for NHTS purposes. There is no empirically measured national estimate of transfer rate or standard factor for

[2] While the NHTS collection period covered 15 months, a one-year period of data was developed. Start-up, lag time for gathering diary data, and disruptions from September 11, 2001, are among the factors that resulted in the data collection period going beyond 12 months.

converting unlinked to linked transit trips for those trips counted by APTA or NTD methods. An estimate of 1.3 unlinked trips per linked trips is occasionally used; however, others estimate that transferring is more common. (APTA, May 2004).

The NHTS sample indicated that 20 percent of NHTS transit trips involve transfers. Figure 2-1 shows what transfer rates would be required to replicate the unlinked trip numbers reported by various other data sources if one applied this to the estimated unlinked trips noted in the NHTS survey. Matching APTA reported unlinked ridership numbers would require a transfer rate of about 50 percent (ratio of 1.5), i.e., half of all transit trips involved a person needing to use two vehicles to complete the trip. This explanation is given further credence based on the fact that the average trip length for NHTS transit trips (8.6 miles door-to-door) is significantly longer than the transit trip length reported in 2001 NTD data (5.17 miles in vehicle) and the transfer rates captured by the NHTS (20 percent based on the difference between NHTS linked and unlinked transit trips) are well below those commonly reported by transit agencies.

Figure 2-1 Transit Transfer Ratio Scenarios Applied to NHTS Linked Trips



APTA's number is an estimate of national totals. APTA supplements the number of unlinked trips from its member agencies and those agencies subject to the National Transit Database Reporting System by an estimate of unlinked trips from other agencies that do not report to either APTA or FTA. These agencies, whose annual unlinked trips are unavailable, are small but account for 9 out of every 10 agencies in the nation (Table 2-6). They are agencies operating in rural areas or providing specialized transportation. FTA last completed an inventory of these properties in 1994.

Table 2-6. Number of Public Transit Agencies

Federally Funded Agencies			Other Agencies (as reported in 1994)
NTD Agencies 2001	Rural Agencies (as reported in 1994)	Specialized Transportation Agencies (as reported in 1994)	
602	1,074	3,594	753

Source: NTD database 2001.

The 2001 NHTS number is also an estimate of national totals. Public transit in the 2001 NHTS includes bus, subway, elevated train, commuter train, or streetcar service (main mode). Transit services include only those that are available for use by the general public for local or commuter travel, including dial-a-bus and senior citizen bus service. Long distance services or those chartered for specific trips are excluded. It is also possible that the 2001 NHTS number may include trips made on jitneys and other forms of bus services provided by the private sector that are not included in the APTA or FTA number.

Finally, there is the prospect of underrepresentation of low-income persons who are more frequently transit users but who, due to lack of phone service, enhanced sensitivity to personal information disclosure, language barriers or other factors, are under represented in the sample. The NHTS, in its fifth iteration in 2001, was a carefully designed and carried out national data collection efforts. Extensive steps were taken to minimize any sample response biases or adjust for them in the weighting process (carried out as part of the NHTS). The prospect of sample bias is discussed below. The difference in numbers in Table 2-5 is consistent with prior comparisons between different data sources. Specifically, "Public Transit in America: Findings from the 1995 Nationwide Personal Transportation Survey," showed a similar disparity between NPTS and APTA and NTD data, suggesting that it is structural or definitional and not simply the results of sampling errors or randomness. While it would be highly desirable to more fully rationalize the differences between the various data sources, data for such an effort is not presently available.

Households without Telephone Services

The issue of excluding households without telephone services is relevant due to concerns that there is a high correlation between households with no phones and households that are dependent on transit services. While survey weighting is designed to appropriately represent the share of low-income households, the lower response rate may impact the sample size and statistical validity of certain tabulations. There is ongoing concern that the 2001 NHTS and prior NPTS data collection underrepresented low-income households. This issue has been recognized in the original design of the data collection methodology and efforts have been implemented to both evaluate the potential bias if any and to adjust for any sampling differences by income group through the sampling and weighting process. Similarly, there is a growing concern that households are beginning to abandon land lines (home phone service) in favor of exclusive reliance on cell phones. Cell phones are not sampled due to the absence of a national directory that would enable surveys of cell phone users and due to the fact that call charges for incoming calls would negatively impact respondents and dampen voluntary participation. This phenomenon is not unique to this survey and is being evaluated by survey professionals. While it was not deemed to be an issue for the 2001 survey, for the next scheduled survey in 2007/8 it may be a more significant issue.

Survey strategies of follow-up calls are designed to minimize the impact of non-response or call screening devices. A full report on NHTS survey design can be found at: http://nhts.ornl.gov/2001/usersguide/index.shtml

Table 2-7 shows three distributions of household income. The first column is based on the 2002 Current Population Survey (CPS) of the Census and includes 2001 household income information. The middle column is the non-weighted distribution from the 2001 NHTS. The last column is the weighted distribution from the 2001 NHTS. Both households with very low and very high incomes are slightly undercounted in the income-reporting sample of the 2001 NHTS. Weighting the actual responses reduces the undercounting for low-income households. Similarly, weighting the actual responses more than offsets the over counting for high-income households. The NHTS sample appears to be largest in the $35,000 to $50,000 household income range. Weighting reduced this overrepresentation; however, it remains higher than the actual population share. The weighting process is constrained by efforts to balance weighting for numerous factors including geography, thus, the weights for income do not exactly replicate the population income distribution. The sample weighting process attempts to balance several factors felt to be important to travel behavior. The resultant weighting strategy, developed by the survey contractor, is felt to provide the best overall results. The nature of transit use, being disproportionate among low income groups, results in the lack of income distribution match of the sample being more unfortunate for researchers interested in gleaning information about transit travelers and travel behavior. The following section describes the limitation of sample estimates.

Table 2-7. Comparison of Distributions of 2001 Household Income between 2001 NHTS and Census

Household Income	2002 Census (2001 income)		2001 NHTS Sample	2001 NHTS Weighted	
Below $5,000	8.96 %	15.83%	2.14 %	2.91 %	14.57%
$5,000 - $9,999			4.63 %	6.01 %	
$10,000 - $14,999	6.87 %		4.84 %	5.65 %	
$15,000 - $19,999	6.78 %		6.18 %	7.04 %	
$20,000 - $24,999	6.56 %		5.44 %	6.04 %	
$25,000 - $34,999	12.43 %		13.12 %	13.68 %	
$35,000 - $49,999	15.38 %		19.51 %	19.18 %	
$50,000 - $74,999	18.35 %		19.22 %	17.61 %	
$75,000 - $99,999	10.83 %		11.88 %	10.54 %	
Above $100,000	13.83 %		13.04 %	11.33 %	

Sources: The Census distribution: Current Population Survey, March 2002. Numbers in thousands. http://ferret.bls.census.gov/macro/032002/hhinc/new06_000.htm; The distributions from the 2001 NHTS were derived from the Household File – variable total household income. Additional information about the surveys is available on the NHTS web site: http://nhts.ornl.gov/2001/index.shtml. Details on the sample weighting procedures are explained in Appendix F and details of non-response weighting are covered in Appendix H

Limitation of Sample Estimates

Most statistics in this report are sample estimates, i.e., they refer to an entire universe of units (households, persons, or trips), but are constructed from the 2001 NHTS, a sample survey. In constructing a sample estimate, an attempt is made to come as close as is feasible to the corresponding value that would be obtained from a complete census of the universe. Estimates based on a sample will, however, generally differ from the values from a census. As a result, sample estimates involve errors.

Two classifications of errors are associated with sample estimates: sampling error and non-sampling error. The sampling error of an estimate arises from the use of a sample, rather than a census, to estimate the universe value. The particular sample used in a survey is only one of a large number of possible samples of the same size, which could have been selected using the same sampling procedure. Estimates derived from the different samples would, in general, differ from each other. The standard error is a measure of the variation among the estimates derived from all possible samples. The standard error is the most commonly used measure of the sampling error of an estimate.

Non-sampling errors arise from non-sampling sources. Two kinds of non-sampling errors exist: random and non-random. Random non-sampling errors arise because of the varying interpretation of questions (by respondents or interviewers) and varying actions of coders, data entry personnel, and other processors. Some randomness is also introduced when respondents must estimate values. Non-random non-sampling errors result from:

- Total non-response (no usable data obtained for a sampled unit),
- Partial or item non-response (only a portion of a response may be usable),
- Inability or unwillingness on the part of respondents to provide correct information,
- Difficulty interpreting questions,
- Mistakes in recording or keying data,
- Errors of collection or processing, and
- Coverage problems (over-coverage and under-coverage of the target universe).

For an estimate calculated from a sample survey, the total error in the estimate is composed of the sampling error and the non-sampling error. Ideally, estimates of the total error associated with statistics presented in this report should be given. However, neither sampling errors nor non-sampling errors are presented in this report. The magnitudes of non-sampling errors cannot be estimated from the 2001 NHTS. While sampling errors can be estimated from the 2001 NHTS with specially designed software, the most commonly used statistical software, such as SAS and SPSS suites do not correctly calculate sampling errors because of the complex sample designs in the 2001

NHTS. Table 2-8 exemplifies the response rates for a specific public transit relevant variable.

Table 2-8 Number of Sample Cases Related to Waiting Time for Public Transit

Variables	Valid Cases	Legitimate Skip	Unknown or Refused	Total
Time waited for transportation (actual mode)	3,079	245,353	85	248,517

Sources: 2001 NHTS daytrip file- variable trwaittm, time spent waiting for public transportation.

Sample Characteristics Related to Public Transit Use

Tables 2-9 and 2-10 show the number of cases for variables measuring public transit use. These include frequency of public transit use and main means of transportation to work. These tables are intended to provide the reader with a sense of the nature of the sample of transit users. As Table 2-9 indicates, many NHTS participants never use transit or noted transit is not available, thus data on transit use is less robust than for the dominant auto based modes of travel. Each question had a different numbers of respondents. Subsequent chapters discuss the findings.

Table 2-9 Frequency of Public Transit Use

Response Category	Responses
Two or more days a week (11+ times)	2,186
About once a week (5-10 times)	1,012
Once or twice a month (2-4 times)	1,831
Less than once a month (1 time)	1,558
Never	36,867
Transit Unavailable	3,653
Legitimate Skip	4
Unknown or Refused	92
Missing/not ascertained	13,079
Total	47,203

Sources: 2001 NHTS person-file (ptused) public transit use in the last 2 months – sample.

Terms

The terms used in this document to describe public transit can be grouped into four categories: personal characteristics, household characteristics, land use characteristics, and geography.

Table 2-10 Number of Sample Cases Related to Main Means of Transportation to Work

Response Category	Responses
Bus	455
Subway/elevated rail	228
Streetcar/trolley	8
Commuter train	161
Others	24,196
Legitimate skip	22,155
Unknown or refused	21
Missing/not ascertained	13,066
Total	60,290

Sources: 2001 NHTS person file – variable wrktrans.

Personal Characteristics

Five personal characteristics are used in presenting the statistics in this document: person age, gender, driver's license status, working status, and frequency of using public

transit in general. Gender and license status need no further explanation. Person age is grouped into three categories: under 18, 18 to 64, and 65 or older. This age grouping is commonly used to separate out the working age population. Working status refers to whether one was working full time, or working part time during the week before the interview for the 2001 NHTS. Frequency of using public transit refers to how frequently a person used public transit during the two months before the interview. It has four categories: two or more times a week, about once a week, once or twice a month, and less than once a month.

New in the 2001 NHTS is a question about medical conditions which may limit driving or result in alternative transportation or minimize the amount of travel. Also new in the 2001 survey is a question about emigration status.

Household Characteristics

Six household characteristics are used in describing public transit usage in this document: race, ethnicity, household income, household vehicle ownership, home ownership, and household life cycle. Current survey practices categorize race into three categories: White, Black, and Other. Ethnicity has two categories: Hispanic and Non-Hispanic. Thus, the Race and Ethnicity categories are non-exclusive and reflect the evolution in race and ethnicity categorization being used for census and other data collection purposes. Household income is grouped into three ranges: under $15,000, $15,000 to $49,999, and $50,000 or over. These three income groups are mutually exclusive. The same grouping for household income is used by APTA (1992) in its profiling of Americans in public transit. Household vehicle ownership is divided into three ranges: 0 vehicles, 1 vehicle, and 2 vehicles or more. Home ownership has two categories: owner versus renter. Household life cycle also has two categories: single-adult households versus multi-adult households.

Geography

Metropolitan Statistical Areas (MSAs) are based on the application of 2000 MSA definition standards to 2000 decennial census data. Specifically, each MSA must include at least: (a) one city with 50,000 or more inhabitants, or (b) a Census Bureau-defined urbanized area (of at least 50,000 inhabitants) and a total metropolitan population of at least 100,000 (75,000 in New England). The 2001 NHTS divides all areas in the United States into six categories: Outside MSA and five ranges of population size for MSAs, including under 250,000; 250,000 to 499,999; 500,000 to 999,999; 1 million to 2,999,999 and 3 million and over. The variable describing MSA population size is used to measure the scale of areas.

CHAPTER 3
UNDERLYING TRENDS

This chapter presents trends in population, vehicles, vehicle travel, person travel, and public transit's market share over the 32 years from 1969 to 2001. These trends are based on the NPTS and NHTS database. The purpose of this chapter is to place the following chapters in proper context so that the statistics there are better understood. Much of the material in this section comes from the 2001 NHTS.

Growth of Population and Vehicles

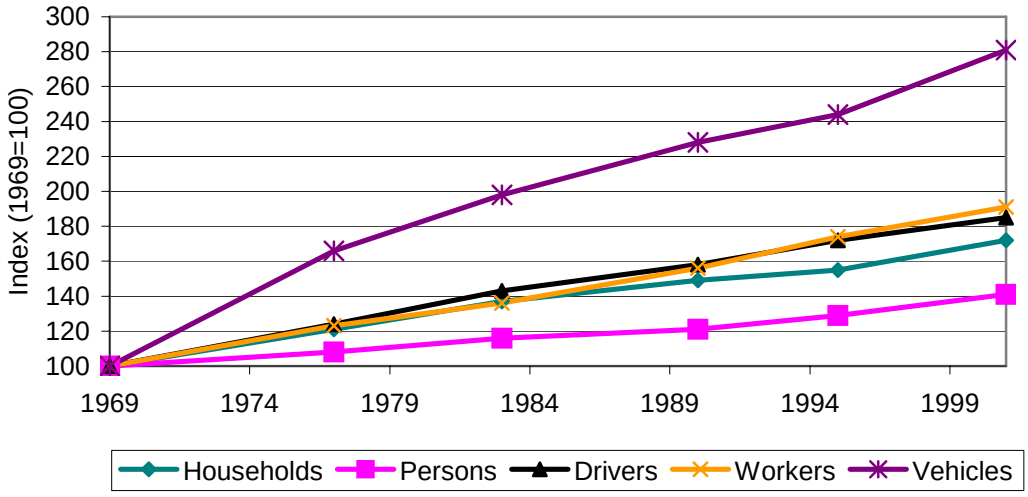
Table 3-1 and Figure 3-1 show growth in population and vehicles. Over the thirty-two years (1969-2001) population increased 41 percent or slightly over one percent per year. The increases in households (72 percent), workers (91 percent), and drivers (85 percent) are much larger. Collectively these trends characterize the aging of the baby boomer into adulthood combined with increasing female labor force participation and a shift from the historically dominant pattern of households with two adults, one worker, children and a vehicle. The most striking change in the data is the 181 percent increase in household vehicles since 1969. The nation went from a society of one car per household in 1969 to a society of close to two cars per household in 2001, in a time during which household size declined by 17 percent. The most dramatic increase in household vehicle ownership occurred between 1969 and 1977, with steady growth since then. Vehicle availability has grown dramatically with data indicting that nearly 75 percent of households that are below the poverty line have at least one household vehicle. Having as many vehicles as workers is very common and having at least one vehicle per licensed driver is increasingly the norm.

Table 3-1 Index of Changes in Population and Vehicles

Year	Households	Persons	Drivers	Workers	Vehicles
1969	100	100	100	100	100
1977	121	108	124	123	166
1983	137	116	143	136	198
1990	149	121	158	156	228
1995	155	129	172	174	244
2001	172	141	185	191	281

Source: Summary Statistic on Demographic Characteristics and Total Travel 1969, 1977, 1983, 1990, 1995 NPTS, and 2001 NHTS.

Figure 3-1 Index of Changes in Population and Vehicles



Source: Summary Statistics on Demographic Characteristics and Total Travel 1969, 1977, 1983, 1990, 1995 NPTS, and 2001 NHTS. FHWA.

Stabilization of Vehicle Ownership Rates

Despite the significant growth in the number of household vehicles over time, the data from the 2001 survey indicate that household vehicle ownership is beginning to stabilize (Table 3-2 and Figure 3-2). This trend can be seen in the rates of vehicles per household, vehicles per driver, vehicles per worker, and vehicles per adult over age 16.

Table 3-2 Changes in Vehicle Ownership Rates

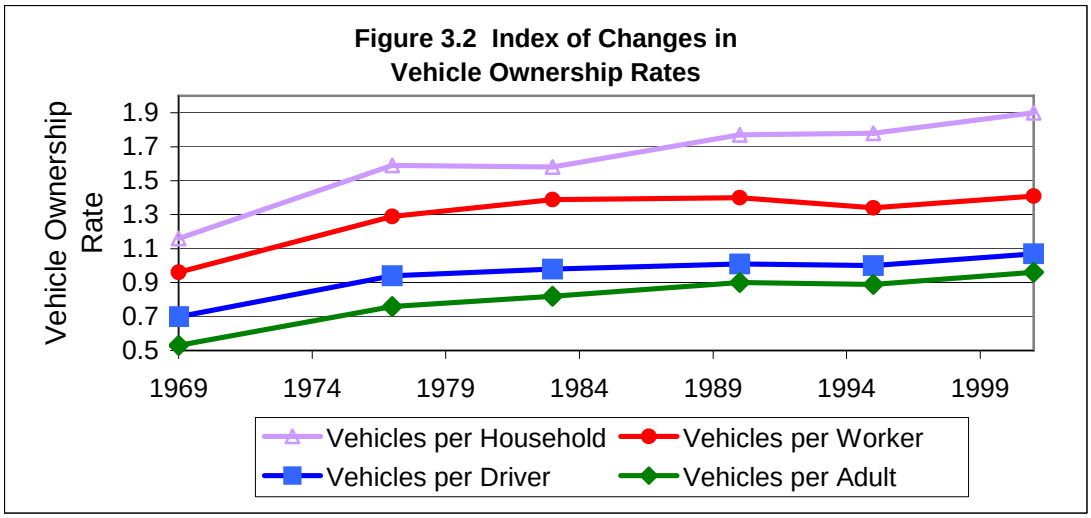
Year	Vehicles per Household	Vehicles per Worker	Vehicles per Driver	Vehicle per Adult
1969	1.16	0.96	0.70	.53
1977	1.59	1.29	0.94	.76
1983	1.58	1.39	0.98	.82
1990	1.77	1.40	1.01	.90
1995	1.78	1.34	1.00	.89
2001	1.90	1.41	1.07	.96

Source: Summary Statistics on Demographic Characteristics and Total Travel 1969, 1977, 1983, 1990, 1995 NPTS, and 2001 NHTS.

Decline of Zero-Vehicle Households

The number of households without a vehicle has decreased from almost 13 million to 8.5 million from 1969 to 2001 (Table 3-3 and Figure 3-3). The number of one-vehicle households has remained almost stable over time with a slight growth towards 35 million. The number of two-vehicle households has grown from 17 million in 1969 to 40 million in 2001. It has been quite stable since 1995. Almost 40 percent (37 percent) of all U.S. households in 2001 were two-vehicle households. The most startling change in

vehicle ownership has been in the number of households with three or more vehicles, which as grown from 3 million households in 1969 to 25 million in 2001.

