

**RESIDENTIAL LOCATION, LAND USE AND TRANSPORTATION:  
THE NEGLECTED ROLE OF NONWORK TRAVEL**

Bumsoo Lee, Peter Gordon, James E. Moore, II, and Harry W. Richardson

School of Policy, Planning and Development  
University of Southern California  
Los Angeles, California 90089-0626

October 19, 2005

This research was supported by a grant from the Lusk Center for Real Estate at the University of Southern California.

## 1. INTRODUCTION

Simple introspection as well as accumulating evidence from academic research suggests that a core idea of urban economists, that journeys-to-work dominate households' choice of residential location, is suspect (Giuliano and Small, 1993). Indeed, our own recent research identifies neighborhood characteristics (attractions) that help to explain *longer* commutes; we found very few neighborhood types that would help to explain a shorter journey to work (Gordon *et al.*, 2005). Also, findings that reveal the relative importance of non-work activities and trips, some of which may be amenable to more flexible scheduling and/or are less essential, also inform the long-running discussion about the potential power of peak-load road pricing to reduce highway congestion.

In this paper, we present evidence that corroborates both of these ideas. Four sets of findings are discussed. First, we investigate work and nonwork travel for a set of weekly travel periods more detailed than the standard division into peak vs. off-peak travel. Instead, we use ten distinct periods of the week. Second, we attempt to identify the variables that explain nonwork travel frequencies and durations. Third, we revisit the standard work vs. nonwork trip purpose dichotomy and study types of *tours* (involving trip chains) that combine the two. In 2001, approximately 25 percent of commutes included one or more stops along the way. Fourth, we test hypotheses that explain the nature and the frequencies of the trip and tour types.

Most of our analysis is based on data from the 1990 and 1995 Nationwide Personal Transportation Survey (NPTS) and the 2001 National Household Travel Survey (NHTS). The analysis of trips and tours, however, is restricted to different periods, 1990

to 2001 for trip analysis and 1995 to 2001 for tour-level analysis, because of limitations of each year's survey. In the eleven years between the 1990 and 2001 surveys, the U.S. population grew by 15.8 percent but the number of drivers increased by 16.8 percent while the number of workers grew by 22.8 percent. The Census Bureau also reports that the labor force participation rate dipped slightly between 1990 and 2000, from 65.3 percent to 63.9 percent.

## **2. LITERATURE REVIEW**

As the importance of daily non-work activities and travel continues to grow, urban researchers have belatedly started to look beyond the journey-to-work. Some of us (Gordon, Kumar, and Richardson, 1988) reported that there had been remarkable increases in non-work travel by the mid-1980s, with particularly faster growth in the peak periods. The observation of a faster increase in the frequency of nonwork travel among suburbanites led us to suggest that trip cost savings resulting from more efficient spatial structure (suburbanization) helped to explain more trip making. Later research attributed non-work travel growth to changes in household structure (Strathman, Dueker, and Davis, 1994) or changes in lifestyle and retail industry structure (Nelson and Niles, 2000).

Because travel demand is a derived demand, the increase in non-work travel must ultimately be associated with individual (or household) preferred activity patterns. In this context, non-work travel behavior can best be understood via the perspective of "human activity" approaches. We briefly review activity-based studies of non-work travel behavior focusing on trip-chaining and on the links between urban form and non-work

travel. For more complete surveys, see Kitamura (1988), Fox (1995), and Bhat and Koppelman (1999).

Activity-based approaches “study travel in the context of daily household activity patterns, as a link in the process of fulfilling travel demands through the formation of daily sets, or chains, of activities” (Fox, 1995, p.105). Two key ideas associated with this approach are that travel demand is derived from the demand for activities and that people make decisions about activities and travel in the face of spatio-temporal constraints (Bowman and Ben-Akiva, 2000). Researchers using this approach have made significant contributions to a better understanding of activity participation and scheduling, spatio-temporal and interpersonal constraints, and interactions between travel decisions and household structure (Kitamura, 1988).

In the activity-based approach, the rapid growth in non-work travel is explained by socio-economic change. For example, rising female labor participation has increased the opportunity cost associated with activities at home, and increasing incomes have enabled more activities outside the home, often substituting for at-home activities (Levinson and Kumar, 1995). Dining out is a good example. The dispersion of work trips over off-peak periods and increased non-work trips during the peak hours can also be explained by substantial increases in the chaining of work and non-work trips (Levinson and Kumar, 1995). Indeed, trip-chaining behavior is a critical factor for understanding daily urban travel and empirical studies have shown how individuals or households link work and non-work trips within types of trip chains (tours) given spatio-temporal constraints.