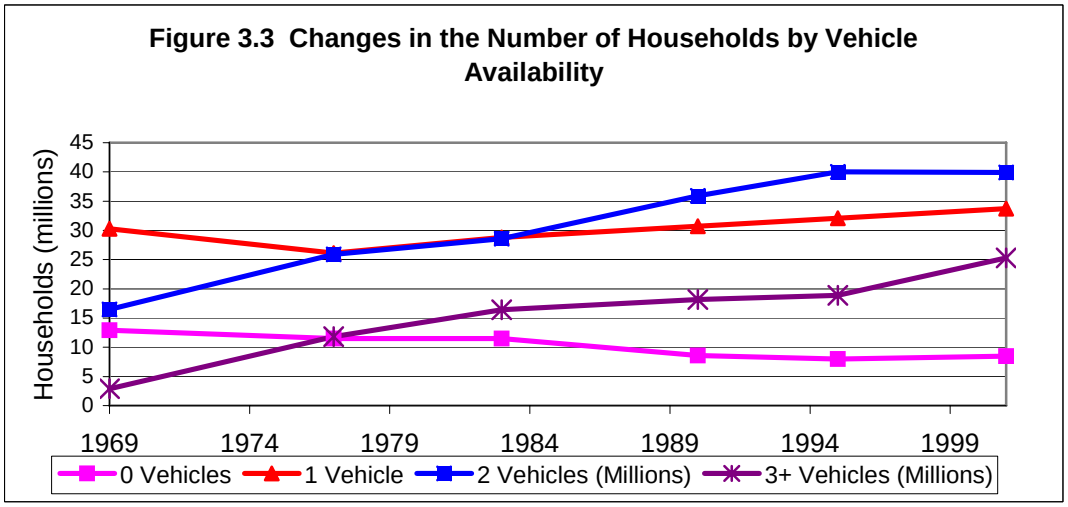


Source Table 3.2

Table 3-3 Changes in Number of Households by Vehicle Availability

Year	0 Vehicles (Millions)	1 Vehicle (Millions)	2 Vehicles (Millions)	3+ Vehicles (Millions)
1969	12.9	30.3	16.5	2.9
1977	11.5	26.1	25.9	11.8
1983	11.5	28.8	28.6	16.4
1990	8.6	30.7	35.9	18.2
1995	8.0	32.1	40.0	18.9
2001	8.5	33.7	39.9	25.3

Source: 2001 NHTS household file – variable hhvecnt (count of vehicles in household)



Source: Table 3-3.

Changes in Travel

Statistics included in this section are intended to show overall trends. The exact numbers in the trends should be used with caution due to changes in survey methodology across the different NHTS and NPTS surveys. Despite this caveat, the dramatic trends are indisputable.

Growth of Overall Travel

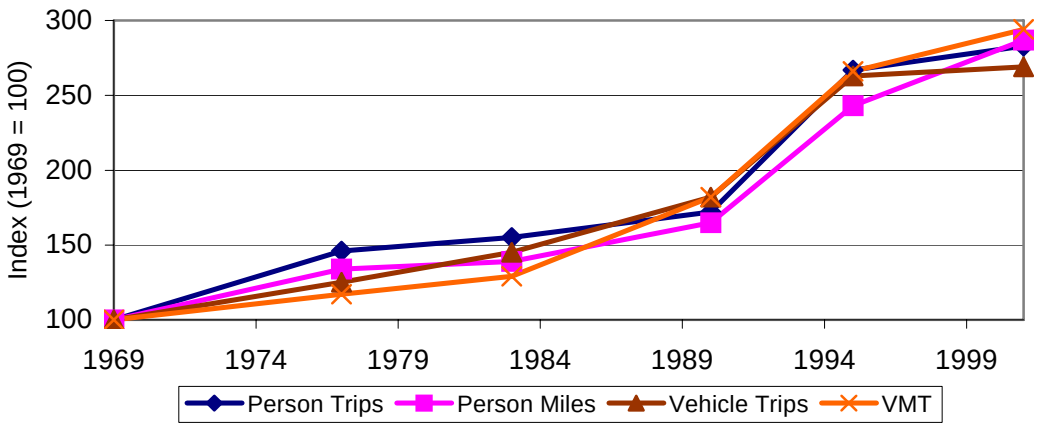
Table 3-4 Index of Changes in Overall Travel (1969=100)

Year	Person Trips	Person Miles	Vehicle Trips	VMT
1969	100	100	100	100
1977	146	134	125	117
1983	155	139	145	129
1990	172	165	182	182
1995	267	243	263	266
2001	283	287	269	294

Source: Summary Statistics on Demographics Characteristics and Total Travel 1969, 1977, 1983, 1990, 1995 NPTS, and 2001 NHTS.

Personal travel increased dramatically during the 32 years between 1969 and 2001 (Table 3-4), regardless whether personal travel is measured by person trips, person miles, vehicle trips, or vehicle miles traveled (VMT). Figure 3-4 presents this data graphically. The evidence of a dampening of trip rate growth from 1995 to 2001 is encouraging as trip rate growth has been responsible for much of the increases in travel demand over the past few decades. The overall trends in travel are attributable to a variety of factors including some survey effects and significant changes in socio-economic and demographic conditions. Real income growth, vehicle availability increases, labor force participation increases, declines in household size, the growth in the age cohorts that are in peak travel ages, shifts from bike, walk, shared ride and transit to single occupant vehicle travel, continued suburbanization, and changes in cultural conditions that influence trip making are among the factors. For a more comprehensive discussion of overall trends in travel growth see, “The Case for Moderate Growth In Vehicle Miles of Travel: A Critical Juncture In U.S. Travel Behavior Trends,” http://nhts.ornl.gov/2001/articles/index.shtml.

Figure 3-4 Index of Changes in Overall Travel



Source: Table 3-4.

Change in Transit Market Share

In contrast to this increase in overall personal travel, the proportion of person trips made on public transit has declined by half during the same period (Table 3-5 and Figure 3-5). It is interesting to note that this decline in the market share of public transit is highly correlated with the decline in both the share of non-licensed drivers in the population and the share of zero-vehicle households among all households until 1995. In 2001 there was a slight increase in non-drivers and in zero-vehicle households compared to 1995. The total number of non drivers increased; however, the number of non-drivers over age 16 decreased. The overall growth in the population was such that the shares of non-drivers declined, though very modestly. High Immigration levels, growth in the young population, the impact of some states' program to delay licensure age, and cessation of driving by elderly are factors that contribute to sustaining the non-driver pool. The historic decline of non-licensed individuals has been driven by greater licensure rates among adults, particularly women. However, this trend has nearly run its course. Gender licensure rate differences are only meaningful in the over 50 age groups and the licensure levels of younger adults are more stable. Looking ahead one would expect more stable shares of non-licensed individuals.

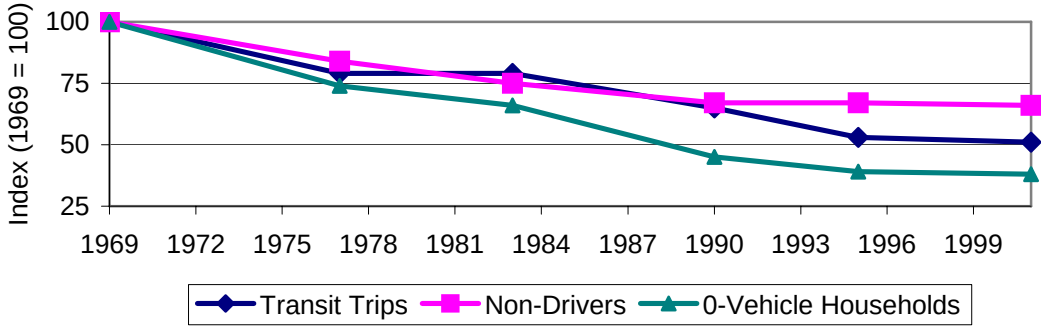
Table 3-5 Index of Changes in Shares of Transit Trips, Non-drivers, and 0-vehicle Households (1969=100)

Year	Transit Trip Share	Non-Drivers	0-Vehicle Households
1969	100	100	100
1977	79	84	74
1983	79	75	66
1990	65	67	45
1995	53	67	39
2001	51	66	38

Source: 2001 NHTS. With adjustments to mode share to increase comparability with 1995 data.

The actual number of zero vehicle households actually increased for the first time between 1995 and 2001; however, their share of households continued its decline but far more slowly than in the past. Immigration is one of the factors that are known to

Figure 3-5 Index of Changes in Shares of Transit Trips, Non-Drivers, and Zero-Vehicle Households



Source: Table 3-5.

produce zero-vehicle households as often immigrants are zero-vehicle households initially but gradually shift toward vehicle ownership and travel behavior traits more similar to the overall population.

Two characteristics of the decline in transit share are worth noting (Pisarski, 1992). First, in the general context of the decline of all alternatives to driving alone, transit has fared better than other alternatives, including carpooling and walking. This is true at least in the case for the journey to work. Second, this decline in public transit's market share has been uniform across all the traditional users of public transit: women; all age groups, especially younger and older travelers; geographic area types; and demographic groups.

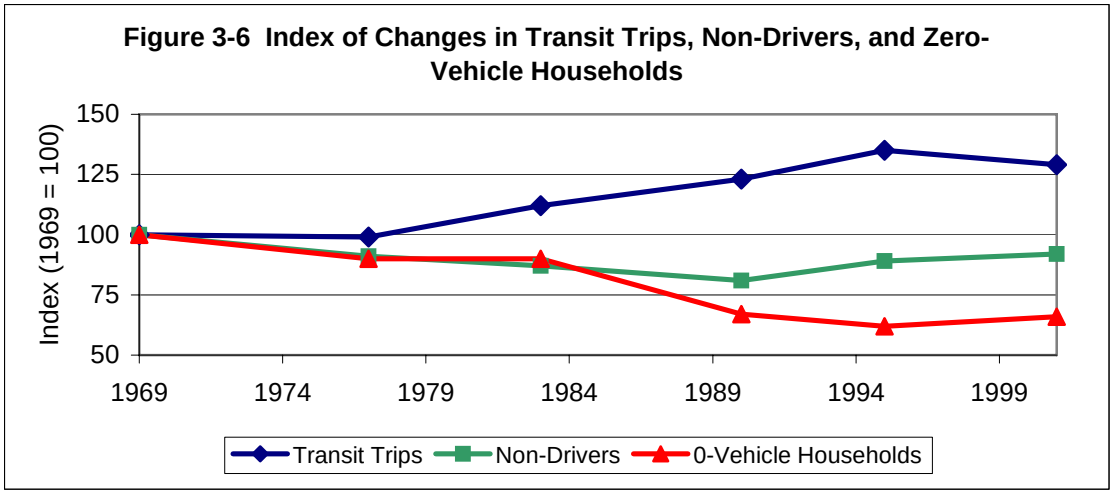
The trend tells a positive story if one looks at the numbers of public transit trips, non-licensed drivers, and zero-vehicle households (Table 3-6 and Figure 3-6). Non-licensed drivers and zero-vehicle households declined over time not only in shares but also in absolute numbers. Despite this decline in the number of potential captive riders of public transit, the number of linked transit trips has grown. This would suggest that drivers and individuals in households with vehicles are making more transit trips. The most recent period shows a modest increase in non-drivers and zero-vehicle households. Factors include the increase in youth noted above, the increase in overall households and the strong immigration trends in the 1990's. The transit trip trends shown in the NHTS database during this time period is generally consistent with the FTA and APTA numbers but deviates some in more recent years.

Table 3-6 Index of Changes in Numbers of Transit Trips, Non-Drivers, and Zero-Vehicle Households (1969=100)

Year	Transit Trips	Non-Drivers	Zero-Vehicle Households
1969	100	100	100
1977	99	91	90
1983	112	87	90
1990	123	81	67
1995	135	89	62
2001	129	92	66

Source: 2001 NHTS

Figure 3-6 Index of Changes in Transit Trips, Non-Drivers, and Zero-Vehicle Households



Source: Table 3-6.

This is discussed in greater detail in Chapter 5. Commentary on the key trends of transit dependency is also provided in Chapter 6.

Changes in Trip Characteristics

While the average commute has increased in distance, the travel time to work has not shown proportionally corresponding increases (Table 3-7). Between 1983 and 2001, commuting trips grew 43 percent longer in miles, while the travel time increased by only 29 percent. This comparison is meaningful because analysts believe that work trip characteristics measured in the NHTS and NPTS surveys have not been significantly impacted by the survey changes.

This trend appears counterintuitive to the reality of greater congestion on urban roads. There are three reasons most often cited for the increase in speed of travel for work:

- the continued decentralization of metropolitan areas with more work trips on generally less congested suburban roads and more longer trips on higher speed facilities;
- the expansion of the peak period, because of greater flexibility in hours of work; and
- the switch from carpool, transit, walk, and bike to single occupant vehicle trips, which are usually more time-efficient for the individual worker, even though they may be less efficient for the overall transportation systems.

Table 3-7 Changes in Commuting Characteristics

Characteristics	1983	1990	1995	2001	2001- 1983 % Change
Average Distance in Miles	8.5	10.6	11.6	12.2	43.5
Average Time in Minutes	18.2	19.7	20.7	23.5	29.1
Average Speed in MPH	28.0	32.3	33.6	31.2	11.4

Source: 2001 NHTS daytrip file, variables: whytrp 90 (tofrmwrk), trvl_min, trpmiles

Table 3-7 hints at several trends that may be significant if born out by additional analysis and future surveys.

- Trip length growth appears to be slowing which may indicate some dampening of longer trips in light of both dispersed employment trends and perhaps some frustration with longer travel distances. Employment has traditionally followed residences to outlying areas. Typically education, retail and service follow population development and a significant share of employment can be provided by these activities. Suburban office, light manufacturing and a host of other employment types in suburban areas are resulting in more employment closer to residential population. This trend will be partially jeopardized if housing

affordability concerns result in continued exurban residential development pressures to enable housing affordability.

- Second, the increase in travel time for commuting has significantly outpaced earlier inter-survey period increases. The increase in work trip commute time as reported by the census journey to work statistics has shown a 2+ minute increase in the average commute time (the increase is 3 minutes but an estimated one minute of that increase is attributed to the fact that trip length was truncated to 99 minutes in 1990 but not in 2000.) This pace of increase suggests a combination of increasing trip length and slower travel speeds.
- Finally, for the first time, average travel speed has begun to slow. This may suggest the end of the opportunities to continue to increase travel speeds via shifts in travel time, mode, and route. The multi decade period of travel demand outpacing capacity expansion may have created sufficient congestion on the roadway network that adaptations that previously enabled travelers to increase travel speeds may no longer be available. Alternative travel paths, times and modes may no longer be available to enable travelers to avoid congestion.

Another important consideration is trip chaining behavior that can mask or minimize the impact of longer work trips by interspersing other trips on the trip to and from work. FHWA staff is exploring this phenomenon with the NHTS data base by developing a data series that establishes chains of trips for analysis. A final important consideration is the reliability of travel time. As roadways have become more congested the travel time reliability has deteriorated and created a longer perceived travel time (as travelers need to plan more time for time sensitive travel such as work in order to ensure on-time arrivals given the probability of incidents resulting in delays on a regular basis). Thus, part of the reported travel time may reflect planned or average time and the onerousness of the travel time may be increasing due to the prospect of delays. This becomes relevant to travelers where exclusive guideway facilities enable transit travel to offer more reliable travel times.

CHAPTER 4
THE NATURE OF PUBLIC TRANSIT USE

This chapter presents findings from the research organized around five subject areas relating to public transit in America:

- characteristics of public transit trips (distance, travel time, speed, and waiting time);
- extent of transferring;
- public transit's share of the travel market;
- public transit's market penetration; and
- public transit's sub-markets.

The focus is on public transit's market share, market penetration, and sub-markets. The findings on transferring and trip characteristics help our understanding of these three issues. The rest of this chapter is divided into five sections, one for each of the perspectives.

Characteristics of Public Transit Trips

Understanding the characteristics of public transit trips is helpful in gaining a richer understanding of public transit markets. This report examines five characteristics of public transit trips including trip distance, travel time (excluding waiting time), waiting time, travel speed (excluding waiting time), and overall speed (including waiting time).

It is important to point out that statistics on these characteristics are based on respondent reported data and not field measurement; hence, the data reflect perceived values. Evidence has shown that travelers are not particularly adept at accurately self-determining trip characteristics such as time and length and tend to round time and distance measures to recognizable increments. This is more frequently the case for infrequent trips or unique situations. This possibility is likely to be more valid for those who use public transit infrequently. However, over 87 percent of public transit trips are taken by people who use public transit two or more times a week.

It is also important to note that characteristics of service supply are not available for the respondents or trips. Thus, the frequency, span, connectivity, reliability, cost and other characteristics of the supply of service are unknown and hence the relative changes in these factors over time cannot be used to help explain the changes in transit use over time.

Results are shown at the national level first, followed by the variation of trip characteristics with MSA scale, and personal, and household characteristics.

National Distributions

Table 4-1 shows national averages of selected trip characteristics by transit modes as derived from the NHTS. Compared with national averages of unlinked transit trips from other sources (NTD and on-board surveys), the national average length of linked trips for transit modes is longer for NHTS data. NTD (2001) shows a national average of 5.17 miles for unlinked transit trips (in transit vehicle distance), which is considerably less than 8.78, the national average of linked trips computed from the 2001 NHTS (door-to-door distance supplied by NHTS respondents). Differences between linked versus unlinked trips explain at least the majority of this difference.

Table 4-1. Average Public Transit Trip Characteristics Nationwide by Transit Mode

Characteristics		Bus	Commuter Train	Streetcar/ Trolley	Subway/ Elevated Rail	All Transit
Trip Distance in Miles	2001	7.01	28.8	7.3	8.5	8.8
	1995	11.7	24.3	3.6	10.0	12.4
Travel Time in Minutes	2001	35.3	69.7	51.2	43.0	39.7
	1995	37.5	50.0	26.2	38.6	38.8
In-Vehicle Travel Speed, Miles per Hour	2001	11.9	24.8	8.6	11.9	13.3
	1995	18.7	29.2	8.3	15.5	19.2
Waiting Time in Minutes	2001	12.1	6.3	9.8	5.9	10.1
	1995	10.8	9.1	6.3	7.4	9.8
Overall Time in Minutes	2001	47.4	76.0	61.0	48.8	49.8
	1995	49.3	59.1	32.4	46.0	48.7
Overall (door-to-door) Speed, Miles per Hour	2001	8.9	22.8	7.2	10.5	10.6
	1995	14.6	24.7	6.7	13.0	15.3

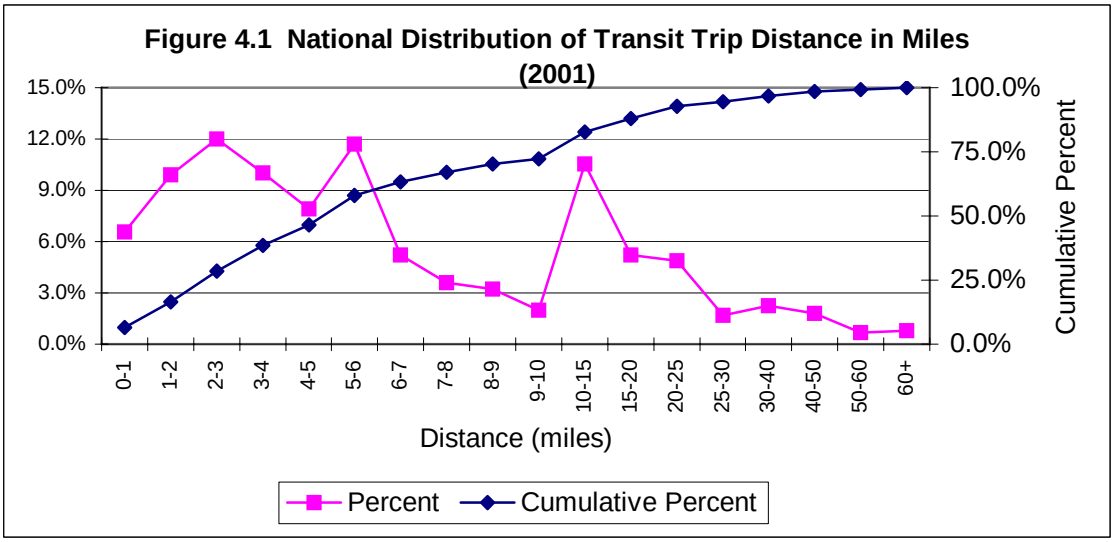
Source: Analysis of 1995 and 2001 travel day file (includes city to city bus).

Table 4.1 also contains the same analysis of the 1995 NPTS data. It is important to note that there is one large change in the table, the average bus trip length. The 2001 trip length appears far more reasonable than the number developed from the 1995 data and produces an in-vehicle travel speed that is consistent with other source data (NTD) on route speeds for urban transit services. The longer streetcar/trolley and commuter train trips in 2001 seem plausible given the expansion of rail systems in the past several years. The shorter bus trip in 2001 appears to be at least partially attributable to the fact that the 1995 data included more longer trips as the bus mode was not disaggregated sufficiently to delineate intercity and charter trips in the 1995 database. Other changes between 1995 and 2001 appear to be consistent with industry trends.

The average waiting time for all transit modes, 10.09 minutes, is about one quarter of the average travel time, 39.72 minutes. Accounting for waiting time increases total travel time and lessens the overall speed of linked transit trips. In fact, accounting for waiting time increases average travel time to 49.8 minutes, while average speed falls from 13.26 miles per hour without accounting for waiting time to 10.58 miles per hour when accounting for waiting time. These national average trip characteristics, as expected, vary significantly among the transit modes. Again, the 2001 numbers appear to be consistent with those observed in other data sources such as NTD data and local travel survey data numbers.

Knowing the mean of a distribution alone is not very meaningful when the distribution is unusual (asymmetric, for example). To complement the average values presented in Table 4-1, Figures 4-1 through 4-4 show the distributions of trip distance in miles, travel time in minutes (excluding waiting time), waiting time in minutes, and travel speed in miles per hour (excluding waiting time) by transit mode. Figure 4.1 indicates that a large proportion of transit trips are short in distance. In fact, about 40 percent of linked transit trips are less than three miles. About 60 percent are less than six miles. Overall, about 75 percent of linked trips are shorter than the national average of 8.78 miles. About 6 percent of the trips are more than 30 miles long. The peaking of trips at the 5 and 10 mile lengths is typical of the natural rounding that respondents apply when completing this type of survey.

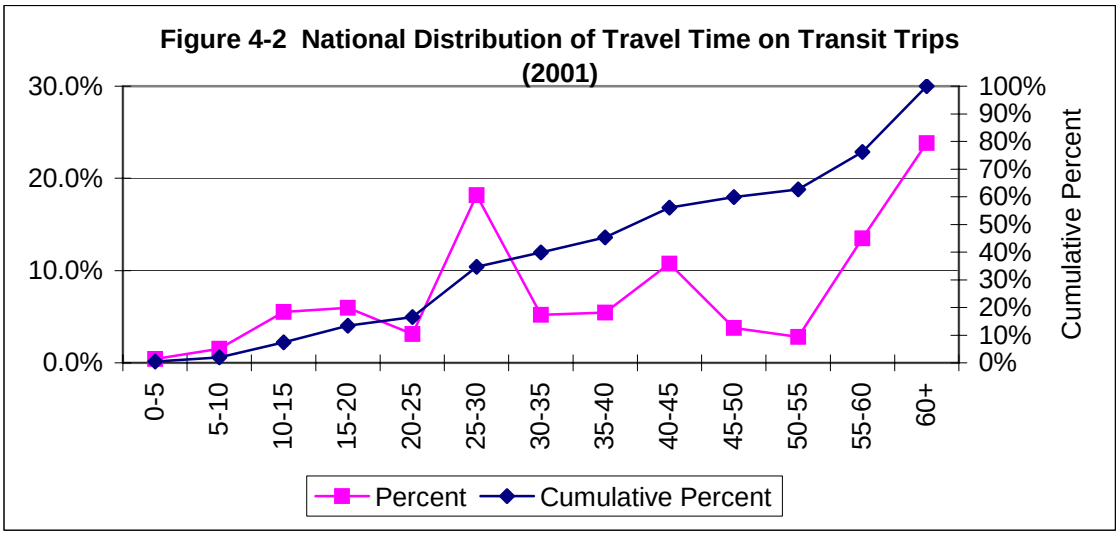
Figure 4.1 National Distribution of Transit Trip Distance in Miles (2001)



Source: CUTR analysis of 2001 NHTS.

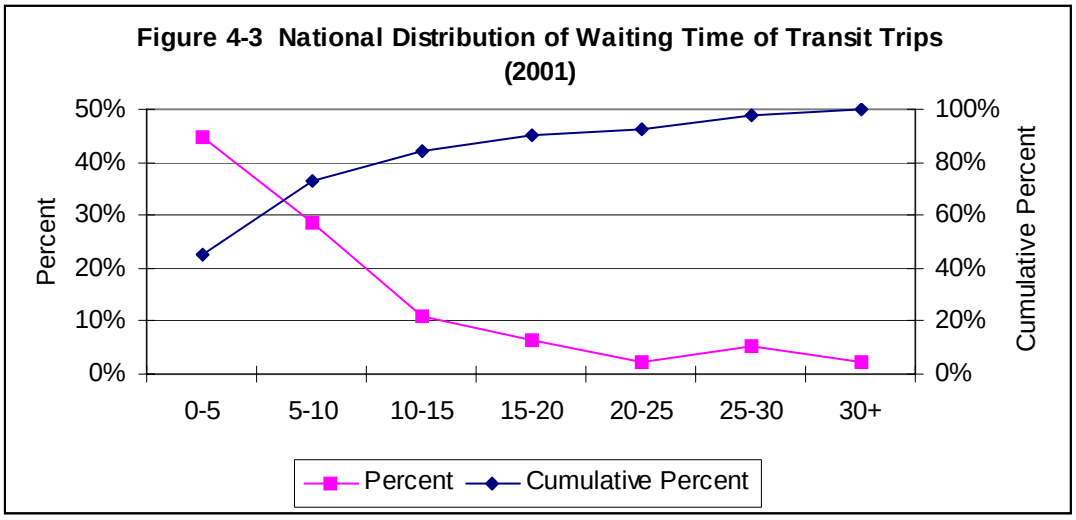
Figure 4-2 indicates that travel time has a slightly different distribution than trip distance. Less than four percent of linked trips take less than five minutes. One quarter of linked trips take less than 15 minutes. Over half take less than 30 minutes. About three quarters take no more than 45 minutes. About 14 percent of linked trips take over an

hour to complete. Overall, about two thirds of linked trips take no more time than the national average transit trip duration (39.72 minutes).



Source: CUTR analysis of 2001 NHTS.

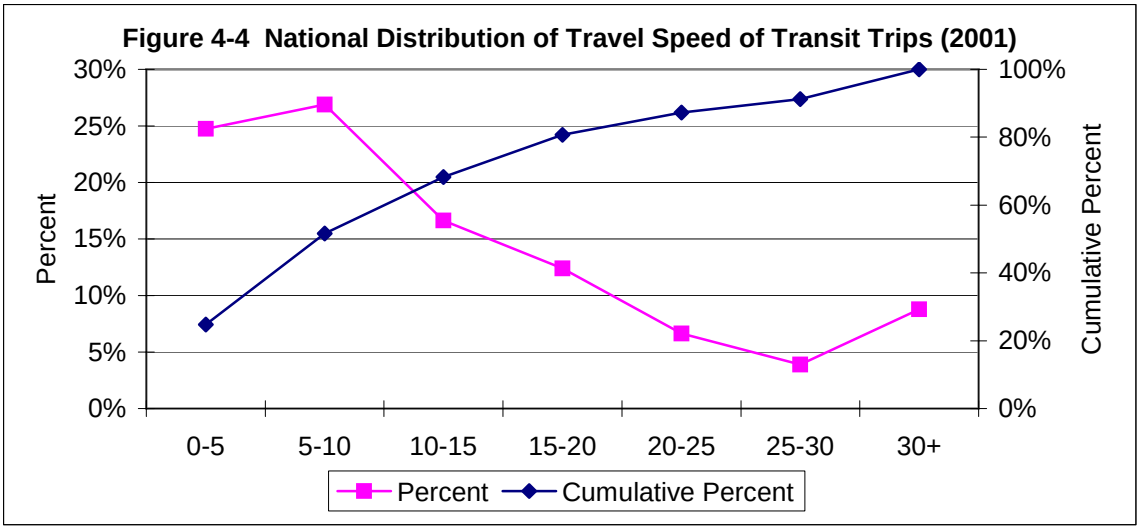
Figure 4-2 shows the strong tendency for respondents to round travel time to 30 or 15 minute increments when estimating in-vehicle time. Long trip times were aggregated to 60 + minutes in-vehicle transit travel time. Figure 4-3 shows the reported wait time. Approximately 75 percent of transit trips have a wait time of ten minutes or less. Over half of all linked transit trips involve less than five minutes of waiting. About 13 percent of trips involve more than 15 minutes of waiting. Overall, about three quarters of linked trips involve no more than the national average amount of waiting time according to NHTS. This is important as it provides a perspective on the tolerance for waiting for transit.



Source: CUTR analysis of 2001 NHTS.

Fig. 4-4 shows the distribution of travel speed of transit trips in miles per hour. Approximately 75 percent of trips involve speeds of 15 miles per hour or less. Over 50 percent occur at speeds of less than 10 miles per hour. This is reflective of the large share of transit trips on buses in urban areas where bus schedule speeds can average approximately 10-12 miles per hour.

Figure 4-4 National Distribution of Travel Speed of Transit Trips (2001)



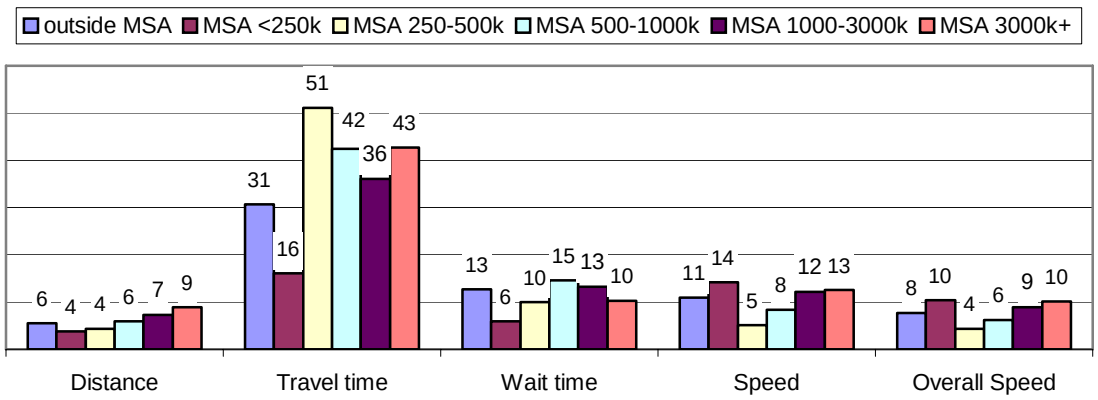
Source: CUTR analysis of 2001 NHTS.

Effects of MSA Scale

Figure 4-5 shows public transit time, speed and distance trip characteristics for selected MSA sizes: outside MSA, MSAs with a population under 250,000; 250,000 – 500,000; 500,000 - 1 million; 1 million to 3 million; and MSAs with at least 3 million people. Public transit trips outside MSAs are long in both distance and travel time. The average distance for trips outside MSAs reflects some commutes to urban areas as well as short local trips. As the urban area is larger the trip length increases as would be expected as the physical size of the area generally increases with population size. Travel time variations are large and vary. They generally follow the pattern of trip length with the exception of very much longer trips for mid-sized urban areas. This may be attributable to a higher probability of needing to transfer and incur a relative long transfer wait as a result of relatively infrequent service. Waiting time is influenced by both the frequency of service and the ability of the persons being able to time their arrival at stops. Persons knowledgeable of the schedule can plan their departures in order to influence the initial vehicle wait time (assuming on-time performance of the transit); however, at a transfer point the traveler is captive to the scheduled time between vehicles. The fact that wait times do not increase significantly in the smallest urban areas with the poorest transit frequency is evidence that travelers use the schedules aggressively and time their trip departures to match the schedule, thus minimizing wait time. As the urban areas become larger, a larger share of the trips may be random stop arrivals (the traveler does not worry about the actual schedule but when they want to travel they go to a transit stop

and are willing to wait for the next bus) with relatively infrequent service; the average wait time is quite large. For the larger urban areas the frequency of service begins to produce lower average wait times. The resultant speeds reflect the combination of in-vehicle speed and wait times. Linked transit trips vary modestly between the medium-sized and the largest MSAs in terms of distance, travel time, waiting time, and average speed with speeds increasing in larger areas as a result of both lower wait times and a higher probability of exclusive right-of-way facilities and use of higher speed roads.

Figure 4.5 Travel Time, Speed and Distance by MSA Size



Source: CUTR analysis of 2001 NHTS.

Effects of Personal and Household Characteristics

Transit trip characteristics vary systematically across modes and population groups with various personal and household characteristics. Table 4-2.a shows this variation. Table 4-2.b provides the cell sizes of the NHTS sample used to calculate the shares. Cell sizes are provided for trip distance and are virtually identical for trip time and speed. Specifically, the first column of the table shows the different types of traits. The second column lists the population groups for each given characteristic. The final five blocks of columns show average trip distances, average travel time, average waiting time, average speed (excluding waiting), and average overall speed (including waiting). For each type of trip characteristic, averages are shown for bus, rail, and bus and rail combined. It is important to remember for some cross-classifications the sample sizes are smaller and that these are perceived travel times reported by travelers and they tend to be rounded off in reporting to 5 or 15 minute increments. The differences across groups are a function of service supply characteristics as well as behavior and demographic traits of the different groups.

Population groups considered as having high concentrations of persons captive to transit make transit trips that are shorter in distance, shorter in travel time, longer in waiting time, and at slower speeds. These include non-drivers, females, not working, non-

Whites, Hispanics, people living in households with low income, people living in households with low vehicle ownership, renters, and single-adult households. Many of these conditions are highly correlated with residence in larger urban core cities where the supply levels and characteristics of transit are noticeably different. However, these areas also offer the quality of services that can be attractive to choice travelers, thus offsetting the correlation between group traits and urban size.

Table 4-2.a Characteristics of Linked Transit Trips by Personal and Household Traits

Trait	Sub-groups	Distance (Miles)			Time (Minutes, Excluding Waiting)			Waiting (Minutes)			Speed (MPH, Excluding Waiting)			Overall Speed (MPH)		
		Bus	Rail	Total	Bus	Rail	Total	Bus	Rail	Total	Bus	Rail	Total	Bus	Rail	Total
Person Age	Under 18	5	5	5	33	63	39	10	6	9	9	5	7	7	5	6
	18-64	7	13	9	38	50	43	13	6	10	11	15	13	8	14	10
	65+	6	5	6	35	36	35	10	5	10	11	9	10	8	8	8
License Status	Driver	8	13	11	37	50	43	12	6	9	14	16	15	10	14	12
	Non-Driver	6	9	6	39	54	42	13	8	12	9	10	9	7	9	7
Gender	Male	6	13	9	35	50	41	12	6	10	11	15	13	8	14	10
	Female	7	11	8	39	52	43	12	6	10	11	12	11	8	11	9
Working Status	Full Time	8	15	11	36	52	44	12	6	9	14	17	15	10	15	13
	Part Time	6	9	7	39	44	41	12	6	10	10	12	10	7	11	8
Race	White	7	12	9	31	47	39	10	5	8	13	15	14	10	14	12
	Black	7	13	8	41	59	46	13	6	11	9	13	10	7	11	8
	Others	7	11	8	37	50	41	13	8	11	11	13	11	8	11	9
Ethnicity	Hispanic	7	9	7	37	52	40	13	8	12	11	11	11	8	9	8
	Non-Hispanic	7	12	9	37	51	43	12	6	9	11	14	12	8	13	10
Household Income	Under $15,000	5	7	6	38	50	41	13	9	12	8	8	8	6	7	6
	$15k-$49,999	7	10	8	39	53	43	12	6	10	11	11	11	9	10	9
	$50,000+	8	14	12	32	51	43	11	5	7	15	17	16	12	15	14
Vehicle Ownership	None	6	7	6	38	49	41	13	7	11	9	8	9	7	7	7
	One	6	10	7	36	47	39	11	6	10	10	13	11	8	12	9
	Two+	10	19	13	39	60	48	12	6	9	15	19	17	12	17	14
Home Ownership	Renter	6	7	6	37	47	40	12	6	10	9	10	9	7	8	8
	Owner	8	17	12	38	58	46	12	6	10	13	18	15	10	16	13
Life Cycle	Single-Adult	6	9	7	36	47	39	15	6	12	10	11	10	7	10	8
	Multi-Adult	7	13	9	37	53	43	11	6	9	11	14	13	9	13	10
Medical Condition	Night Driving	5	4	5	43	30	41	9	5	8	7	8	7	6	7	6
	Cease Driving	6	3	5	40	57	43	10	9	10	8	3	7	7	3	6
	Less Travel	6	5	5	46	41	45	12	7	12	8	7	7	6	6	6
Emigration	Not an Emigrant	6	11	8	42	38	40	12	6	10	9	17	12	7	15	9
	One Year	7	9	8	33	49	38	12	10	11	12	11	12	9	9	9
	Two+ Years	7	9	8	42	53	45	14	6	12	10	10	10	8	9	8
All		7	12	8	37	51	42	12	6	10	11	14	12	8	12	10

Source: Travel Day File, Person File, and Household File.

Table 4-2.b Sample Sizes for Characteristics of Linked Transit Trips by Personal and Household Traits

Trait	Sub-groups	Distance (Miles)		
		Bus	Rail	Total
Person Age	Under 18	235	55	290
	18-64	987	632	1,619
	65+	199	28	227
License Status	Driver	636	568	1,204
	Non-Driver	625	636	739
Gender	Male	579	394	973
	Female	842	321	1,163
Working Status	Full Time	462	473	935
	Part Time	217	88	305
Race	White	608	458	1,066
	Black	402	112	514
	Others	411	145	556
Ethnicity	Hispanic	243	57	300
	Non-Hispanic	1,178	658	1,836
Household Income	Under $15,000	452	62	514
	$15k-$49,999	537	177	714
	$50,000+	317	420	737
Vehicle Ownership	None	628	192	820
	One	454	229	683
	Two+	339	294	633
Home Ownership	Renter	578	395	973
	Owner	832	320	1,152
Life Cycle	Single-Adult	339	130	469
	Multi-Adult	842	542	1,384
Medical Condition	Night Driving	56	3	59
	Cease Driving	58	6	64
	Less Travel	159	7	166
Emigration	Not an Emigrant	1133	606	1739
	One Year	31	7	38
	Two+ Years	237	100	337
All		1,421	715	2,136

Source: Travel Day File, Person File, and Household File.

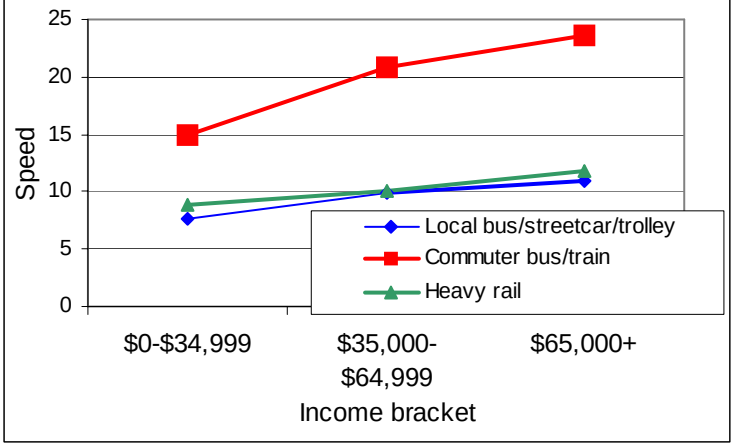
Before interpreting Table 4-2.a it is useful to review Table 4-2.b to observe the sample sizes. As one might expect given the number of classifications involved and the relatively infrequent occurrence of options such as rail travel, some of the sample sizes are very modest. This is particularly true for the respondents indicating a medical condition. Other small samples include persons over 65 and under 18 using rail, one year emigrants, and low income and Hispanic rail users.

Observations from Table 4-2.a include the following:

- Working age travelers tend to make the longest trips in distance and time, particularly for the rail mode. This carries over into higher speed trips for the working age population.
- Non-drivers tend to have shorter trips in distance but not necessarily in time. This reflects the fact that non-drivers are more likely to have to use transit for more of their trips including local shorter length trips but are also more likely to use bus and core urban area transit that tends to operate at slower speeds. Non-drivers wait longer for transit and have noticeable slower transit speeds as might be expected by persons who have less of a choice in their travel mode.

- Gender differences are modest with males more likely to have longer rail trips, which result in a faster travel speed.
- Workers similarly have longer and faster trips reflecting the fact that they are more likely to choose transit in cases where it offers attractive options.
- Race differences (Black versus White) are apparent but modest with Whites having somewhat longer trips and faster trips as might be explained by the more dominant suburban presence of the White population, particularly in the largest transit intensive urban areas.
- Ethnic differences (Hispanic and non-Hispanic) are similarly modest with non-Hispanics having somewhat longer and faster trips.
- Household income has an expected relationship where higher income respondents tend to have longer and faster trips with lower wait times. This reflects the fact that these travelers may only be choosing higher quality services and may more often be located in suburban locations where they take advantage of rail and express services that have high speeds and good frequencies. Figure 4-6 portrays that relationship with three modes and different income brackets.
- Vehicle ownership differences produce a similar predictable result with greater vehicle availability (particularly two car households) having longer and faster transit trips – reflecting the fact that these persons choose higher quality services when they do use transit.

Figure 4-6 Transit Mode Speed by Income Category



Source: CUTR analysis of 2001 NHTS data.

- Home ownership similarly shows strong differences between owner and renter groups. Home owners have longer and substantially faster transit trips reflecting a combination of factors including their willingness to choose to use quality services and the propensity for owners to be more concentrated in suburban locations.
- Multi-adult households similarly had longer and faster transit travel reflecting the fact that these households are more likely to be choice travelers and choose quality transit services and longer trip situations where transit is competitive.
- The questions on medical conditions grouped respondents into categories, three of which are shown in the table: those who ceased driving, those who limited night driving and those who traveled less. There were no large differences in trip length or speed across these groups, however, all these groups had both shorter and far

slower transit trips than the overall population. This may reflect the impact of these respondents using paratransit services and being more dependent on transit for more of their overall travel.

- Non-Immigrants have similar transit use characteristics to immigrants with the exceptions that there is a greater use of long rail trips by non-immigrants with the consequences being faster travel speed for these trips.