In general, people are more likely to link multiple trips in a chain to economize on time when their demand for travel intensifies, while longer-duration activities are less likely to be chained (Recker, McNally, and Root, 1987; Strathman, Dueker, and Davis, 1994). Workers with longer commute distances (Nishii, Kondo, and Kitamura, 1988) and/or off-peak commutes (Strathman, Dueker, and Davis, 1994), on the other hand, have higher propensities to link non-work trips with commutes.

Demographic factors also have clear effects on travel behavior. Gender difference is one of the most important because females tend to make more non-work trips (especially for shopping and family/personal business) and to form more trip chains. However, males take longer trips and tours both in time and distance (Wegmann and Jang, 1998). Some authors (Srinivasan and Ferreira, 2002) have found that household structure and lifecycle stage are also important factors: Families with children tend to engage in more non-work activities and travel times, and hence are more likely to chain non-work trips.

However, spatial variation evidence is mixed. Some researchers (Williams, 1988) have found that suburban residents with higher trip frequencies and lower mobility engage in more trip-chaining. Srinivasan and Ferreira (2002) reported that more non-work activities of suburbanites are chained, but neighborhood level land uses, urban design, and accessibility variables were statistically insignificant in their study.

The New Urbanism discussion has also prompted research about possible neighborhood impacts on non-work travel. The major interest in this literature is whether accessibility or urban design at the neighborhood level could somehow alter travel behavior towards fewer vehicle miles traveled (VMT) and more transit use. To date, the

empirical evidence for this view is unconvincing. One case study (Handy, 1996) of the San Francisco Bay Area found that VMT savings from higher accessibility in traditional neighborhoods might be offset by increased trip frequencies. Overall, neighborhood land uses and/or urban design impacts on non-work travel behavior are moderate and of particularly little significance when controlled for socio-demographic factors and/or attitudinal (lifestyle) variables (Crane and Crepeau, 1998; Boarnet and Sarmiento, 1998). The latter finding implies self-selection bias in the studies of neighborhood impacts (Kitamura, Mokhtarian, and Laidet 1997; Bagley and Mokhtarian 2002).

The links between urban form and non-work travel may also be better understood via activity-based approaches. Zhang (2004) and Srinivasan and Ferreira (2002) are among the few studies in this vein.

### **3. DATA AND RESEARCH APPROACH**

The 1990 and 1995 Nationwide Personal Transportation Survey and 2001 National Household Travel Survey are three of a series of nationwide surveys that were begun in 1969 to collect personal daily travel data. These surveys were subsequently conducted in 1977, 1983, 1990 and 1995 by the U.S. Department of Transportation (USDOT). In 2001, DOT integrated the American Travel Survey (ATS), which addressed long distance travel, with the NPTS, and renamed the survey the NHTS. In the last few rounds, the surveys have employed telephone interviews to collect detailed data on households, people, vehicles, and travel for all purposes by all modes. Thus, NPTS/NHTS data series provide a rich data source for research on travel characteristics nationwide over time.

Unfortunately, some opportunities to analyze travel trends using NPTS/NHTS are limited because the survey techniques have changed between survey years. In particular, a travel diary (replacing memory recall) and household rosters have been used only since the 1995 survey. These changes have significantly improved interview responses, but they restrict comparability from one survey to another. Appendix 2 of Hu and Young (1999) provides a method to adjust 1990 data for comparison with 1995 and 2001 data by estimating the impact of the two new techniques had they been used in 1990 survey. Another problem is that, given what is known of work trip trends in the 1990s, the 1995 survey is believed to overestimate work trips. For these reasons, our trip-level analysis relies on the 1990 and 2001 data only. However, there is no reason to conclude that the potential overestimation of work trips in the 1995 survey adversely affects the 1995 data on trip chaining. Thus, our tour-level analyses compare 1995 and 2001 data.

Descriptive and regression analyses follow. The first descriptive discussion includes basic statistics on work and non-work travel, tabulated by trip purpose, metropolitan population size, place of residence (central cities vs. suburbs), and travel time of day and day of week (travel time of week). In particular, we classified all trips into ten categories according to their departure time of day and day of week in order to analyze work and non-work trip patterns in terms of temporal variation. Place of residence is inferred from zip code information using GIS tools to process the 2001 data, while place of residence was provided in 1990.

The second part of the descriptive analysis focuses on trip-chaining behavior. While trip-chaining is an increasingly important factor in understanding non-work travel

behavior, the analysis of trip-chaining was performed only for 1995 and 2001 because the 1990 NPTS survey does not provide enough information.

The Federal Highway Administration (FHWA) defines a trip chain as “a sequence of trips bounded by stops of 30 minutes or less” (McGuckin and Nakamoto, 2005, p.1). Thus, any stop of more than 30 minutes duration becomes a boundary, separating two different tours. A tour denotes “total travel between two anchor destinations,” (McGuckin and Nakamoto, 2005, p.3). A tour can be composed of a single direct trip or chained trips. Unlike previous research, the FHWA includes places other than the home and workplace as anchor destinations that may constitute either end of a tour. Thus, trip chain datasets for 1995 NPTS and 2001 NHTS classify all tours into nine tour types according to origin and destination place types: 1.) home-to-home, 2.) home-to-other, 3.) home-to-work, 4.) other-to-home, 5.) other-to-other, 6.) other-to-work, 7.) work-to-home, 8.) work-to-home, and 9.) work-to-work. The home-to-work and work-to-home tours are clearly commute tours, whether direct or chained.

However, a commute tour in the general sense can be much more complicated, possibly involving intervening stops of more than 30 minutes, such as a visit to a fitness center. To distinguish these kinds of commutes, we define six types of commute tours based on to the number of stops of 30 minutes or less and the number of stops of more than 30 minutes (Table 3.2). We identified commutes with a stop of more than 30 minutes by connecting two pairs of continuing, FHWA-defined tours in the categories home-to-other and other-to-work; and in the categories work-to-other and other-to-home. If, however, there are two or more intervening stops of more than 30 minutes en route to or from the workplace, we do not count the tour as a commute.



Our hypothesis tests are of two types, trip-level analysis and trip-chaining behavior analysis. In the trip-level analysis, we estimate a series of regression models to test hypotheses with regard to trip-level characteristics. We associate trip frequency, distance and duration with socio-demographic and geographic factors. The criterion variables for all regressions are in natural log form because these variables tend to have a skewed distribution and we added a small number (0.1) to each observation to avoid log of zero (Giuliano, 2003).

Explanatory variables include place of residence (MSA size and central city vs. suburbs), survey year, person- and household-level variables (Table 3.3). We also examined whether the impacts of these determinants vary by time of day and day of week (Table 3.1). All variables except the total number of day-trips, distance to work, and income enter the regressions as dummy variables. To adjust for inflation between 1990 and 2001, we converted categorical income variables into approximate continuous measures by assigning the midpoints of each person's household income bracket as the actual income. Based on the urban consumer price index (CPI-U), the 1990 incomes are multiplied by a factor of 1.35425 to adjust them to 2001 values. We also enter the income variable quadratically to account for the possible nonlinear relationship between income and travel behavior.

Some observations from the original data sets were excluded. First, all regression analyses are undertaken only for trips made by persons aged 16 years and older who live in metropolitan areas. Second, trips longer than 75 miles or 120 minutes are also excluded from the regression samples because they are too atypical. Finally, we excluded observations for which trip length/time or any values of the explanatory

variables are unknown. All observations are weighted according to sampling rates because NPTS/NHTS surveys are not based on random sampling. The weight values in the original data set range from thousands to millions. We divided these weight variables by the appropriate sample means in order to scale down to the unweighted sample size (Giuliano, 2003).

In the analysis of trip chaining behavior, we tested the likelihood of trip chaining in commute and non-commute tours via binomial and multinomial logit models. In contrast to the trip-level analysis, trip chaining behavior is tested with a tour level data set. Explanatory variables relate to person level travel demand in addition to the variables used in trip level analyses. Whenever a person used multiple modes in a tour, the mode of transportation variable is defined to be the mode used to travel the greatest distance.

Sampling is different for the commute and non-commute tour models. Whereas models for commute chaining are estimated only for samples of workers, samples for non-commute tour models also include the unemployed. We estimate logit models for both a pooled sample and for samples within each time period from Monday through Thursday.