Transferring

The time and aggravation involved in transfers are believed to be critical considerations influencing peoples' use of public transit. In mode choice models, the coefficients on transfer waiting time and the number of transfers often are several times greater than for in-vehicle travel time indicating that the time spent transferring is perceived as being far more onerous than time spent in travel. The uncertainty of the arrival of the next vehicle, the environment where the transfer occurs (which may not be as comfortable, weather protected or perceived as safe as being on a vehicle), and the disruption of giving up a seat and the interruption of another activity that one may be pursuing (e.g., reading), are among the factors that may contribute to this reluctance to transfer.

The NHTS is the only nationwide data source that has some information on transferring. Nationwide results are discussed first. Results of the effect of MSA scale on the extent of transferring are presented next. Results of the effect of personal, household, and land use characteristics on transferring are discussed last.

The reader should note that the information about transferring is solicited from the travelers who are asked to detail their travel. There are not specific queries into transferring and, as noted earlier, the definition/perception of a transfer may vary across individuals. Some individuals may not count cross platform or in-station transfers and others may not recall or report other routine or convenient transfers. The rate of transferring observed in NHTS and NPTS data is notably less than that reported by most transit agencies.

Transferring Nationwide

The extent of NHTS reported transferring is limited. At the national level, over 86 percent of linked trips do not have transfers reported; eleven percent involve one transfer; and less than 3 percent involve two or more transfers (Table 4-3). In terms of unlinked trips, about 14 percent of vehicle boardings are transfer boardings.

Table 4-3 Nationwide Distribution of Linked Transit Trips by Transfers

Transfers	Distribution (%)
Zero	86.2
One	11.4
Two or More	2.4
Total	100.0

Source: 2001 NHTS, daytrip file, new created variable "segment" based on variables "tracc1 to 3 and tregr1 t o3".

Effects of MSA Scale

As would be expected, the extent of transferring varies by MSA scale and area density. Tables 4-4 show the distribution of linked transit trips with respect to the number of transfers for MSA scale.

Table 4-4 Distribution of Linked Transit Trips by Number of Transfers and MSA Scale

MSA Scale (000)		Outside MSA	Under 250	250-499	500-999	1,000-2,999	3,000+	Nation
Percent by Number of Transfers	0	73.9	84.7	91.4	84.2	91.2	85.5	86.2
	1	20.6	15.3	8.6	13.7	7.5	11.8	11.4
	2+	5.5	0	0	2.1	1.3	2.7	2.4

Source: 2001 NHTS day trip file, variables "segment" and "msascale".

For areas outside MSA about 74 percent of linked trips do not involve transferring. For MSAs with a population under 250,000, between 500,000 and 1 million, and over 3 million about 85 percent of linked trips do not involve transferring. There seems to be little difference in the distribution among the size categories of MSAs (except 2+ transfers, where under 500,000 is really below average). Table 4-4 indicated that transferring is most common outside MSA's and in smaller urban areas and least common in the larger areas from one to three million persons. This suggests that transferring is required in the smaller areas as a necessary step in completing a trip. It appears that more trips can be accomplished with a single transit segment in large urban areas but for the largest urban areas the density and frequencies of service may minimize the impedance of transferring and the number of transfers increases again. The largest urban areas are also likely to have rail networks where transferring between trains may occur within stations in a controlled environment. Without more information of service supply some of the explanations are hypotheses as there is not adequate data to fully diagnose the situation.

Effects of Personal and Household Characteristics

The extent of transferring varies systematically across population groups within various personal, household, and land use characteristics. Table 4-5 shows this variation. Specifically, the first column of the table shows the different types of traits. The second column lists the population groups for the given triatss. The next three columns show the distribution of linked transit trips by the number of transfers. The last column shows the percent of unlinked trips that are transfer trips.

Most population groups that are considered to have high concentrations of public transit users show a high proportion of their linked trips involving transfers. This is true for non-drivers, non-Whites, Hispanics, people living in low-income households, people living in households with low vehicle ownership, and renters.

Both the young and old have smaller proportions of their linked trips involving transfers than does the rest of the population. Full-time workers and people who are not working have higher

Table 4-5 Extent of Transferring by Personal and Household Traits

Traits	Population Groups	Percent by Number of Transfers			Transfer Trips (%)
		0	1	2+	
Person Age	Under 18	91.5	7.9	0.7	8.5
	18-64	84.8	12.4	2.8	15.2
	65+	90.0	7.9	2.1	10.0
License Status	Driver	84.0	12.8	3.2	16.0
	Non-Driver	86.7	11.4	1.9	13.3
Gender	Male	86.6	11.3	2.1	13.4
	Female	85.9	11.4	2.7	14.1
Working Status	Full Time	83.9	13.4	2.7	16.1
	Part Time	82.4	12.5	5.2	17.6
Race	White	84.5	14.0	1.4	15.5
	Black	85.2	11.5	3.3	14.8
	Others	89.2	8.4	2.4	10.8
Ethnicity	Hispanic	88.2	9.4	2.4	11.8
	Non-Hispanic	85.6	12.0	2.4	14.4
Household Income	Under $15,000	89.0	9.2	1.8	11.0
	$15,000-$49,999	84.7	11.7	3.6	15.3
	$50,000+	84.3	13.6	2.0	15.7
Vehicle Ownership	Zero	86.0	11.6	2.3	14.0
	One	87.8	9.9	2.3	12.2
	Two+	84.3	13.0	2.7	15.7
Home Ownership	Owner	82.2	15.3	2.6	17.8
	Renter	88.7	9.1	2.2	11.3
Life Cycle	Single Adult	87.9	10.6	1.4	12.1
	Multi-Adult	85.2	12.1	2.8	14.8
Med Condition	Day Travel	82.2	13.4	4.4	17.8
	No Driving	89.2	5.5	5.3	10.8
	Limit Travel	82.8	13.1	4.2	17.2
Emigration	< 5 Years	88.8	8.4	2.8	11.2
	5 to 10 Years	90.7	5.6	3.8	9.3
	> 10 Years	85.9	10.7	3.4	14.1
Life Cycle	Single Adult	87.9	10.6	1.4	12.1
	Multi-Adult	85.2	12.1	2.8	14.8
All		86.2	11.4	2.4	13.8

Source: Travel Day File, Segmented File, Person File, and Household File.

proportions of their linked trips involving transfers than do part-time workers. People living in single-adult households have a slightly lower proportion of their linked trips involving transfers than do people living in multi-adult households.

Mode Share

One important aspect of understanding transit markets is public transit's share of the overall travel market. This section presents selected statistics to show the influence of urban area scale and transit dependency on transit's mode share. It is important to point out that modal shares here are defined by the actual mode used for individual trips rather than the usual mode used by a given person. The concept of the usual mode is used in the Census Journey-to-Work data to derive modal splits for commuting (see chapter 5).

Effects of Dependency

A number of population groups depend heavily on public transit, i.e., a meaningful proportion of their trips are made on public transit (Table 4-6). At the national level, the largest market shares for public transit are found to be people who use public transit two or more times a week and people who live in households without vehicles. People who use public transit two or more times a week make close to a quarter of all their person trips on public transit, while people who live in households without vehicles make one-fifth of all their person trips on public transit. Other population groups that depend highly on public transit include Blacks (5.1 percent mode share), persons with an annual household income below $15,000 (5.3 percent mode share), non-licensed drivers (10.5 percent mode share), and renters (4.2 percent mode share).

Transit dependency, however, is far from uniform across geographical areas. The transit dependency of the six groups mentioned above is much higher in the largest MSAs, but dramatically lower in smaller areas. The most frequent users, persons without household vehicles, Blacks, persons with low income, non-licensed drivers, and renters make 25.7 percent, 27.4 percent, 9.7 percent, 11.6 percent, 16.3 percent, and 7.8 percent of their trips on public transit, respectively, in the largest MSAs. However, Blacks, persons with low income, non-licensed drivers, and renters in areas outside MSAs, and the smallest MSAs make no more than the national average percentage of their trips on public transit.

Effects of MSA Scale

One way to see the effects of area scale is to examine how the degree of transit dependency is influenced by area scale in Table 4-6.a. Transit dependency increases dramatically from MSAs with a population between 500,000 to 1 million to the largest MSAs. To illustrate, consider persons without household vehicles and non-licensed

drivers. For persons without household vehicles, transit's market share jumps from 11.4 percent in MSAs with a population between 500,000 and 1 million to 27.4 percent in the largest MSAs. For non-licensed drivers, transit market share jumps from 4.6 percent to 16.3 percent between MSAs with a population between 500,000 to 1 million and the largest MSAs.

Another way to see the separate effects of area scale is to examine how transit market share changes with different levels of area scale. For example, transit market share increases from 0.1 percent outside MSAs to 0.3 percent in the smallest MSAs, to 0.6 percent in medium-sized MSAs, and to 3.3 percent to the largest MSAs (last row in Table 4-6.a).

Table 4-6.a also shows the data for the 1995 NPTS. Recognizing that the mode share is slightly lower overall in 2001 as a result of several factors including modal definition, the inclusion of children under 5 and the increase in walk trips, the differences between the findings appear to generally be consistent with the overall differences with a few exceptions. The most pronounced difference is the mode share calculations for non-licensed drivers. Here the mode share for transit increased in 2001. This suggests that the dependency of this group on transit has increased. This may be attributable to the growing level of licensure and auto availability for the overall population resulting in the non-licensed population becoming a more distinctly mobility disadvantaged population and hence more dependent on public transit. This tendency for the groups that are highly dependent on transit becoming even more dependent appears to be confirmed when looking at several variables including income and driver licensure status. Phenomenon such as declining household size and lessened dependence on extended families may be creating a greater dependency on public transit for individuals without personal access to a vehicle. Table 4-6.b is a shadow table that shows the cell sizes for each cross classification shown in table 4-6. One quickly realizes that transit data for various subsets of the population becomes relatively sparse even with a national sample the size of NHTS. Thus, one has to exercise extreme caution when interpreting the data based on a single cross tab or data point. The strongest interpretation occurs when logic and theory complement the data and anecdotal or other data sources confirm the phenomenon or observation.

Highlighting the Variation in Mode Share

Figures 4-7 through 4-15 emphasize the variation in transit mode share for groups as defined by some key variables that are critical in defining transit markets. Collectively, these graphics indicate that transit is far more important to segments of society that are less able to have auto travel options for any number of reasons. While transit ridership embraces individuals whose characteristics match those of all groups in society, the national transit market is still strongly representative of persons who use transit because their economic, physical, or other conditions make auto travel less available.

Table 4-6.a Summary of Public Transit Mode Shares (Percent)

Traits		Year	Nation	MSA Scale (1,000s)					
				Outside MSA	Under 250	250-499	500-999	1000-2999	3,000+
Use transit 2 or more times a week in the 2 months before interview		2001	23.4	9.8	12.2	15.9	17.8	19.6	25.7
		1995	24.8	5.5	15.9		19.8		27.5
Living in zero-vehicle households		2001	20.3	1.3	3.3	14.0	11.4	19.2	27.4
		1995	21.0	1.8	9.6		13.0		28.9
Black		2001	5.1	0.3	0.5	1.3	0.4	3.5	9.7
		1995	7.0	0.1	1.8		3.2		11.4
Medical/dental trips		2001	3.6	1.0	1.3	0.0	0.2	1.3	8.3
		1995	5.0	0.7	1.1		1.1		9.0
Household income < $15,000		2001	5.3	0.5	1.7	1.9	1.7	6.3	11.6
		1995	5.0	0.3	1.6		2.2		11.8
Non-licensed driver		2001	10.5	1.7	1.8	4.5	4.6	9.6	16.3
		1995	4.9	0.6	1.4		2.7		9.4
Renter		2001	4.2	0.3	1.0	1.6	1.5	3.0	7.8
		1995	4.6	0.4	1.1		2.0		8.4
Living in single-adult households		2001	3.2	0.3	0.4	0.8	1.1	2.6	6.7
		1995	3.4	0.3	1.4		1.5		6.7
Hispanic		2001	3.1	0.2	0.7	1.8	1.4	2.4	4.5
		1995	3.2	0.4	1.2		0.5		5.4
Not working in the week before Interview		2001	1.9	0.2	0.7	1.0	0.9	1.3	3.8
		1995	3.0	0.3	0.8		1.6		6.0
Female		2001	1.6	0.2	0.4	0.6	0.6	1.2	3.5
		1995	2.0	0.2	0.5		1.1		4.1
Person age 18-64		2001	1.8	0.2	0.5	0.6	0.6	1.0	3.9
		1995	1.9	0.1	0.6		0.9		3.9
Medical Condition	Day travel	2001	2.4	0.4	0.0	0.0	1.4	2.2	5.5
	No driving		8.1	1.4	1.5	1.1	2.1	6.4	16.0
	Limited driving		3.2	0.4	0.6	1.8	2.0	2.2	6.7
Emigrants		2001	6.5	2.0	3.5	4.9	3.7	7.8	7.3
All		2001	1.6	0.1	0.3	0.6	0.6	1.0	3.3
		1995	1.8	0.2	0.6		0.9		3.8

Source: CUTR analysis of 2001 NHTS.

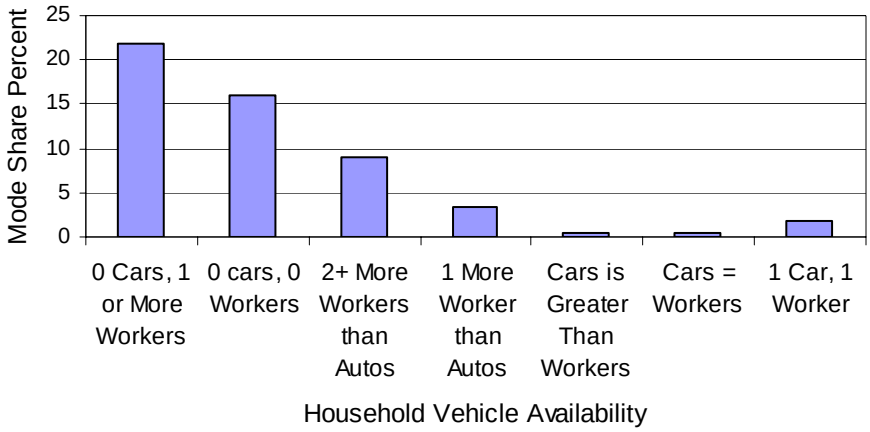
Table 4-6.b Sample Sizes for Summary of Public Transit Mode Shares

Traits		Year	Nation	MSA Scale (1,000s)					
				Outside MSA	Under 250	250-499	500-999	1000-2999	3,000+
Use transit 2 or more times a week in the 2 months before Interview		2001	1,899	29	35	69	55	293	1,418
		1995	5,034	95	154		567		4,218
Living in zero-vehicle households		2001	1,088	17	13	59	52	176	771
		1995	3,569	69	120		451		2,929
Black		2001	630	7	8	17	3	129	466
		1995	2,269	12	50		353		1,855
Medical/dental trips		2001	130	10	5	0	2	18	95
		1995	287	10	3		51		223
Household income < $15,000		2001	672	23	22	38	34	157	398
		1995	1,685	57	93		331		1,204
Non-licensed driver		2001	968	28	20	60	32	170	658
		1995	3,968	107	191		583		3,087
Renter		2001	1,450	21	28	77	52	255	1,017
		1995	4,528	106	138		536		3,748
Living in single-adult households		2001	596	11	7	17	19	128	414
		1995	2,186	59	100		390		1,637
Hispanic		2001	452	3	3	25	15	51	355
		1995	1,044	7	15		41		981
Not working in the week before interview		2001	720	29	22	61	35	137	436
		1995	3,187	144	202		515		2,327
Female		2001	1,418	43	34	63	39	256	983
		1995	4,258	126	195		621		3,316
Person age 18-64		2001	1,909	53	45	78	58	289	1,386
		1995	5,609	128	139		702		4,540
Medical condition	Day travel	2001	64	6	0	0	8	18	32
	No driving	2001	78	4	4	1	2	14	53
	Limited driving	2001	190	8	6	20	10	29	117
Emigrants		2001	534	7	5	9	18	55	440
All		2001	2,534	73	50	117	81	415	1,798
		1995	7,499	239	364		1,013		5,883

Source: CUTR analysis of 2001 NHTS.

Figure 4-7 provides a clear representation of how significant vehicle availability is in the extent to which trips are made on transit. The three bars on the far right hand side of the graphic represent household types where there are adequate cars available (where adequacy is defined as being as many or more cars than workers). For these households transit use is very modest, below national averages. As vehicle availability declines, the share of trips on transit increases significantly. While some share of the lower vehicle availability households may be that way by choice (they have chosen an urban residential location and chosen not to own a car due to the availability of transit and walk access to desired locations), income and other data suggests that this share is modest. It is not possible using NHTS data to fully discern what share of households have chosen to forgo auto ownership when in situations where there is no financial, legal, physical or mental reason for not having a vehicle.

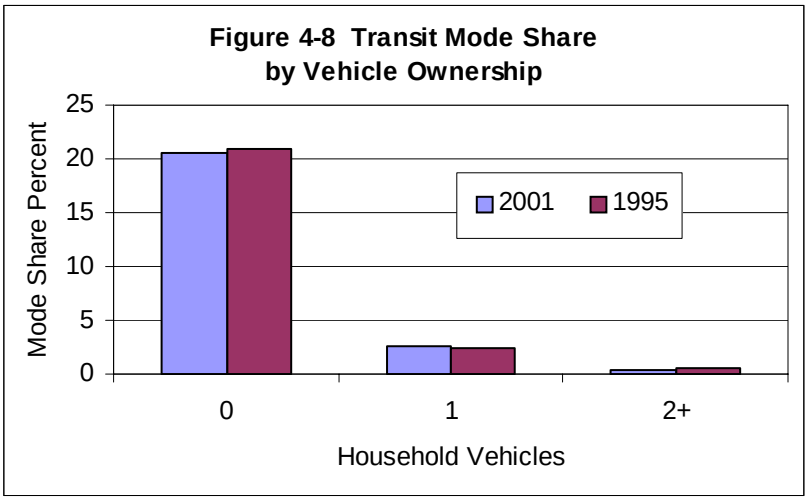
Figure 4-7 Transit Mode Share by Vehicle Availablility



Source: CUTR analysis of 2001 NHTS data.

Figure 4-8 similarly reveals the strong relationship between vehicle ownership at the household level and transit mode share.

Figure 4-8 Transit Mode Share by Vehicle Ownership



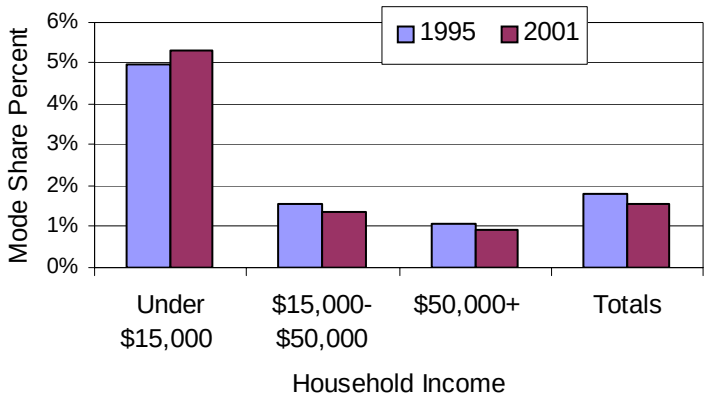
Source: CUTR analysis of 1995 and 2001 NHTS data

Figure 4-9 provides a graphic representation of the significance of household income to mode share. The lowest income households have dramatically higher transit mode shares than middle or upper income households. While other segmenting of the income might provide more insight into the transition point with respect to the mode share and income compendium, the message is very clear from Figure 4-9.

Figure 4-10 portrays the relationship between mode share and home ownership status. The data indicate that renters have about a five times greater use of public transit.

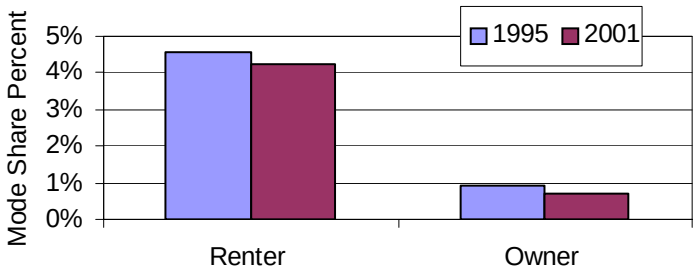
Figure 4-11 shows mode share differences between households with drivers and with no drivers for various sized urban areas. Again the differences are very significant with the mode share levels in no-driver household many times higher.

Figure 4-9 Transit Mode Share by Income



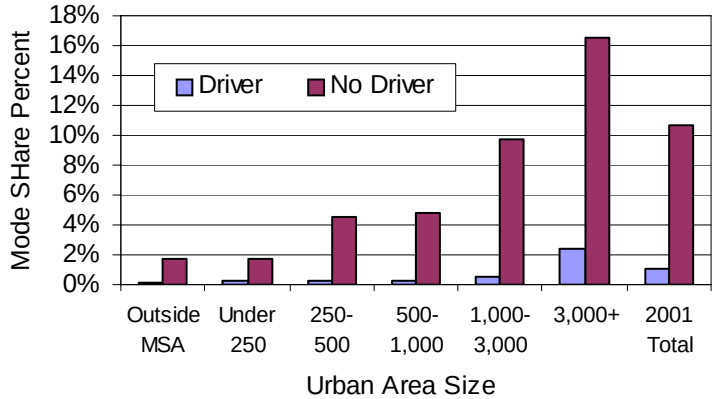
Source: CUTR analysis of 1995 and 2001 NHTS/NPTS data.