## **4. DESCRIPTIVE ANALYSIS**

### **The Growth and Characteristics of Work and Non-work Trips**

Most travel by Americans does not involve commuting. In fact, it is now clear that even the majority of peak period travel is not work-related (Table 4.1). Non-work trips accounted for more than four-fifths of all trips in each year of the survey, and were a sizeable majority in every one of the ten time-of-week periods analyzed. They also grew more quickly between the 1990 and 2001 survey years than work trips (by 30 percent as opposed to 23 percent, while the U.S. population grew by 15.8 percent).

The Monday-Thursday AM peaks included the largest number and share of work trips, but these work trips were never the majority trip type, and they fell significantly between survey years. The Friday AM peak shows a larger and increasing proportion of non-work trips. The only period showing a large increase in the proportion of work trips was the Monday-Thursday night off-peak period. There is a stark contrast among growth patterns for work and non-work trips in terms of their temporal distribution across weekly periods. Whereas work trips became more spread out, extending to off-peaks, non-work trips grew faster in the morning peak. The spreading of work trips may be the result of increasingly flexible work schedules, while the growth in morning-peak non-work trips reflects the increased frequency of non-work trip chaining into commute tours.

Non-work trips are dominated by trips for family or personal business (including shopping and doctor visits). Yet, there was also considerable growth in the school/church trips and the social/recreation trips categories. All three of these frequencies grew most in the Friday AM-peak period, perhaps the result of a trend towards early weekends.

These data can also be arranged into broad geographical areas by central city or suburban residence or by five major metropolitan population size classes (Tables 4.2-4.4). Non-work trip frequencies (trips per person per day) increased everywhere, but significantly more so in some places than others. The only exception to this trend is the slight decline in family and personal trips in the suburbs of the 500k-999k population size-group. Interestingly, the growth in work trip frequencies was positive for all central city residents, but was negative for all suburbanites with the exception of those in the smallest and 1-3 million size classes.

A similar analysis can also be carried out for daily average person-miles and person-minutes of travel (Tables 4.3 and 4.4). Suburban residents traveled greater distances than their central city counterparts in both years, but we know from Table 4.2 that this is not only a result of longer but also the result of more frequent trips. Not surprisingly, the number of average person-minutes traveled per day increased across the board. The increases were most pronounced for central city residents (all size classes and across all trip purposes), with family and personal trips most affected.

### **The Trip-chaining Phenomenon**

Non-work travel cannot be fully understood without addressing the extent to which non-work trips are linked to work trips. Studying tours is useful. For example, of the 20.7 percent of all tours that involve commuting, only three-quarters are a direct commute in 2001 (Table 4.6). Trip-chaining accounts for the rest. In the case of non-commute tours, which accounts for 78 percent of all tours, 18.4 percent are chained tours. The proportions of chained commute and non-commute tours become slightly larger (37

percent and 35 percent, respectively) when measured in person-miles traveled (Table 4.8). At the trip level, 37.1 percent of all trips for non-work purposes are chained into either commute or non-commute tours (Table A2). Also, almost one-half of trips for family and personal business purpose are chained.

Most of the chained commute tours are of the chain 1 type, involving a single stop of less than thirty minutes. Most of these tours occur during the peaks, especially in the AM-peak.. However, more complex commute chains involving a stop of more than thirty minutes occur more frequently in the PM-peak or the daytime off-peak than in the AM-peak (Tables 4.6 and 4.8). There are also variations in trip-chaining behavior across different geographies (Table A3). Residents of central cities in the largest metropolitan areas are the least likely to chain trips. This could be the result of differences in accessibility levels and automobile use.

Intertemporally, the apparent decline in total commuting volume may be because of the overestimation of work trips in the 1995 survey. The 1995 data are much more useful for exploring trip-chaining behavior than for commute and non-commute tour comparisons. Many more workers chained non-work trips with their commute tours in 2001 than in 1995. In particular, chained commute tours in the morning peak increased significantly. Trip-chaining also increased among the non-commute tours, and even more so when measured in terms of person miles of travel (PMT). Again, chained non-commute tours increased the fastest in the Monday through Thursday AM peak. This increase in chained tours in the morning peak may be an important factor in the increased congestion of the late 1990s (Gordon *et al.*, 2004). In the next section, we test to what

extent the increasing tendency to chain trips can be explained by socio-demographic changes. The influence of geographies and trip timing will also be readdressed.

## **5. HYPOTHESES TESTED**

### **Determinants of Trip Lengths and Times**

The analysis of trip lengths is summarized in Table 5.1. Household income helps to explain longer trips. As expected, the marginal effects of higher income declines with increasing income. Females take shorter non-work and shorter work trips. The latter has been explained in terms of many females' involvement with home-centered activities, but the same reasoning may also apply to non-work trips. The effects of age are mixed. The young (aged 16-24) take shorter work trips but longer non-work trips. On the other hand, seniors take shorter trips of all kinds, work and non-work, although of course fewer members of this group work. Those in the 25-34 cohort take longer trips in all trip categories.

Interestingly, central city residents took significantly shorter trips of all types. Similarly, those not living in the largest (3-million and above) metro areas experienced shorter work-trip lengths. Yet, they chose longer non-work trips. Also, both work and non-work trips all became longer in the second-year of the survey, with the exception of social and recreational trips. Note that these geographic effects occur after household income and the household availability of automobiles has been controlled. As expected, average trip lengths are strongly affected by the number of vehicles and drivers per household.

Many of these relationships can also be found in the regression analyses of trip times (Table 5.2). The interesting exception is income. Whereas higher-income individuals have longer work-trip times, they have shorter non-work trip times. This may be partly the consequence of location, given that driver licenses has already been taken into account. Non-work trip times and lengths can also be studied by time-of-day, making use of our division of the data into ten time-of-week categories. In both regression equations, the proportion of the variance explained is slightly higher for work than for non-work trips.

Tables 5.3, 5.4 and 5.5 show the links between trip length, trip times, frequency and time of travel. Household income helps to explain more of non-work trip-making for all ten time periods. The square of income is negative and significant in almost all cases, indicating that income has a positive but decreasing effect. Employed individuals understandably take fewer non-work trips during the AM peak and daytime, but more during the night and the Friday PM peak. Households with children have more non-work trip demands, except during the night. Geographical patterns are mixed. Estimated coefficients for central city residency are negatively significant for half of the ten periods. Smaller-MSA residents take more non-work trips on Mondays through Thursdays. But the estimated coefficients for MSA size show a less clear pattern on Fridays and weekends. Females take more non-work trips, except during the weekday nighttime hours.

## **Determinants of Tours**

The first tour test is a binomial logit analysis of commute tours focusing on the decision to chain or not to chain (Table 5.6). The results conform to expectations. The odds of chaining are greater as the longer the journey to work and the greater the number of daytrips. That is, the more intense the demand for travel, the more pressure to consolidate trips. These effects are consistent through all time periods. Transit users and those who walk, on the other hand, are understandably less likely to link trips. Females are much more likely to link work trips with non-work trips and do so over all time periods. Age effects are mixed and income is insignificant.

The presence of children affects the odds of commute chaining only in the morning peak. The location of the workers' residence is also a partial predictor of commute chaining behavior. Residents of small metropolitan areas that are less subject to congestion tend to be less likely to chain commute tours, but only in certain periods. Workers residing in less urbanized neighborhoods that have lower accessibility seem to be more likely to chain non-work trips into commute tours. However, only residence in the rural-type neighborhoods is consistently significant through all time periods. Finally, trip-chaining was less likely during the morning commute, and more likely in the afternoon commute, and in Monday-Thursday off-peak commutes.

A more complex analysis relates the probability of engaging in various types of journey-to-work tours, as opposed to making a direct trip. Table 5.7 summarizes estimates of the determinants of making a relatively short (<30 minutes) vs. making a longer stop (>30 minutes). When all time periods are considered (columns A), the coefficients that are statistically significant in both columns rarely change signs. The



variables that change signs include whether or not the commuter holds a part-time job (if so, s/he is more likely to chain with longer stops), whether a child is in the household (if so, the commuter is more likely to tour with shorter stops) and whether or not the trip is on Sundays (if so, longer stops are more likely). Very similar patterns persist when the time-of-week models are estimated separately.

Studying non-commute tours (Table 5.8) identifies the odds of making non-work trips singly or in bunches. We see that trips are more likely to be grouped if there are many trips per day and if non-auto modes are avoided. Income is not a determinant, but gender is: women are more likely to chain. Employment reduces the incentive to chain, as expected.