Figure 4-10 Transit Mode Share by Home Ownership Status



Source: CUTR analysis of 1995 and 2001 NHTS/NPTS data.

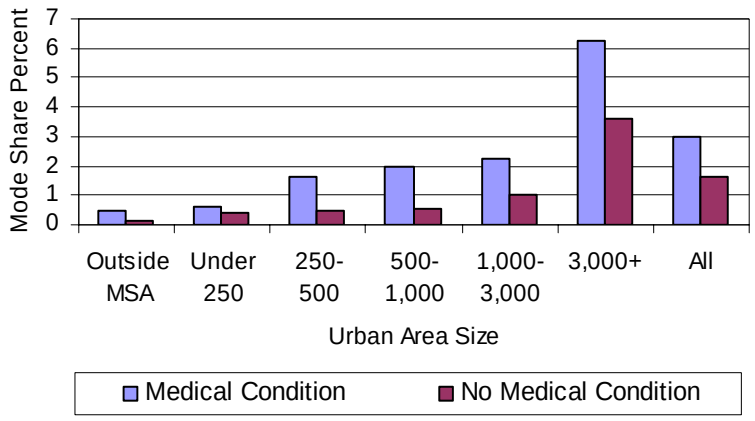
Figure 4-11 Transit Mode Share and Driver Status



Source: CUTR analysis of 1995 and 2001 NHTS/NPTS data.

Figure 4-12 reveals the significance of the presence of medical conditions on transit mode share. Generally the presence of a medical conditions results in the mode share on transit being approximately twice as large.

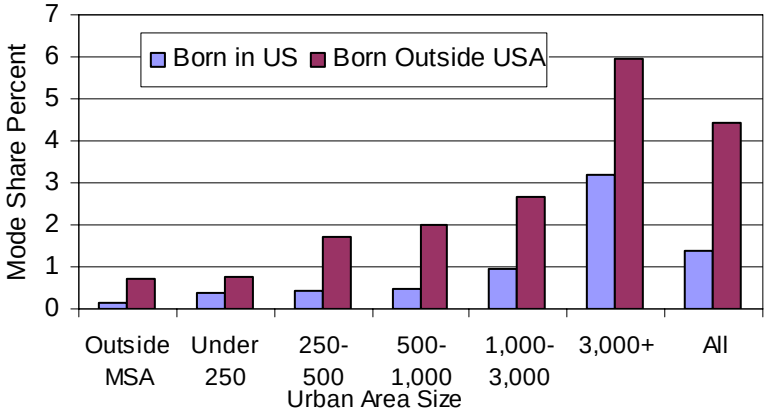
Figure 4-12 Transit Mode Share by Medical Condition



Source: CUTR analysis of 1995 and 2001 NHTS/NPTS data.

Figure 4-13 portrays mode share by immigration status. Immigrants have a significantly higher transit mode share as might be expected given the predominance of urban locations and often modest resources of new immigrants.

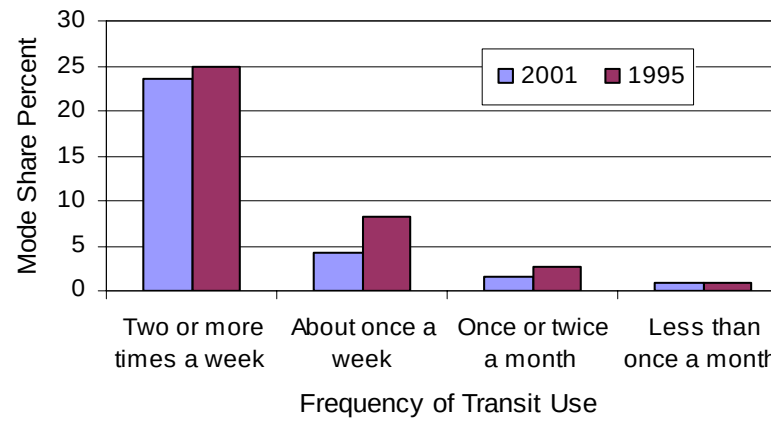
Figure 4-13 Transit Mode Share by Immigration Status



Source: CUTR analysis of 1995 and 2001 NHTS/NPTS data.

Figure 4-14 shows the mode share for persons based on their frequency of transit use. As would be expected, more frequent users have a higher mode share.

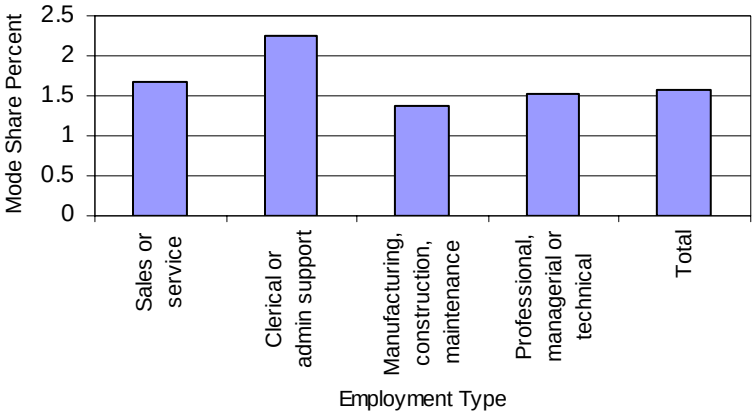
Figure 4-14 Mode Share by Frequency of Use



Source: CUTR analysis of 1995 and 2001 NHTS/NPTS data.

Finally, Figure 4-15 shows the mode share by employment classification. Differences across classes are modest. A more refined classification would be expected to reveal differences across subclasses as subclasses are more highly correlated with income levels and geographic location of activities.

Figure 4-15 Mode Share by Employment Type



Market Shares

Another important aspect of understanding public transit markets is understanding the proportion of public transit trips made by various population groups. A population group that makes a large share of its trips on public transit is particularly significant when it captures a reasonably large proportion of all public transit trips. This section presents selected results on the distribution of public transit trips among various population groups, geographical areas, and between bus and rail modes.

Market Share by Population Groups

Table 4-7 presents the proportion of public transit trips made by each of the population groups listed in the first column for a given level of MSA scale. The second column gives the size of public transit markets represented nationwide by each of the population groups in the first column. The next four columns give the size of public transit markets represented by each population group for a given MSA scale. The last row gives the nationwide markets represented by different levels of MSA scales. For example, persons without household vehicles make 45 percent of all public transit trips in the largest MSAs, with the other 55 percent made by persons with household vehicles in the largest MSAs.

Figure 4-16 portrays the market share by vehicle availability in pie-chart fashion. The importance of vehicle availability is again readily apparent. Forty-five percent of all transit trips are made by persons in zero-car households. An additional 24 percent are made by households with more workers than vehicles. The balance of 33 percent are made by households where cars are as or more numerous than workers (but not necessarily than adults or drivers). While this does not mean that vehicle availability is

the driver of all transit demand as there are certainly situations where vehicle ownership is influenced by the availability of transit services. However, one should not underestimate the significance of vehicle availability and transit use.

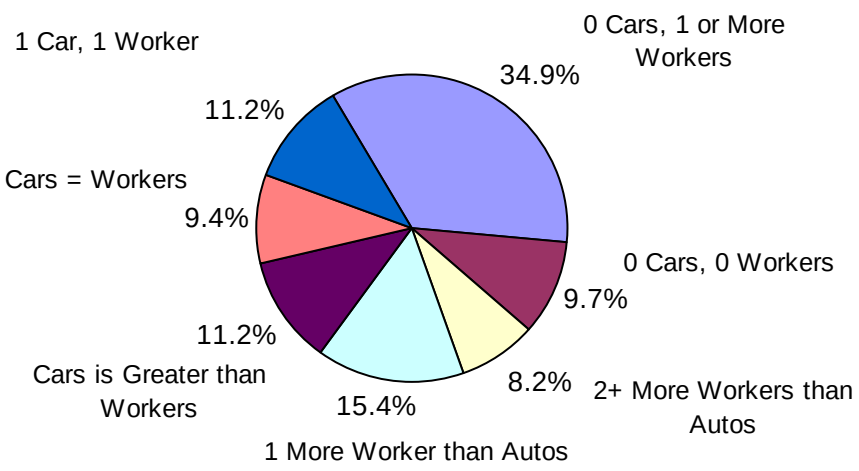
Table 4-7 Summary of Public Transit Market Shares
(percent of transit trips with given traits for each urban area size category)

Trait		Year	Nation	MSA Scale (1,000s)					
				Outside MSA	Under 250	250-499	500-999	1,000-2,999	3,000+
Use Transit 2 or More Times a Week in the 2 Months before Interview		2001	87	57	84	65	80	81	89
		1995	84	63	91		84		85
Person Age 18-64		2001	77	71	94	71	72	70	79
		1995	74	39	74		68		76
Renters		2001	64	34	75	71	57	65	64
		1995	62	32	41		53		66
Females		2001	54	55	66	55	56	59	53
		1995	57	53	39		64		56
Non-licensed drivers		2001	45	52	24	56	51	52	43
		1995	56	51	40		60		56
Living in zero-vehicle Households		2001	45	25	20	51	59	42	45
		1995	47	18	25		35		50
Blacks		2001	35	14	13	22	8	41	37
		1995	44	4	19		37		46
Household income < $15,000		2001	32	40	56	29	34	47	28
		1995	32	21	33		32		30
Living in single-adult Households		2001	25	22	20	18	24	33	24
		1995	31	21	40		26		29
Hispanics		2001	23	7	18	34	32	17	23
		1995	17	10	13		6		19
Emigrants		2001	26	44	81	78	27	53	21
Medical Condition	Day travel	2001	32	38	0	0	39	36	33
	Limit driving		42	45	43	8	31	40	46
	No driving		86	64	88	82	84	78	89
All		2001	100	2	1	3	3	14	77
		1995	100	3	3		4		79

Source: CUTR analysis of 1995 and 2001 NHTS.

The ranking of the population groups considered differs significantly between public transit's share of the overall travel market and the proportion of transit trips captured by each population group. At the national level, the most frequent users represent the largest market, capturing 87 percent of all public transit trips. Persons ages 18-64 represent the second largest market, making more than three-quarters of all transit trips. Following these groups are renters, females, non-licensed drivers, persons without household vehicles, Blacks, and persons with low incomes, who capture 64 percent, 54 percent, 45 percent, 45 percent, 35 percent, and 32 percent of all public transit trips, respectively.

Figure 4-16 Transit Market Share by Car Availability



CUTR analysis of NHTS data.

Some of these sub-markets are relatively stable across different levels of MSA scale, while others change significantly. Dramatic changes are found among persons without vehicles and Blacks. For example, Blacks make more than a third of public transit trips in the largest MSAs, while they make less than ten percent of public transit trips in MSAs with 500,000 to 1 million persons. Relatively smaller changes are found among the most frequent users, non-licensed drivers, and females. For example, non-licensed drivers make 24 to 56 percent of all public transit trips across different geographical areas. Note also, service supply changes potentially impact the results in this table.

Table 4-8 also shows the data from the 1995 NPTS. The comparisons are generally consistent with the overall decline in mode share. Transit use is even more concentrated in traditionally strong transit using groups of regular users two or more times per week, working age population, Hispanics, and renters and dramatically more concentrated in the unemployed. There is less transit use concentration for Blacks, single adult households and non-licensed drivers.

Figures 4-17 through 4-24 show various comparisons of the general population versus transit users for various characteristics. Each of these figures was produced by CUTR from the 2001 NHTS data.

Figure 4-17 reveals that transit users are disproportionately prevalent in the late teen and early work age cohorts, 16-40 years of age and underrepresented in other age categories. Figure 4-18 indicated the very slight preponderance of females among transit users compared to the general population.

Figure 4-17 Age Comparison between Transit Users and the General Population

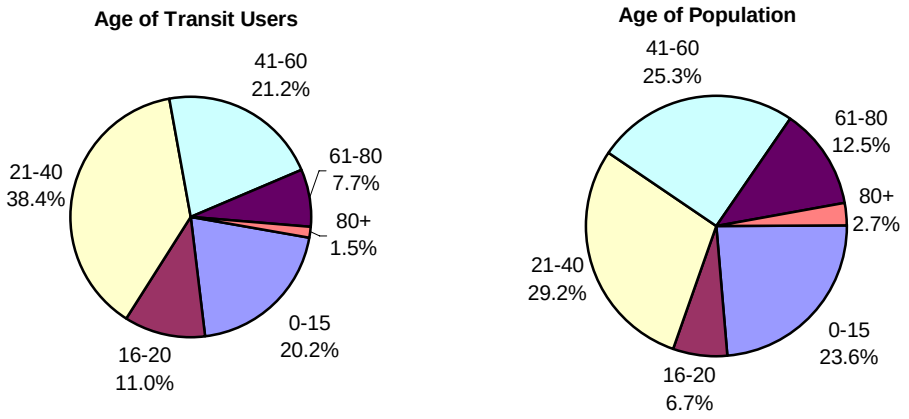


Figure 4-18 Gender Comparison between Transit Users and the General Population

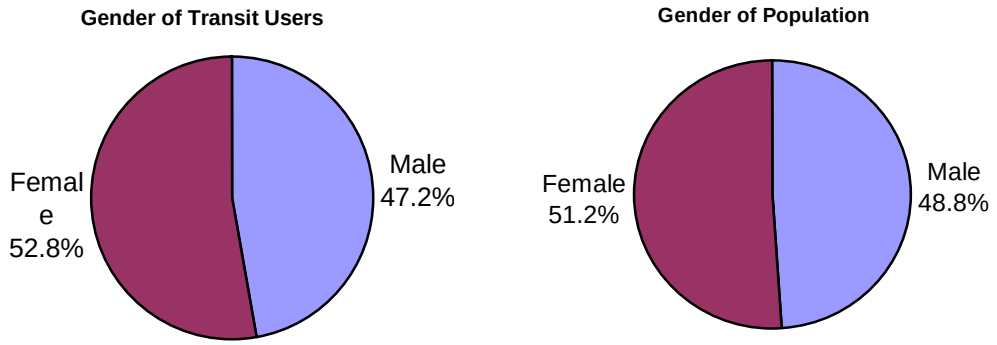


Figure 4-19 indicates that the propensity of various minority groups among transit users is approximately twice their share in the general population. Figure 4-20 indicates the greater intensiveness of lower income among transit users relative to the general population. Figure 4-21 indicates that renters are twice as prevalent among transit users as among the general population.

Figure 4-19 Ethnicity Comparison between Transit Users and the General Population

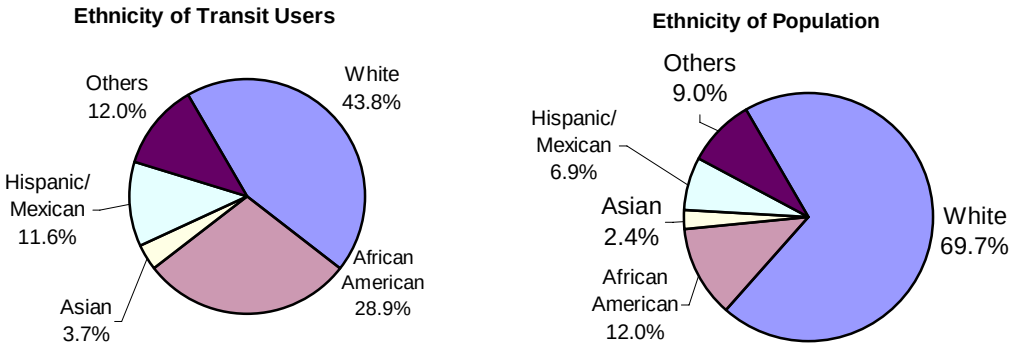


Figure 4-20 Income Comparison between Transit Users and the General Population

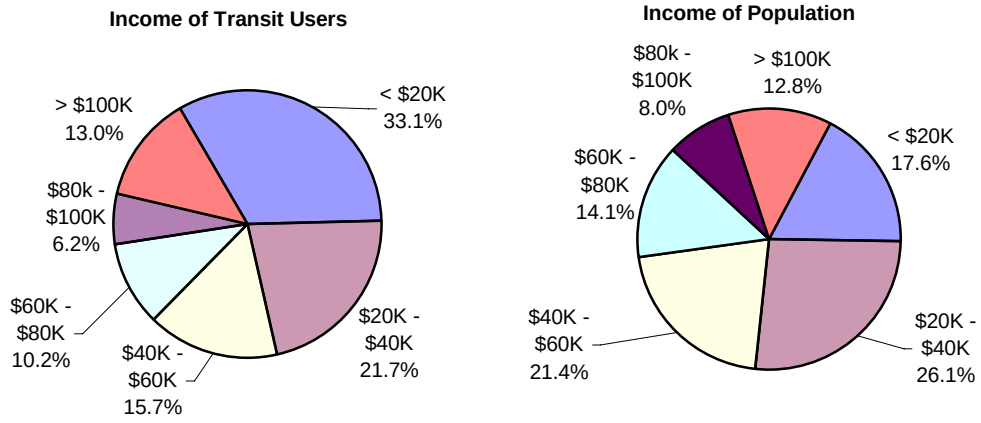


Figure 4-21 Home Ownership Comparison between Transit Users and the General Population

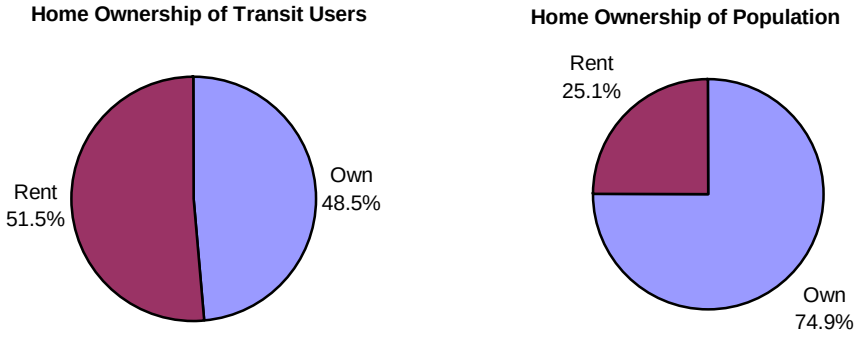


Figure 4-22 is a comparison of vehicle availability between transit using households and the general population. Figure 4-23 provides a driver status comparison for the general population and transit using households. Figure 4-24 presents a comparison of urban area size location for the general population compared to transit users. Not surprisingly, transit users are much more concentrated in larger urban areas.