Many of these results conform to expectations. People are strategic about most of their daily travel, not simply about their journey-to-work. After controlling all the variables cited, people are more likely to chain both commute and non-commute tours in 2001 than in 1995. The increased odds ratios of 1.14 and 1.09 for trip chaining are probably because of the effects of increased traffic.

## 6. CONCLUSIONS

Whether we count commutes that are parts of tours or not, work trips are overshadowed throughout the week by non-work travel. Not only this, but our statistical tests show that the patterns and choices involved in non-work travel are linked to economic and demographic explanatory variables in ways that follow common sense intuition. It is very difficult, then, to maintain the idea that households (and by extension whole cities) arrange themselves in space solely in response to journey-to-work distances. In an increasingly affluent, opportunity rich society, complex consumption lifestyles matter more than ever. Households allocate not simply dollars earned but also available hours subject to the normal constraints, including travel and housing costs. Lifestyle choices are much more complex than a simple trade-off between commuting times and housing costs.

Many planners and real estate developers are fully aware of this, and are keen to build planned developments that include varied shopping and recreational lifestyle opportunities. Also, increasingly footloose employers follow the labor force to where households prefer to locate. It follows that regional land use plans should be maximally flexible. We have found no results about the complexities of travel behavior that would justify, or are even consistent with top-down land use planning efforts.

## REFERENCES

- Bagley, Michael N., and Patricia L. Mokhtarian. 2002. The impact of residential neighborhood type on travel behavior: A structural equation modeling approach. *The Annals of Regional Science* 36: 279-97.
- Bhat, Chandra R., and Frank S. Koppelman. 1999. A retrospective and prospective survey of time-use research. *Transportation* 26 , no. 2: 119-39.
- Bowman, John L., and Moshe E. Ben-Akiva. 2000. Activity-based disaggregate travel demand model system with activity schedules. *Transportation Research Part A* 35: 1-28.
- Crane, Randall, and Richard Crepeau. 1998. Does neighborhood design influence travel?: A behaviorl analysis of travel diary and GIS data. *Transportation Research Part D: Transport and Environment* 3: 225-38.
- Fox, Michael. 1995. Transport planning and the human activity approach. *Journal of Transport Geography* 3, no. 2: 105-16.
- Giuliano, G, and K. Small. 1993. Is the journey to work explained by urban structure? *Urban Studies* 30, no. 9: 1485-500.
- Giuliano, Genevieve. 2003. Travel, location and race/ethnicity. *Transport Research Part A* 37: 351-72.
- Gordon, Peter, Ajay Kumar, and Harry W. Richardson. 1988. Beyond the journey to work. *Transportation Research A* 6: 419-26.
- Gordon, Peter, Bumsoo Lee, James E. Moore, and Harry W. Richardson. 2005. Do neighborhood attributes affect commuting times? *Western Regional Science Association 44th Annual Meeting*.
- Gordon, Peter, Bumsoo Lee, and Harry W. Richardson. 2004. The commuting conundrum of the 1990s. *Lusk Center Research Brief Winter* .
- Handy, Susan L. 1996. Understanding the link between urban form and nonwork travel behavior. *Journal of Planning Education and Research* 15: 183-98.
- Hu, Patricia S., and Jennifer R. Young. 1999. *Summary of Travel Trends: 1995 Nationwide Personal Transportation Survey*. Federal Highway Administration, U.S. Department of Transportation.
- Kitamura, Ryuichi. 1988. An evaluation of activity-based travel analysis. *Transportation* 15, no. 1-2: 9-34.
- Kitamura, Ryuichi, Patricia L. Mokhtarian, and Laura Laidet. 1997. A micro-analysis of land use and travel in five neighborhoods in the San Francisco Bay Area.

- Transportation* 24: 125-58.
- Levinson, David, and Ajay Kumar. 1995. Activity, travel, and the allocation of time. *Journal of the American Planning Association* 61, no. 4: 458-70.
- McGuckin, Nancy, and Yukiko Nakamoto. 2005. Trips, chains, and tours: Using an operational definition. *Data for Understanding Our Nation's Travel: National Household Travel Survey Conference* Transportation Research Board.
- Nelson, Dick, and John Niles. 2000. Observations on the causes of nonwork travel growth. Presented at the *Transportation Research Board, 79th Annual Meeting*.
- Nishii, K., K. Kondo, and R. Kitamura. 1988. Empirical analysis of trip chaining behavior. *Transportation Research Record* 1203: 48-59.
- Recker, W. W., M. G. McNally, and G. S. Root. 1987. An empirical analysis of urban activity patterns. *Geographical Analysis* 19: 166-81.
- Srinivasan, Sumeeta, and Joseph Ferreira. 2002. Travel behavior at the household level: Understanding linkages with residential choice. *Transportation Research Part D* 7: 225-42.
- Strathman, James G., Kenneth J. Dueker, and Judy S. Davis. 1994. Effects of household structure and selected travel characteristics on trip chaining. *Transportation* 21 : 23-45.
- Wegmann, Frederick J., and Tae Youn Jang. 1998. Trip linkage patterns for workers. *Journal of Transportation Engineering* 124, no. 3: 264-70.
- Williams, P. A. 1988. A recursive model of intraurban trip-making. *Environment and Planning A* 10: 535-46.
- Zhang, Ming. 2004. Exploring the relationship between urban form and nonwork travel through time use analysis. *Landscape and Urban Planning* forthcoming.

## TABLES AND FIGURES

**Table 3.1.** Definition of ten periods of the week

Time of day/week	Week	Departure time
Mon.-Thu. AM peak	Mon.-Thu.	6:00am-8:59am
Mon.-Thu. day off-peak	Mon.-Thu.	9:00am-3:59pm
Mon.-Thu. PM peak	Mon.-Thu.	4:00pm-6:59pm
Mon.-Thu. night off-peak	Mon.-Thu.	7:00pm-5:59am
Friday AM peak	Friday	6:00am-8:59am
Friday day off-peak	Friday	9:00am-3:59pm
Friday PM peak	Friday	4:00pm-6:59pm
Friday night off-peak	Friday	7:00pm-5:59am
Saturday	Saturday	0:00am-12:59pm
Sunday	Sunday	0:00am-12:59pm

**Table 3.2.** Nine types of commute and non-commute tours

		Number of stops of 30 minutes or less	Number of stops of more than 30 minutes
Commute tour	Direct commute	0	0
	Commute chain 1	1	0
	Commute chain 2	2 and plus	0
	Commute chain 3	0	1
	Commute chain 4	1	1
	Commute chain 5	2 and plus	1
Non-commute tour	Direct non-commute	0	0
	Non-commute chain	1 and plus	0
Other	Other, involving trip to/from workplace		2 and plus

**Table 3.3.** Definition of independent variables

	Variable <sup>1)</sup>	Definition	Reference group for dummy variables
Travel demand	Trip frequency	Number of total trips on the travel day	
	Tour period of the week	See table 3.1.	Mo. through Th. AM peak
	Transportation mode of tour <sup>2)</sup>	Transit; Walk; Others	POV
	Distance to work	Miles to workplace	
Individual Characteristics	Gender	Female	Male
	Age	16-24; 25-34; 55-64; 65 and plus	35-54
	Employment status	Employed	Unemployed
	Employment type <sup>3)</sup>	Part time employed; Multiple jobs	Full time employed
	Driver's license	Licensed	No license
Household Characteristics	Income	HH income (\$10,000); HH income square	
	Life cycle	Have children of age 15 and under	No children of the ages
	Car ownership	# vehicles < # drivers; # vehicles > # drivers	# vehicles = # drivers
Geography	MSA size	250K-; 250K-500K; 500K-1M; 1M-3M	3M+
	Block group level urban/rural code	Second city; Suburban; Town; Rural	Urban
Year <sup>3)</sup>		2001	1990

- 1) Variables from the list are selectively used in regression models according to the purpose of each analysis.
- 2) Main transportation mode of tour is decided as the mode used for the longest segment of the tour when multiple modes are used in a tour.
- 3) Employment type dummy variables are used only for the sample of employed workers.