Figure 4-22 Vehicle Availability Comparison between Transit Users and the General Population

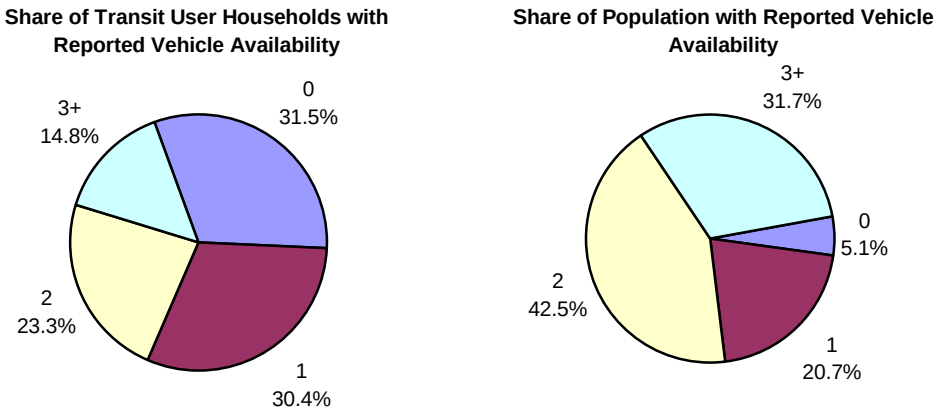


Figure 4-23 Driver Status Comparison between Transit Users and the General Population

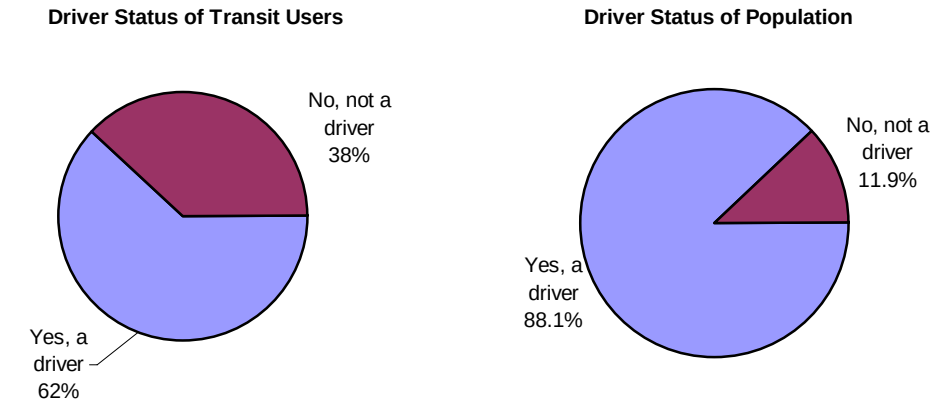


Figure 4-24 Urban Area Location Comparison between Transit Users and the General Population

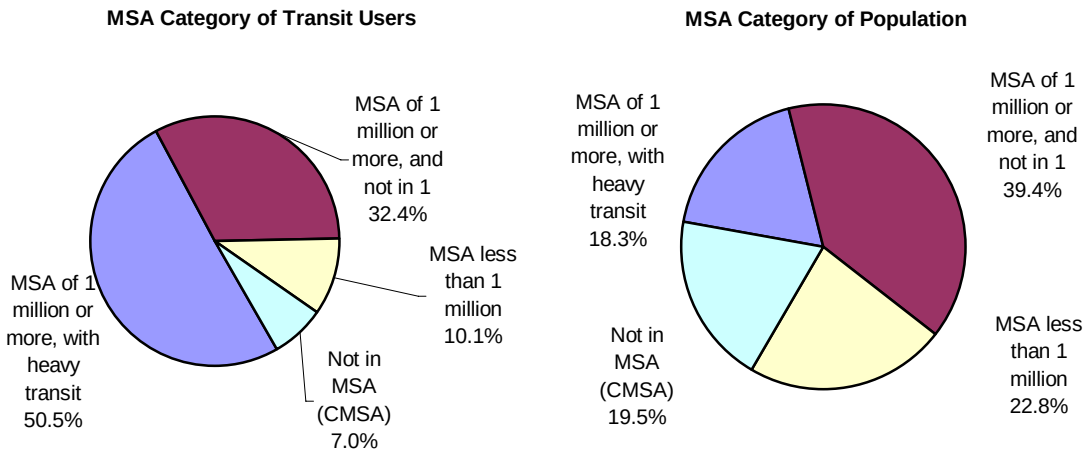


Figure 4-25 presents a comparison of trip purposes for all travel compared to travel on transit. Travel on transit is more highly concentrated on work, school and medical/dental trips. For these trip purposes, the shares on transit are approximately twice as high as their shares in total travel. For other trip purposes (exclusive of return home), the frequency on transit is approximately half that for all travel. High frequency trips such as work and school are often good transit markets as these trips are repeat trips, occur during rush periods when transit service is best, often have parking cost or capacity constraints associated with them, and frequently are located in central dense areas where transit can be more competitive. Less frequent trips or trips whose destinations are likely to be in lower density dispersed locations are typically less well served by transit and hence transit frequency for these trips is lower. Multi-person trips such as social trips are also more likely to be auto trips as the probability of auto availability is higher for multi-person trips and the economics of auto travel is more compelling for higher occupancy travel by personal vehicle (as opposed to each person having to pay a fare).

Sub-Markets by Mode

Figure 4-26 portrays the overall mode share allocation for the 2001 NHTS. More detailed discussion of mode share is provided in Chapter Five.

Buses capture 64 percent of all public transit trips in the nation. This percentage varies across personal, household, and geographic characteristics. In general, other transit options are limited in availability to larger urban areas and, hence, bus provides a smaller share of trips to travelers whose location is

Figure 4-25 Trip Purpose Comparison Between Transit Users and the General Population

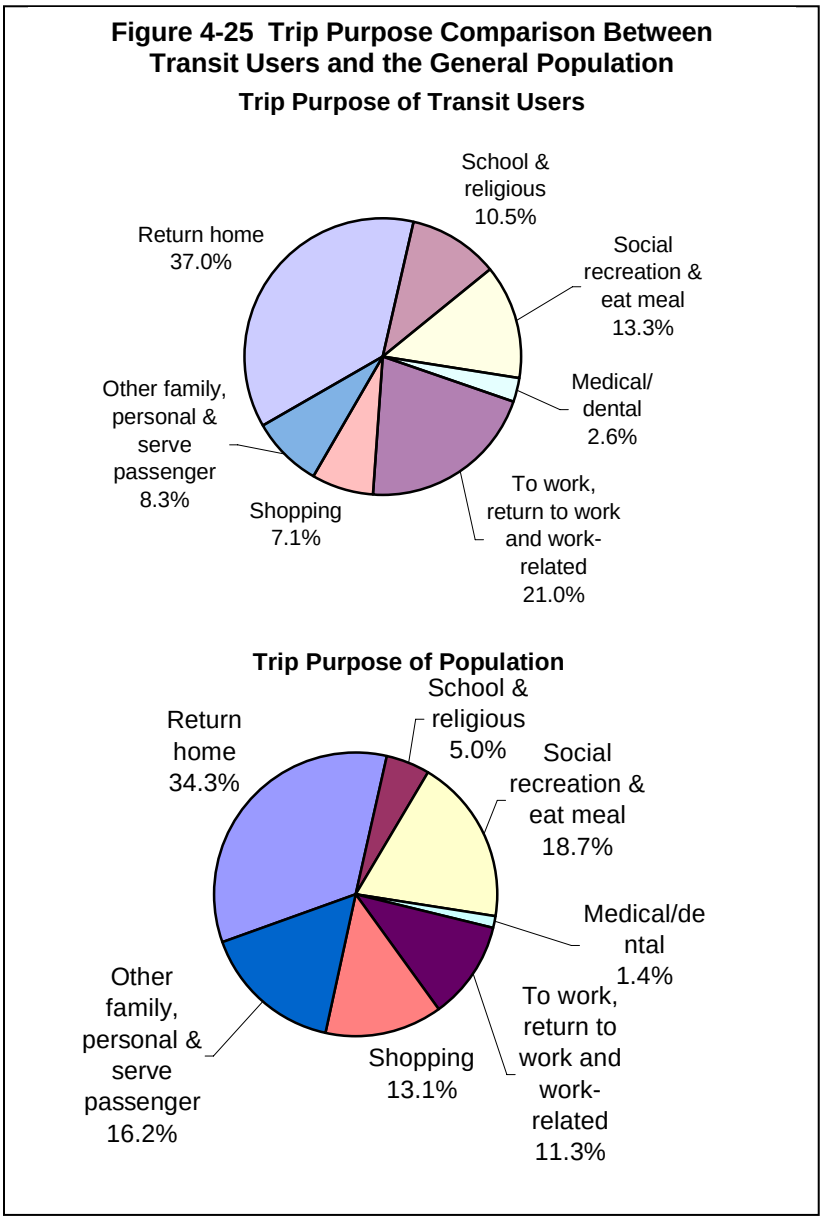
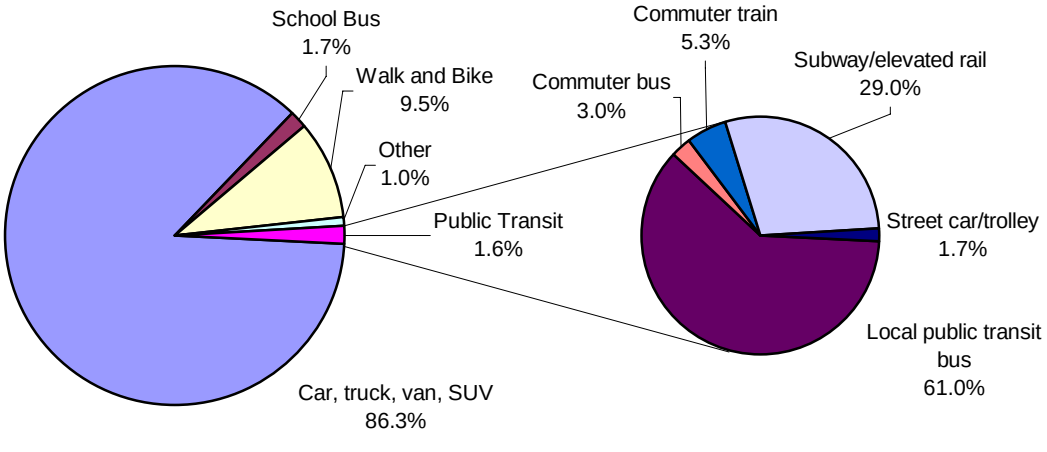


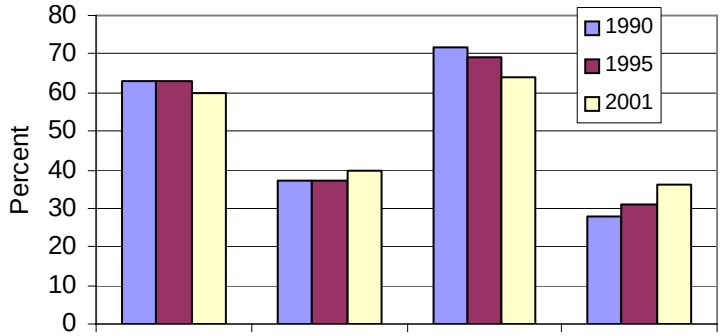
Figure 4-26 Modes of Travel



concentrated in large urban areas. The more a group is dependent on transit, the higher the share of their travel that is on bus. Rail, offering a higher speed of travel had greater appeal to choice travelers and hence groups who are choice travelers have lower bus use in general. The growth of rail transit investment in the past few decades has contributed to a growth in the share of transit travel that is on the rail system.

Figure 4-27 shows the changes in rail and bus shares for both the survey data and for NTD data. Both show the same trend in growing rail shares. NTD data is a measure of boarding, thus, the fact that many rail trips involve transfers may explain why the NTD numbers are somewhat higher.

Figure 4-27 Bus-Rail Transit Shares



Source: CUTR analysis of NHTS/NPTS and NTD data.

Table 4-8 shows the variation in the share of transit on bus across some context variables.

Summary

This chapter has presented selected results intended to communicate the nature of the market for public transportation. Some of the results include:

- Public transit in America captures 1.76 percent of all personal trips. This amounts to 6,409 million linked transit trips and 7,673 million unlinked transit trips.

- The largest market shares are comprised of people who use public transit two or more times a week and people who live in households without vehicles. People who use public transit two or more times a week make close to a quarter of all their person trips on public transit, while people who live in households without vehicles make one-fifth of all their person trips on public transit. Transit market share for these two groups remains relatively high at 12.2 percent and 3.3 percent in the smallest MSAs (with a population under 250,000).

- Transit's market share drops dramatically between the largest MSAs (with at least 3 million in population) and medium-sized MSAs (with 500,000-1 million in

population). Transit share falls from 3.3 percent in the largest MSAs to 0.3 percent in medium-sized MSAs.

- The greatest threats to the validity of NHTS data involve under representation of segments of the population who have low incomes, may not have phones available, may have English communication problems or may have concerns regarding disclosing information that may jeopardize their personal situation (e.g. illegal immigrants, unreported employees, etc). To the extent that these persons might be under represented in the weighted NHTS data, the characterizations in the preceding sections may be even more polarized.

Evidence from individual urban areas is replete with stories of how transit is making inroads into higher income, suburban, urban regentrification or other choice markets and the data indicate that there are transit users in all socio-demographic groups; however, the national totals are still dominated by those who have a need for transit service. This shows that transit continues to be a critical service to those segments of the population and is necessary for their contributions to the overall economy and their individual quality of life.

It is equally clear that transit's role in overall mobility will be modest unless it is able to capture a larger share of trips for persons who have travel options. The share of households with no vehicles has declined dramatically in terms of the share of the population, and has been declining in absolute terms over several years. This market

Table 4-8 Percent of Transit Trips Made on Bus by Personal, Household, and Geographic Characteristics

Traits	Sub-groups	Nation
Person Age	Under 18	80
	18-64	63
	65+	86
Licensure Status	Driver	53
	Non-Driver	80
Gender	Male	62
	Female	71
Working Status	Full Time	54
	Part Time	68
Race	White	54
	Black	74
	Others	73
Ethnicity	Hispanic	79
	Non-Hispanic	63
Household Income	Under $15,000	84
	$15,000-49,999	72
	$50,000+	44
Vehicle Ownership	None	71
	One	68
	Two+	58
Home Ownership	Owner	62
	Renter	69
Life Cycle	Single-Adult	72
	Multi-Adult	63
Medical Condition	Day travel	81
	No driving	85
	Limit driving	87
Emigration	<5	65
	5-10	67
	10+	70
All		67

Source: Travel Day File, Person File, and Household File.

alone, even if it is stabilized at current levels or shares, is not sufficiently large to support growth in transit services. Given physical, mental, and legal constraints as well as some irresolvable financial constraints to auto ownership for some share of the population, it appears that the no-car, no-driver market may be stabilizing at current levels. Thus, the pressure on transit ridership associated with several decades of decline in the number of persons dependent on transit may be abating. To keep from losing ridership, the transit industry has had to replace each passenger who switched to auto travel options with a person who was previously making auto trips (the market of dependent riders was not growing). This challenge has been met successfully the past several years as transit ridership has grown as measured by transit trips. This means that the transit service had to be sufficiently appealing to choice travelers – those persons who reasonably had alternatives. Going forward, the growth in transit ridership will similarly require that transit attract more trips that could be made by alternative means. Thus, the nature of the services offered will need to meet the needs of these travelers.

CHAPTER 5
A CLOSER LOOK AT MODE SHARE TRENDS

Recent releases of new data including the census transportation information, the American Housing Survey results, the National Household Travel Survey, and regular updates to APTA ridership statistics and Federal Highway Administration (FHWA) vehicle miles of travel (VMT) data provide opportunities for researchers, policy analysts and others to glean information regarding travel behavior trends in the U.S. Challenging budget situations at all levels of government and reauthorization of federal transportation funding legislation have created a heightened sense of urgency as it relates to understanding the performance of public transportation investments. Information on ridership trends is often a part of policy discussions. During the current reauthorization of the Federal surface transportation program, transit supporters, for example, used increases in transit ridership during the later half of the 1990s as a reason to support increased Federal funding for transit (STPP, 2002). Opponents, on the other hand, used the continued decline in the mode share of transit from the Decennial Census as a reason for reducing Federal funding for transit (Cox and Utt, 2002). Perceptions of transit ridership levels and trends can influence funding levels, research priorities, and investment decisions at all levels of government (Urban Mobility Corporation, 2002).

One specific subject of considerable interest is the change in transit use and mode share. Several data sources including NHTS shed light on the trends. This chapter reviews both field count data and survey data results. Most studies of mode share and transit ridership trends are motivated by a desire to understand causal factors underlying ridership (Joint Center for Political Studies, 1985; Millar, WW. 1999; Mason, JW., 1998). In the ISTEA era there has been a plethora of studies targeted to strategies for enhancing ridership (Taylor, BD; McCullough, WS 1998; Kain JF, Liu Z 1999; Robert Stanley, 1998; Project for Public Spaces, 1999; Urbitran Associates, Inc. 1999; Brian Taylor & Peter Haas, 2002; Judith Norman, 2003; Schmidt S., 2001). All these initiatives benefit from a rich understanding of ridership and mode share trends. Developing a clear understanding of what is actually occurring regarding transit use trends is highly dependent on specifically what measured and reported. Considerations include:

- Trends in absolute ridership or in shares
- Absolute ridership in unlinked trips or linked trips or passenger miles
- Data sources
- Mode definition (actual or usual mode)
- Method of data collection (observation or respondent reported)

Count Based Measures of Transit Mode Share

Figure 5-1 is a graphic of the reported transit ridership expressed as annual national total ridership on public transit. These trends, from two data sources, APTA, which

receives quarterly vehicle boarding counts from members that are then factored to a national total, and the NTD, annual sampled counts of ridership reported to the Federal Transit Administration by properties receiving federal funds.[3] These numbers show meaningful positive increases in transit ridership of 22 percent between 1995 and 2001. The 2002 and 2003 APTA data show a reversal of the trend as the slowing economy and related fare and service changes have resulted in declines in ridership in 2002 and 2003. Data for 2004 indicate a recovery in ridership to 2001 and 2002 levels. For 2002, NTD data indicates a very slight increase in ridership and for 2003 show a decline similar to that shown for APTA. Both of these sources report measures of persons boarding transit vehicles. This is termed unlinked trips. A person may have to board two or more vehicles to complete a trip to a destination; this is defined as a linked trip.

Figure 5-1 Transit Ridership Trends

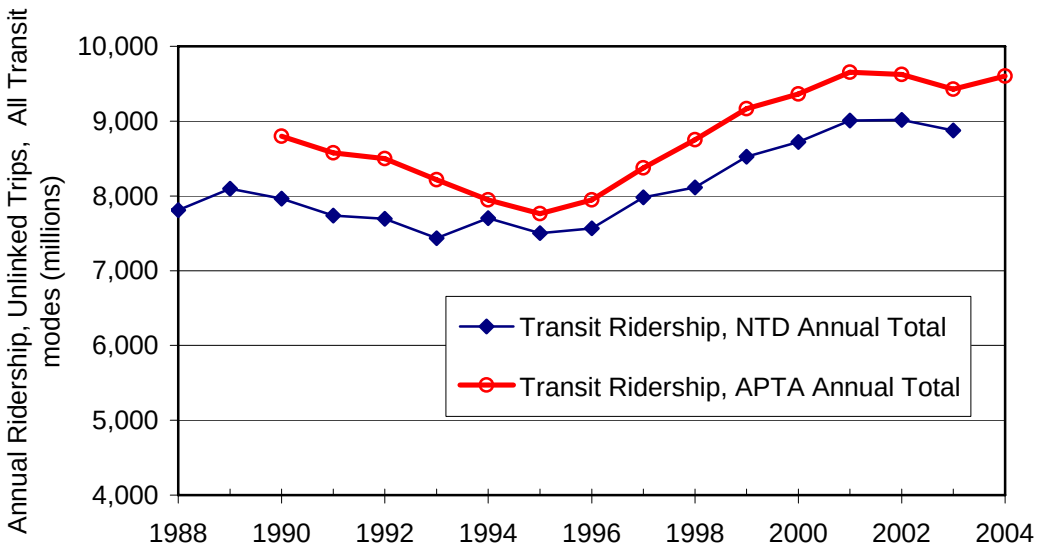
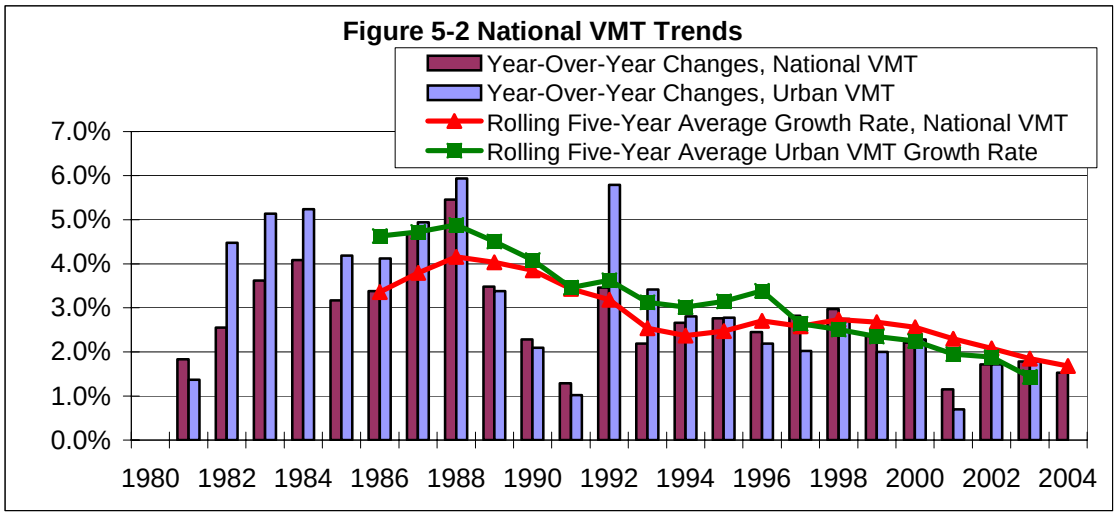


Figure 5-2 shows the most recent data on overall travel trends as measured in percent change in vehicle miles of travel (VMT). This trend shows a declining growth rate over the past several years. The data, based on national Federal Highway Administration reporting of VMT, includes data through June 2004 for total VMT. Both urban and total national VMT are shown. Urban VMT rates of change go from being higher than national totals, indicating a growing share of total VMT in urban areas, to a situation where total VMT outpaced urban VMT, indicating more rapid growth in non-urban areas. In both cases, the pace of VMT growth has clearly slowed.

[3] See Chapter 2 for a more detailed discussion of the APTA and NTD database descriptions.



Source: National VMT data assembled by FHWA.

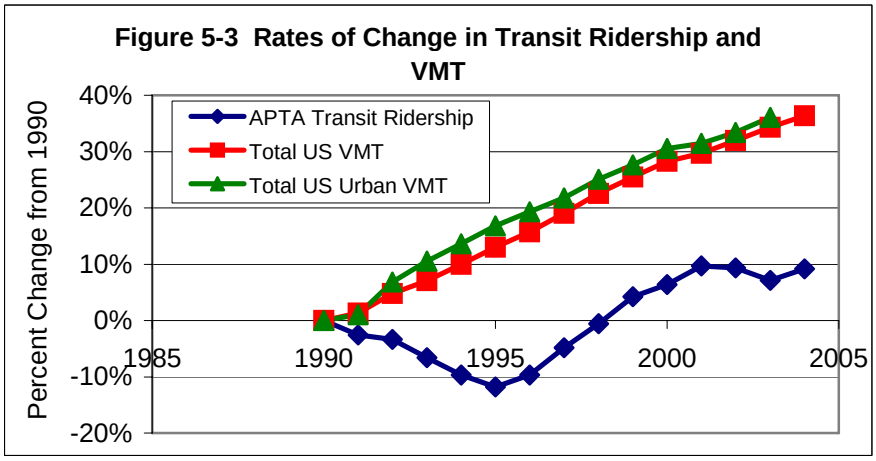


Figure 5-3 displays the relative rates of change for VMT and transit ridership. More rapid rates of change for transit ridership indicate times when transit is likely to gain market share (assuming constant length transit trips as this graphic is comparing trips for transit against vehicle miles for auto). Based on this indicator, transit was losing market share between 1990 and 1995, gaining share from 1996 through approximately 2000 and subsequently loosing share in the most recent years.

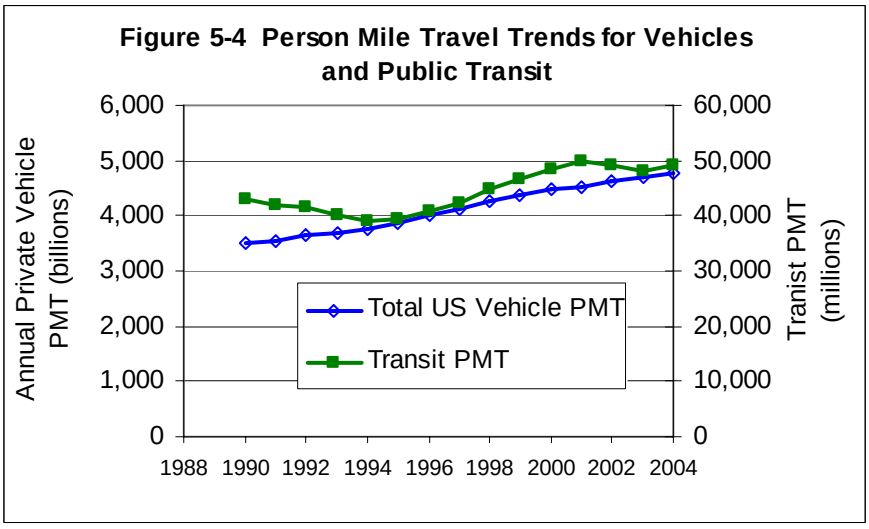


Figure 5-4 indicates changes in person miles of travel by mode. This graphic uses an estimated measure of person miles of travel

(PMT) for auto and transit. Transit PMT is developed by factoring transit trips by multiplying trips measured by APTA by an average transit trip length developed yearly from NTD data. Auto vehicle miles of travel are converted into person miles of travel by factoring VMT by vehicle occupancy. Vehicle occupancy uses NHTS data and interpolates between survey years. This enables the development of a measure of mode share that compares person miles for privately operated vehicles versus public transit. It accounts for the differences in average trip length by mode and thus more accurately reflects travel by each mode. Since unlinked transit trips are significantly shorter than auto trips, the mode share calculation, based on person miles of travel, is markedly lower than the level for trip-based calculated or surveyed measures.

Figure 5-5 PMT Based Transit Mode Share

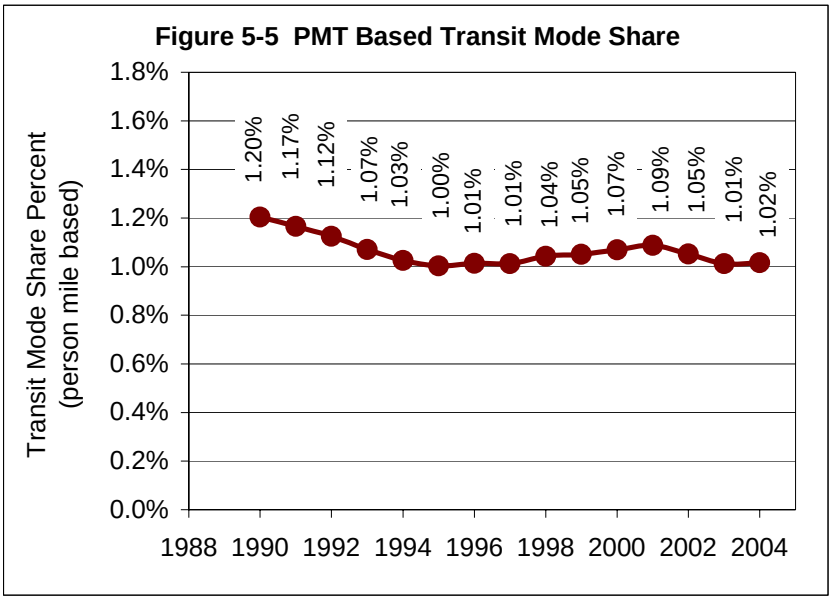


Figure 5-5 indicates a slight increase in transit mode share from 1995 through 2001, with the trend reversing and showing a decline in share for transit post 2001. This measure shows the estimated 2003 mode share being at the lowest historical level with approximately one percent of total national PMT being carried by public transit.

An alternative strategy for reporting PMT based mode share is to use urban, non-commercial vehicle PMT since this is the more comparative market for most transit services. Transit is not intended as an alternative for commercial/freight traffic or for intercity travel. Figure 5-6 provides the results from that calculation. Based on the share of VMT that is urban, approximately 60 percent, and factoring out commercial traffic from the measure of VMT, results in the values for PMT based mode share increasing by about 75 percent. From a viable market perspective these adjusted comparisons might be preferred. However, the indicator in Figure 5-5 is relevant from the perspective that competition for funds between transit and roadway is carried on at the most aggregate level with transit competing for a share of the total transportation trust fund, not just for funds for urban areas or person travel.

Survey Based Measures of Transit Mode Share

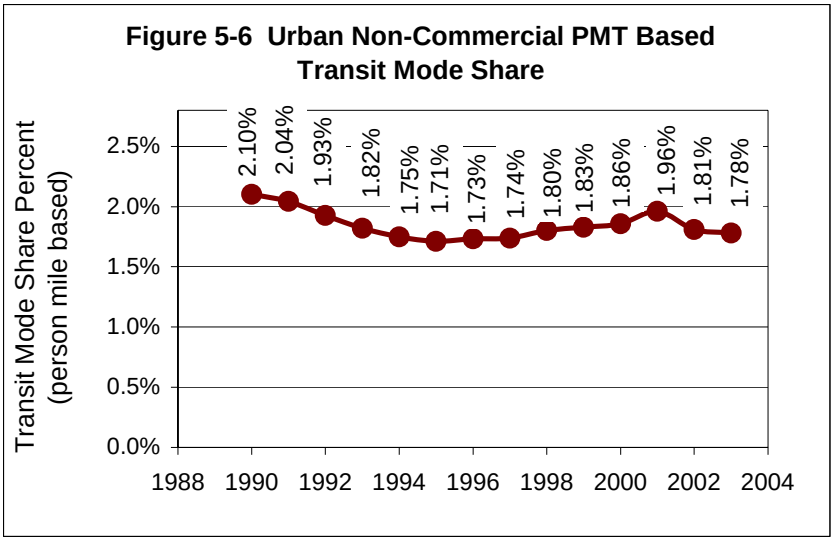


Figure 5-6 Urban Non-Commercial PMT Based Transit Mode Share

The previous section's derived mode share estimation is only one way to explore transit mode share trends. Other national survey data also include insight into transit mode share. Following a discussion of data sources, Figure 5-7 shows the trends for several different surveys of travel. Each survey is somewhat different in terms of the sampling methods, definition of terms, and reference time period. These data suggest that, when looking over a longer period of time - for example comparing 1990 and 2000 data - the transit mode share has declined for census and household survey data sources. Survey information from the more recent years paints a somewhat less clear picture. Of particular interest is the NHTS. This source indicates a mode share of 1.59 percent of person trips on transit. Differences in survey questions, mode classifications, and samples, require modifications to the data to make meaningful comparisons to the prior years' data. Adjustments for sample and definition differences result in a mode share of approximately 1.76, closer to the 1.81 in the 1995 survey. Thus, this data source suggests a very slight decline in overall mode share for transit in the past six years. This is discussed in more detail below.

Comparing NHTS/NPTS Trends over Time

As noted in the early chapters of this report, the survey methodology for carrying out the NHTS is refined with each application in order to provide the best possible data while still trying to preserve comparability over time. In comparing the 2001 NHTS with the 1995 NPTS transit mode share calculations there were several subtle differences that need to be accounted for to enhance the comparability of the estimates.

Use of Add-on Sample – The 2001 national sample NHTS numbers (used in this research) produced a transit mode share of 1.561 percent. This, however, is not directly comparable to the 1995 number for a number of reasons. The 1995 NPTS sample analyzed included the add-on samples, which, while factored to remain representative of national totals, nonetheless, produced a slightly different transit mode share. When the

2004 release of the NHTS database with the add-ons included became available the transit mode share was again calculated and produced a slightly higher 1.591 percent mode share.

Adjustment for Higher Walk Trip Reporting – The 2001 NHTS was designed to try to do a better job of gathering information about walk trips. This included an additional probing question to specifically solicit information on walk travel. The result was a significant increase in reporting of walk trips presumed to be well beyond actual changes in walk mode and a result of the change is survey design. This increase in total trips about which information was gathered had the effect of slightly depressing the transit mode share because the total trip denominator was now a larger number. If the walk trip rate would have remained the same as in 1995, the transit mode share would have been approximately 0.04 percentage points higher.

Definition of Transit – The 2001 NHTS had a slightly different classification of travel that was defined as public transit. In 1995, intercity bus and courtesy bus were probably included in the calculation of transit mode share. The 2001 survey disaggregated the data to allow a closer estimation of what is typically referred to as public transportation. This adjustment, if the 2001 data is adjusted to be most comparable to the 1995 data, results in an increase in transit mode share in 2001 of approximately 0.065 percentage points.

Children under 5 – The 1995 survey excluded trips by children under five years of age. This population segment travels only modest amounts and disproportionately less by transit. If the 2001 data are adjusted to be most comparable to 1995, the mode share for public transportation would be increased approximately 0.029 percentage points. Collectively these adjustments produce the mode share calculation to be used in comparison with 1995 NPTS findings as summarized in Table 5-1. It is important to understand that these adjustments are made only to increase the comparability between the 1995 and the 2001 survey numbers. In absolute terms, the 2001 NHTS directly calculated mode share number appears to be the more accurate reflection of actual transit mode share but is not particularly comparable to 1995 without adjustments. The particular interest in exploring this issue in greater detail is intended to both allow a more comparable data trend analysis and specifically to explore the relative

Table 5-1 Summary of NHTS 2001 Mode Share Adjustments

2001 NHTS transit mode share for all trips	1.561 %
Adjust for Add-on sample changes	+0.030 %
Adjust for walking share change	+0.040 %
Adjust for transit definition	+0.065 %
Adjust for inclusion of children under 5	+0.029 %
Adjust for using non-add-on 2001 to compare with add-on 1995 data	+0.030 %
Adjusted 2001 NHTS public transit mode share	1.755 %

change in mode share between 1995 and 2001 as indicated in NHTS/NPTS data versus the changes perceived and calculated by looking at field data on ridership changes and calculated mode shares. This is discussed in more detail following a summary discussion of Table 5-2 and Figure 5-7, both of which present various survey results regarding transit mode share.

Table 5-2 contains a variety of different survey based measures of transit mode share. These are for various points in time, various survey methods and various trip purposes. Caution should be used when comparing these data items; however, the collective message can provide some guidance to analysts regarding mode share trends. Each survey is briefly described below in a summary paragraph.

Table 5-2 Comparisons of Various Survey Estimates of Public Transportation Mode Share

Year	Census Journey to Work, Usual Mode	American Community Survey, Work Trip Usual Mode	American Housing Survey, Work Trips Usual Mode	NHTS Work Trip, Survey Day Actual Mode	NHTS Work Trip, Usual Mode	NPTS/ NHTS All Trips	NHTS 2001 All Trips Adjusted
1969						3.40	
1970	8.90						
1977						2.70	
1980	6.40						
1983						2.70	
1990	5.30			4.60		2.20	
1995				3.56	5.11	1.81	
1997			4.58				
1999			4.90				
2000	4.70	5.1					
2001		4.9	4.72	3.67	5.05	1.56	1.76
2002		4.8					
2003		4.7					
2004		4.6					

Census Journey to Work

Journey to work mode share can be calculated from the census data long form information. This data is available for prior censuses and is based on a large sample with a high response rate. The census data is based on a question that asks “How did you usually get to work last week? Guidance is provided to the respondent relating to multi-mode trips where the dominate mode is to be noted as the primary mode, and how to handle multiple work trips, working away from the normal workplace location, etc. A

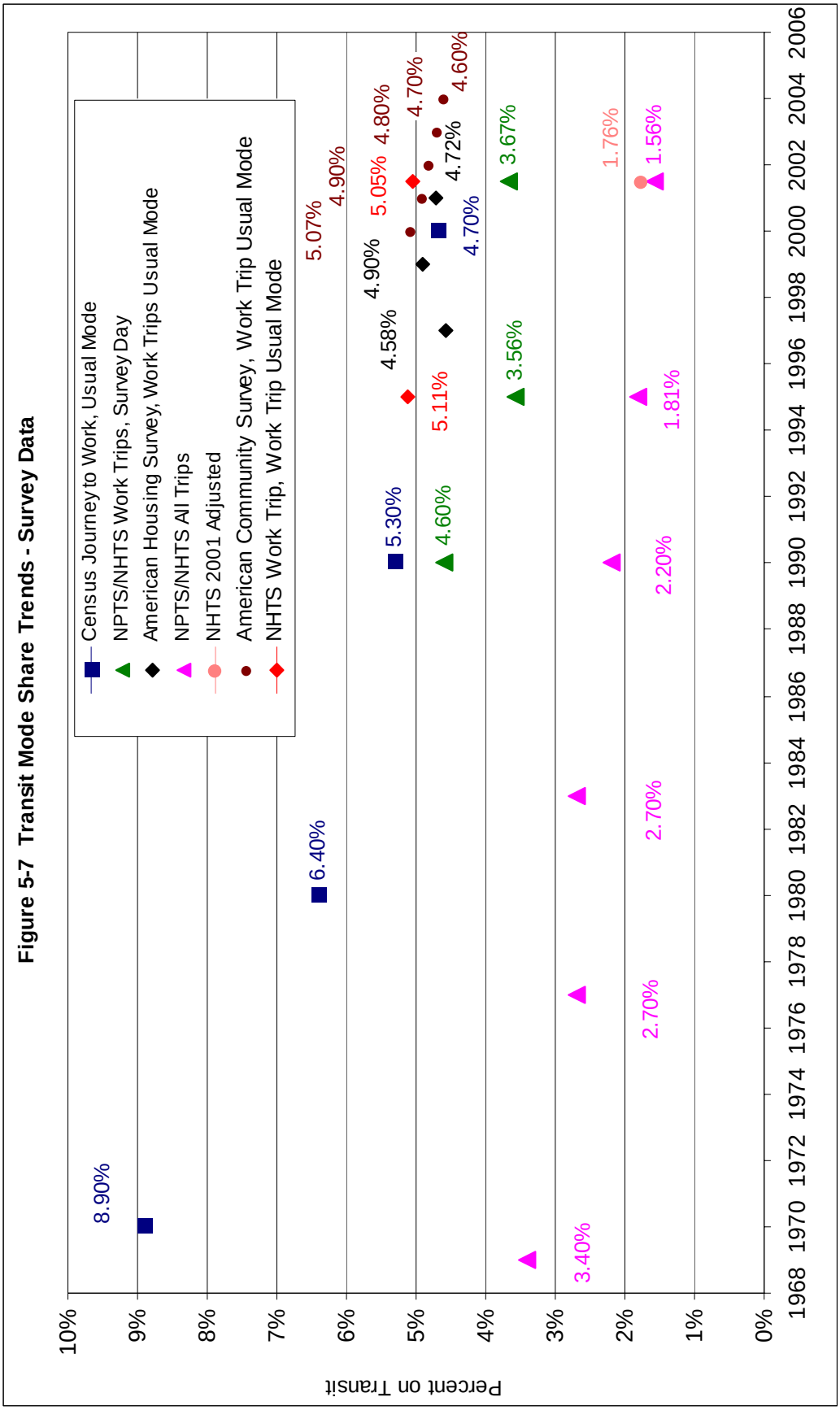


Figure 5-7 Transit Mode Share Trends - Survey Data
Census Journey to Work, Usual Mode
NPTS/NHTS Work Trips, Survey Day
American Housing Survey, Work Trips Usual Mode
NPTS/NHTS All Trips
NHTS 2001 Adjusted
American Community Survey, Work Trip Usual Mode
NHTS Work Trip, Work Trip Usual Mode
Percent on Transit
10%
9%
8%
7%
6%
5%
4%
3%
2%
1%
0%
1968 1970 1972 1974 1976 1978 1980 1982 1984 1986 1988 1990 1992 1994 1996 1998 2000 2002 2004 2006
8.90%
6.40%
5.30%
4.58%
4.90%
4.70%
4.72%
4.60%
4.70%
5.07%
4.90%
5.05%
4.80%
4.70%
4.60%
5.11%
3.40%
2.70%
2.70%
2.20%
1.81%
3.56%
3.67%
1.76%
1.56%

detailed list of transit modes is defined including taxi, ferry, commuter rail, etc. Work at home is a category of response and is typically included in the denominator of the mode share calculations. For the census, the spring delivery results in the respondent answering with respect to the narrowly defined time frame and hence does not capture seasonal variation. The greatest sensitivity regarding the application of the census data relates to whether or not the "usual trip" language impacts the validity of the results in contrast to other sources. There has been a perception that transit may be an occasional mode for non-captive travelers and hence usual mode measures might under represent actual everyday average use. This is discussed in more detail below. More information about this survey and sampling plan is available at: http://www.census.gov/main/www/cen2000.html.

American Community Survey

The planned replacement for the decennial long form, this annual smaller sample survey is similarly structured and has been in the pretest application stages before systematic application starting in 2005. The commuting questions in this survey follow the census long form language by querying about most frequent mode in the reference week. They are continually surveyed (unlike the census). Work at home respondents are included in the denominator. The available American Community Survey (ACS) results from the sample counties are counties that, with respect to transit mode share, are more transit intensive (USDOT has evaluated the census CTPP mode share results for these same counties in comparison to national average mode shares to determine why ACS has shown a somewhat higher mode share). More information about this survey and sampling plan is available at http://www.census.gov/acs/www/index.html.

American Housing Survey

The American Housing Survey (http://www.census.gov/hhes/www/ahs.html) is conducted by the Bureau of the Census for the Department of Housing and Urban Development (HUD). It collects data on the Nation's housing, including apartments, single-family homes, mobile homes, vacant housing units, household characteristics, income, housing and neighborhood quality, housing costs, equipment and fuels, size of housing unit, journey to work, and recent movers. National data are collected in odd numbered years, and data for each of 47 selected Metropolitan Areas are collected currently about every six years. The national sample covers an average 55,000 housing units. Each metropolitan area sample covers 4,100 or more housing units. The mode question is identical to that asked in the Census long form or in the 2001 NHTS person file.

Omnibus Household Survey

The Bureau of Transportation Statistics (BTS) Omnibus Household Survey (http://www.bts.gov/omnibus_surveys/household_survey/) is used as the major data collection exercise to assess customer satisfaction for the U.S. Department of Transportation (DOT) Performance Plan. The survey asks supplementary questions every other month to address DOT five strategic goals: safety, mobility, economic growth, the human and natural environment, and national security. It asks general questions about satisfaction with the transportation system and public interactions with DOT agencies. Data for the survey are from approximately 1,000 randomly selected telephone households and are weighted to allow inferences about the noninstitutionalized population aged 18 years or older who are currently living in the United States. The mode question, one of those asked every other month, is stated as:

On a typical day in September, to get to work did you:

01) Walk
02) Drive or ride in a personal vehicle, not in a company car
03) Drive or ride in a carpool or vanpool
04) Use public transit
05) Drive or ride in a company car
06) Bicycle to work
07) Use a combination of modes
97) Other

Table 5-3 shows the transit share. These numbers should be used with caution for two reasons. The sample is small for measuring transit share and the transit category may exclude transit used as part of a trip on a combination of modes. Thus, while this data will be interesting to watch, it is not included in the Figure 5-7 nor commented on in any additional detail.

Table 5-3 Omnibus Household Survey Transit Use Results

Survey Month	Transit Share %	Sample
February 2003	3.69	16
April 2003	1.89	10
June 2003	3.52	20
August 2003	3.36	21
October 2003	3.21	15

NHTS "Usual" Versus "Actual" Work Trip Mode

One of the challenges in comparing mode share measures across data sources is understanding the comparability of questions that inquire as to usual mode from those that seek information about a specific trip (actual mode). NHTS is unique in that both questions are asked of respondents, thus providing an opportunity to reflect on the differences. As indicated in Table 5-1, NHTS data on actual work trip mode share is

noticeably different with actual mode share on transit being more than one percentage point lower than the usual mode measures. This indicates that individuals who indicate a usual mode of transit are less likely to use transit as an actual mode on a given day.

Usual mode questions typically refer to the conditions for the prior week. Thus, the respondent is answering in the context of a specific period of time that may have included multiple work trips and multiple modes. Presumably someone who travels on a given mode more than half the time would indicate that as the usual mode. It is not uncommon for example for a transit traveler to commute by transit four days per week and then take an auto on Fridays to facilitate an evening event or early work departure. Similarly, a regular auto traveler may choose to use transit on a given day due to auto unavailability or other factors. The usual mode range of categories also includes a "work at home" choice thus, this deflates the shares for the other categories slightly as this category is now included in the denominator in the share calculation. For actual mode questions, work at home is not a choice thus the shares for all other options are proportionally slightly larger.

Table 5-4 presents an analysis of the usual and actual travel mode for work trips from the 1995 and 2001 surveys. This table confirms an interesting phenomenon. Auto usual mode travelers are far more likely to be strongly loyal to the auto mode with very modest use of transit for their actual trips (0.1 percent transit use for actual trips in 2001) whereas usual transit mode travelers used auto modes for 18.4 percent of their actual trips. These data confirm the behavior that is required to produce the differences between the usual and actual mode shares observed in NHTS data. To further verify this phenomenon, 1995 data was also analyzed and presented in Table 5-4. One can apply some algebraic calculations to derive the required mode loyalty for auto and transit travelers for the reported differences in usual and actual mode relationships to be valid. For these conditions to be true required less than four percent of usual mode auto travelers to use transit on a given trip. As the actual transit use by usual auto travelers declines there is an opportunity for greater auto use by transit travelers. An equation can be defined to describe the conditions that would be required to produce any given combination of transit usual mode and actual mode shares.

This data, while logical when analyzed, is contrary to some perceptions of the impacts of reliance on the usual mode question in many travel surveys. The usual mode question has troubled some policy analysts because of the lack of certainty it creates in the data and because there is the expectation that over time the loyalty to any given mode is lessened, as more choices are available. It is more common due to higher auto ownership/availability, more working spouses and flexible work arrangements, more prevalent alternatives to driving (work at home, transit, car/vanpool); to presume that travel arrangements may be becoming more diverse with individuals choosing different modes in response to specific activity plans for the day. Thus, there have been some

concerns that the usual mode measure might be underestimating transit use as well as use of other modes like walk, bike, and shared ride. However, for transit, the data do not bear out this perception. In fact, the usual mode question strategy appears to overstate the actual share of workers commuting on transit in any given day. It may, however, not be a good measure of the share of the population that is using transit for work in a given week. As the data in Table 5-3 suggest, actual travel day behavior can vary significantly from usual mode. In general, for individuals whose usual mode is transit, less than 70 percent of them use transit on the actual day. Usual transit users frequently use shared ride, walk, and single occupant auto. The 2001 survey suggests that usual transit users are actually slightly more loyal to transit on the actual day than was the case in 1995. In the case of auto, the data suggest that of those with auto travel as a usual mode, over 97 percent of them used auto on the specific travel day.

Table 5-4 Work Travel Usual Versus Actual Mode Choice Percent

			Actual Mode on Travel Day					
	Usual Mode							
	Mode	Share	Drive Alone	Carpool	Transit	Walk	Bike	Other/ Non-Report
1995	Private Vehicle	92.2	81.8	15.3	0.3	0.5	0.1	2.0
	Transit	4.7	11.5	10.8	65.6	7.4	0.2	4.5
	Walk	2.6	13.5	9.0	3.2	50.8	0.3	23.3
	Bike	0.5	9.4	11.9	0.3	4.9	68.7	4.9
	Share	100	75.6	14.8	3.6	2.4	0.5	3.1
2001	Drive Alone	83.2	89.8	9.4	0.1	0.4	0.1	0.2
	Carpool	9.1	21.7	75.7	1.0	1.3	0.1	0.2
	Transit	5.0	8.4	10.0	69.3	8.5	0.4	3.3
	Walk	2.3	10.3	9.0	2.7	77.3	0.2	0.5
	Bike	0.4	8.1	10.1	1.4	7.7	72.7	0.1
	Share	100	77.4	15.4	3.7	2.7	0.4	0.4

Analysis by CUTR. Concept source: Final Report, Travel Patterns of People of Color, June 30, 2000, Prepared for Federal Highway Administration, Chapter 4 Work, Automobility, and Commuting, Nancy McGuckin. Based on January 2004 release for NHTS data.

These shares are consistent with those required to make the reported usual mode and actual mode transit shares mathematically correct. Usual mode auto travelers seldom use transit for their actual trip with travel on transit being only a fraction of one percent of actual trips. Usual transit travelers have the least loyalty to their mode of all the usual categories whereas drive alone auto usual mode individuals have the greatest mode loyalty. Between 1995 and 2001 the differences between usual mode and actual mode grew significantly indicating that non-usual transit users were less likely to use transit. This increased loyalty to all modes perhaps runs counter to perceptions of a commuting force that is using a range of travel options. It may be attributable to a host of factors including the share of households with spare vehicles and the high sensitivity to travel

time for workers in the strong economy period leading up to 2001. It is important to remember that a significant share of the auto commuters do not have walk or shared ride options available to them and may not have transit access at one or both ends of their work trip, thus, they are 100 percent auto users.

It is difficult to draw many conclusions regarding the degree of captivity of transit travelers or the degree of options open to auto travelers from this data. However, it does make both mathematical and logical sense when reviewed in the context of the observed travel behavior of the public. While occasional use of transit may be growing for work travel as the work force grows, there is no evidence that the share of occasional transit use by usual auto travelers is growing. This analysis is restricted to work travel and should not be generalized to other trip purposes.

Interpretation of the Mode Share Trend Data

The interpretation of trends is dependent on the data source, specific definitions or context and the time frame of analysis. Sample and measurement issues aside, the body of data can be used to draw a set of conclusions regarding mode share trends.

- The evidence on transit use trends across sources is consistent with declines in unlinked trips in the early nineties followed by strong ridership growth through 2001 at which point in time ridership began declining.
- There is no data on the possibility of changes in the relationship between linked and unlinked transit trip making (the ratio of unlinked to linked trips) but there is some speculation that the evolution of more transfer friendly fare media such as all day passes and the expansion of rail systems that often produce higher total boardings as a prior one seat trips now become a feeder bus and rail trip, may be increasing the ratio of unlinked to linked trips. However, the trend in public transit PMT is clear and consistent with the trend in trips, as average trip length has remained relatively constant according to NTD measures.
- All the data sources appear to confirm the decline in mode share for both work and non-work trips through 1995.
- All the data sources appear to confirm the stable to slight upward trend in work trip mode share from 1995 to 2001 (unfortunately the trip purpose distribution of transit ridership boardings as reported to NTD and APTA does not have data on trip purpose). The census data in 1990 and 2000 bridged the trough in transit mode share and does not reflect the turn in trend in the mid-nineties.
- The most challenging discontinuity between the various data items is the fact that the NHTS overall mode share trend from 1995 to 2001 does not appear to confirm that which is calculated by analysis of the ridership count data sources. The PMT based measures of mode share showed about a 7 percent increase in the share of trips on transit between 1995 and 2001. Had that been confirmed by NHTS, the

NHTS mode share number would have been approximately 1.95 rather than the 1.76 percent. It is not possible at this point to explain the differences in share. All the data sources, certainly including the count data, are subject to a variety of uncertainties. For example, the significant differences between NTD and APTA data for a given property and for the country as a whole are uncomfortably large (Chu, 2004). There is speculation that count data is getting more reliable and higher due to electronic fareboxes and automated ticket vending and thus part of the growth may not be actual increases in transit use. Each measure of transit use has a slightly different definition and trip linking and trip length are not robustly determined. Among the possibilities are that the 1995 NPTS overstated transit use or that the NHTS survey method results in a noticeable undercount of transit ridership. One may gain additional perspective on this issue by reading "Counting Transit so that Transit Counts," prepared by TransManagement, Washington DC. May 2004.
http://www.apta.com/research/info/online/documents/counting_transit.pdf

In spite of this inability to completely rationalize the various data sources, there are some clear conclusions that can be drawn. Regardless of various refinements that may be identified over time, it is clear that transit has grown in total trip terms and has stabilized its overall mode share or perhaps increased modestly through 2001. The work trip share appears to have increased slightly in the late nineties but the duration of growing mode share may have been quite limited. Recognize that national aggregate ridership count data does not include trip purpose data or enable a measurement of linked trips, thus complicating interpretation.

It is equally clear that transit will need to post meaningful year-over-year ridership gains if it is to play a larger role in meeting overall urban travel needs. While there is a heightened sensitivity to transit mode share as it fluctuates between growth and decline, it is clear that the pace of change has moderated from the long-term historic trend of significant declines. It is equally clear that the absolute level of transit use at the national aggregate level is modest.

However, one should also note that the particular context in each community may deviate substantially from this national perspective and the national mode share for transit does not provide a full picture of the contribution of transit to peak-period peak-direction travel in critical corridors in many of the larger urban areas in the U.S., nor does it reflect the importance of transit to those who are dependent on or choose to use public transit services. Nonetheless, the overall role of transit as measured by various measures of mode share is a relevant consideration in public policy decision-making.

CHAPTER 6

SUMMARY

The NHTS is perhaps the single best data source to use in developing a rich understanding of the nature of the public transit market and a profile of public transit users at the national scale. While the survey has shortcomings, it is professionally designed, administered, and documented so that readers are able to understand any potential for biases from sample size, non-response, or question structure features. Using this data in the context of both the historical series of national home travel surveys and also in the context of other data sources both national and local can enable a user to develop a useful knowledge base. With regard to public transportation, the survey results as analyzed in this project reveal a number of key findings.

The authors acknowledge that additional analysis on these data sets could continue as there remain features and variables that have not been fully explored. Perhaps the most significant of these is the analysis of transit use with respect to various land use and social-demographic factors. In 2004, a new NHTS data set became available that included new data fused with the previously provided trip records. These data enable additional analysis of factors such as density. Land use characteristics are acknowledged to be important to the mode choice decision as different land use patterns and intensities support different levels of transit service supply and facilitate transit use. Future work to explore the enhanced NHTS data or to merge NHTS data with other data sets will provide opportunities to do additional analysis of value to the transit industry.

While each prior chapter included a number of summary comments, there are some key findings that merit review. The single most critical goal for public transit is to meet travelers' need, thus ensuring adequate ridership is critical to the ultimate success of public transportation. The benefits of public transportation, mobility for those without alternatives, congestion relief, environmental contributions, land use preservation, economic development, etc., all ultimately require the transit service to be well utilized for the benefits to be meaningful. The ridership goals for transit have been embraced in recent actions at both the FTA which has designated ridership goals, and APTA that included ridership growth as a critical key strategic goal in its recently released strategic plan. Thus, remaining summary comments will be directed to reflecting on what the NHTS findings say about transit ridership.

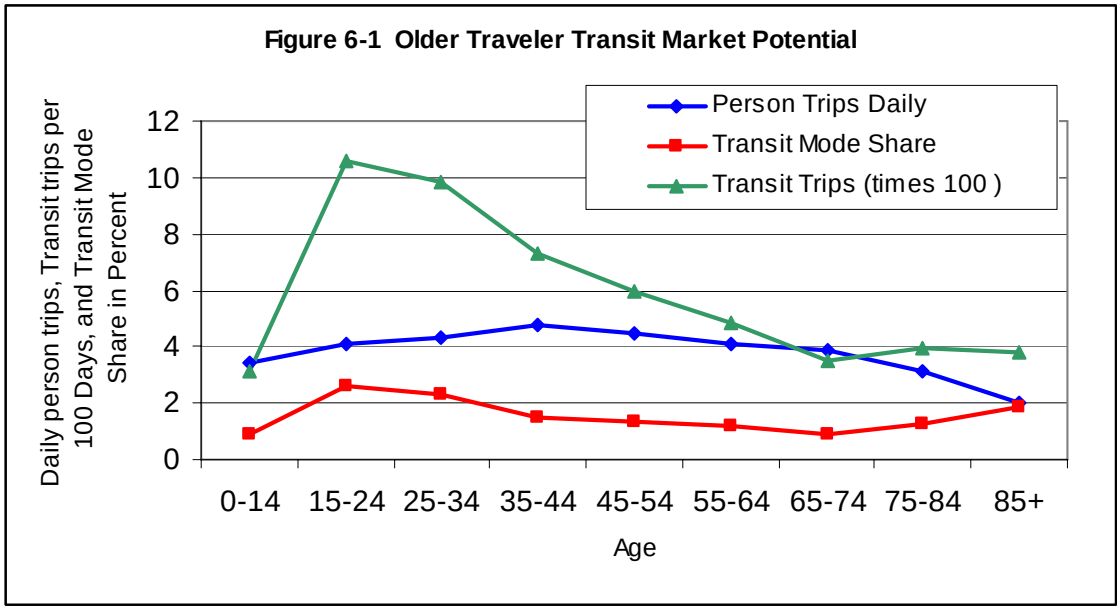
Both anecdotal data and the NHTS reveal the diversity in the population that uses public transportation. Persons in all locations, socio-economic conditions, household structures, ages, and physical conditions use public transportation. Yet, at the national scale, use remains concentrated in population segments that are less likely to have auto travel options. Transit's largest group of passengers need transit service. This is both good; by revealing the importance of transit to the quality of life and economic

contributions of this segment of the population, and unfortunate; in that transit is not a mode of choice for large segments of the population for many of their trips.

Transit's fate for the past few decades has been closely tied to the size of the market of travelers that might be characterized as transit dependent - those who do not drive or do not have a car available. These conditions have been highly correlated with residential area location, income, race/ethnicity, employment status, home ownership status, medical condition, and other factors. As portrayed in Chapter 3, the size of this segment of the population appears to have stabilized after years of declines and may have grown modestly in recent years. The decline in the share of the population of those that might be characterized as transit dependent is a result of numerous factors including the growing availability and affordability of autos. Auto availability may be near or at saturation levels – at least with respect to the share of persons able to choose auto travel. Economic conditions and immigration have and will continue to result in some share of the population transitioning through zero-car status and some core share of the overall population; due to physical, mental, legal or intractable financial conditions, will always be without driving options. The data suggest we may have reached the point where it is unlikely that there will be meaningful future declines in the population that is without auto availability.

While there may be less pressure on transit ridership from the multi-decade trend of transit travelers becoming auto owners and discontinuing or dramatically curtailing transit use, it does not ensure growth of transit demand. Clearly, the transit industry has acknowledged the need to attract travelers to transit who have travel choices. Local experiences across the country provide examples of progress toward that objective through initiatives to improve service quality, amenities, better customer information and marketing, travel time competitive services, and service expansion into areas with new development. However, no one should underestimate the challenge. The convenience and speed of transit travel that is required to be competitive with auto travel can require premium services and unique development patterns that concentrate sufficient demand in a geographic location to make competitive transit service economically justifiable.

Another potential market meriting comment is the aging baby boomers. Many lay persons and professionals see opportunity to grow transit use by leveraging the pending surge in baby boomers reaching retirement age and possibly the end of their driving years. Research is underway to understand the needs of this segment of the population and to more fully access the opportunities for transit. NHTS sheds some light on this subject as revealed in Figure 6-1. Two travel behavior trends have typically accompanied aging; first overall travel rates decline and second transit use increases. The composite effect of these trends produces a relatively constant rate of transit travel as persons age as is shown in the green line in Figure 6-1. Thus, for there to be significant growth in transit demand from aging baby boomers will require changes from

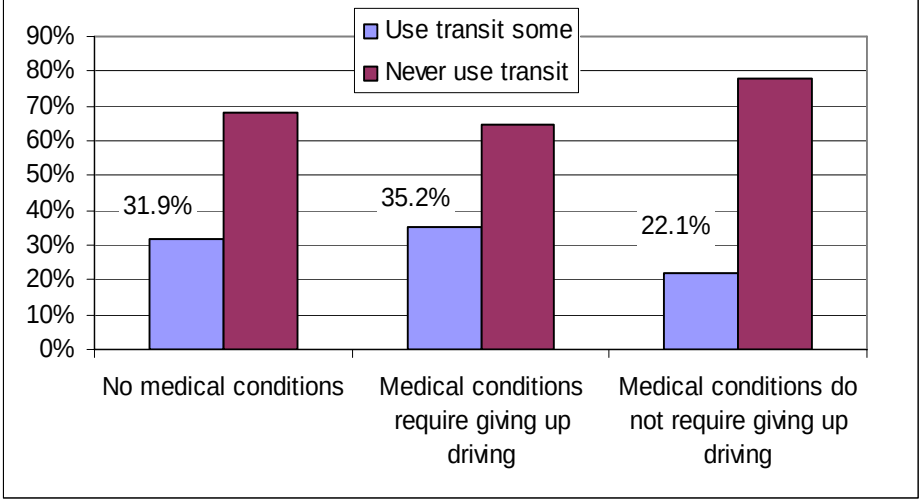


Source: CUTR analysis of 2001 NHTS data.

current trends. Such changes might include stricter regulation of driver competencies that would result in earlier driver cessation for older persons. Medical advances, the baby-boomers' reputations for being highly mobile and cherishing independence, technological advances in driver aids, and a reluctance to put in place the services to provide alternative mobility, do not bode well for dramatic changes. Other possible factors might include a renewed interest in urban living by retiring baby boomers who may be less inclined to maintain a singe family home in retirement or the reduced likelihood of future seniors having spouses, siblings, or locally available children who can provide vehicle travel options resulting in a greater interest in public transit options.

The medical conditions that can impede driving for older travelers may result in those same persons being unlikely to be able to use fixed route transit as an alternative mode. The NHTS survey question on medical conditions suggests that medical conditions are as likely to impede transit use. Table 6-2 indicated that if medical conditions do not require giving up driving, the person is less likely to use transit than the general able bodied population. This suggests that the medical condition is at least as much a deterrent to transit use as to driving.

Figure 6-2 Transit Use and Medical Condition



Source: CUTR analysis of 2001 NHTS data.

There is some speculation and anecdotal evidence that aging baby boomers in their pre-retirement stages may be a potential growth market for transit as they enter the older children or empty nesting stages. One of the strongest motivations for personal auto use has been the freedom to accommodate schedule changes and provide the chauffeuring services to accommodate busy work and children servicing responsibilities. Being relieved of these responsibilities as children age and leave home may enable more persons to schedule their activities to take advantage of transit services.

Two other key factors driving future transit markets are land use patterns and energy cost and availability. Future analysis of NHTS may shed additional light on the role of land use factors in explaining transit use and travel behavior. What is very clear from the work completed is the strong relationship between urban area size and transit use. The largest urban areas, which are known to be denser, remain the strongest public transit markets. The extent to which future growth produces denser development patterns will be a critical factor in determining the extent to which more of the developed area is sufficiently dense to support higher quality transit services. One factor supporting this possibility is the evidence that the trend of declining household size appears to be nearing its conclusion. This, coupled with growing interest in urban redevelopment, may produce more markets that support higher quality transit services.

Technology change in transit such as Bus Rapid Transit (BRT) initiatives, automated systems, enhanced traveler information, smart card technologies and other features may also help transit's competitiveness in the future.

Many of today's senior public transportation professionals entered the industry two or three decades ago at a time when they anticipated that the combination of natural resource constraints and environmental considerations, population growth, and growing congestion were such that a renaissance of public transit was just around the corner. Several decades later, while transit continues to play a very important role in both individual's lives and the overall economy, transit remains a modest and arguably stable provider of transportation. The NHTS data makes it clear that transit is indeed very critical to mobility for many segments of the population that do not have options and that it is a choice mode for a diverse set of individuals who find value in using public transportation. Clearly, the industry can feel proud of its accomplishments and contributions.

The NHTS also makes it clear that the role of public transportation in the overall system of transportation is important but modest and has not shown a meaningful breakout. There are no obvious or easy new markets that can dramatically grow transit use and, absent significant deterioration in economic conditions or energy crises, growth will require attracting travelers that have mobility choices. To grow, transit will have to offer competitive services by using technology, sound planning, disciplined execution and additional resources to improve services or transit will have to position itself to take advantage should capacity constraints in roadway travel create opportunities for transit. Growth will remain challenging.

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