**Table 4.1.** Annual person trips by trip purpose and by time of week, 1990 to 2001

	All		Work		Non-work		Family/ personal		School/ church		Social/ recreation	
		(%)		(%)		(%)		(%)		(%)		(%)
<b>1990 All (billion)</b>	284,551	100	49,327	17.3	235,224	82.7	130,770	46.0	27,848	9.8	76,605	26.9
Mon-Thu AM peak	27,272	100	12,227	44.8	15,045	55.2	6,700	24.6	6,968	25.5	1,377	5.0
Mon-Thu off-peak day	66,526	100	7,906	11.9	58,620	88.1	40,296	60.6	7,189	10.8	11,135	16.7
Mon-Thu PM peak	42,259	100	10,495	24.8	31,764	75.2	19,240	45.5	2,153	5.1	10,371	24.5
Mon-Thu off-peak night	32,709	100	6,152	18.8	26,557	81.2	11,897	36.4	1,853	5.7	12,807	39.2
Friday AM peak	5,068	100	2,536	50.0	2,532	50.0	1,198	23.6	1,113	22.0	221	4.4
Friday off-peak day	14,890	100	1,655	11.1	13,235	88.9	9,268	62.2	1,235	8.3	2,731	18.3
Friday PM peak	9,094	100	2,032	22.3	7,062	77.7	4,199	46.2	191	2.1	2,672	29.4
Friday off-peak night	8,723	100	1,233	14.1	7,489	85.9	2,957	33.9	184	2.1	4,349	49.9
Saturday all day	39,108	100	2,982	7.6	36,127	92.4	19,646	50.2	752	1.9	15,728	40.2
Sunday all day	38,902	100	2,109	5.4	36,793	94.6	15,368	39.5	6,211	16.0	15,214	39.1
<b>2001 All (billion)</b>	366,458	100	60,651	16.6	305,807	83.4	168,438	46.0	37,659	10.3	99,711	27.2
Mon-Thu AM peak	36,121	100	13,683	37.9	22,438	62.1	11,177	30.9	8,328	23.1	2,934	8.1
Mon-Thu off-peak day	89,124	100	10,724	12.0	78,400	88.0	53,182	59.7	8,589	9.6	16,629	18.7
Mon-Thu PM peak	48,367	100	11,712	24.2	36,655	75.8	19,648	40.6	3,573	7.4	13,434	27.8
Mon-Thu off-peak night	33,750	100	7,818	23.2	25,932	76.8	10,806	32.0	2,204	6.5	12,923	38.3
Friday AM peak	9,136	100	3,270	35.8	5,866	64.2	3,043	33.3	2,028	22.2	794	8.7
Friday off-peak day	24,927	100	2,712	10.9	22,215	89.1	15,333	61.5	1,898	7.6	4,984	20.0
Friday PM peak	13,240	100	2,679	20.2	10,561	79.8	5,745	43.4	625	4.7	4,191	31.7
Friday off-peak night	10,180	100	1,815	17.8	8,365	82.2	3,192	31.4	331	3.3	4,842	47.6
Saturday all day	54,218	100	3,786	7.0	50,431	93.0	27,420	50.6	1,686	3.1	21,325	39.3
Sunday all day	47,395	100	2,452	5.2	44,943	94.8	18,891	39.9	8,397	17.7	17,655	37.3
<b>Growth 1990-2001 (%)</b>	28.8		23.0		30.0		28.8		35.2		30.2	
Mon-Thu AM peak	32.4		11.9		49.1		66.8		19.5		113.1	
Mon-Thu off-peak day	34.0		35.6		33.7		32.0		19.5		49.3	
Mon-Thu PM peak	14.5		11.6		15.4		2.1		66.0		29.5	
Mon-Thu off-peak night	3.2		27.1		-2.4		-9.2		18.9		0.9	
Friday AM peak	80.2		28.9		131.7		154.1		82.2		258.9	
Friday off-peak day	67.4		63.9		67.9		65.4		53.7		82.5	
Friday PM peak	45.6		31.8		49.5		36.8		227.2		56.9	
Friday off-peak night	16.7		47.1		11.7		8.0		80.3		11.3	
Saturday all day	38.6		27.0		39.6		39.6		124.3		35.6	
Sunday all day	21.8		16.3		22.2		22.9		35.2		16.0	

- 1) 1990 data are adjusted to be comparable with 2001 data because new survey techniques such as travel diary and 'household rostering' are used since 1995 NPTS (Hu and Young, 1999).
- 2) Persons of age 0 to 4 are excluded from 2001 data because they were not surveyed in the 1990 NPTS.
- 3) Trips for which day of week or time of day are unknown are excluded.
- 4) The column of all trips does not equal to total person trips because it excludes trips for such purposes work-related, pleasure driving, and vacation.

**Table 4.2.** Average daily person trips by trip purpose, MSA size and place of residence, 1990 to 2001 (all modes)

Metro Size Groups	1990 Adjusted <sup>1)</sup>						2001 <sup>3)</sup>						1990 - 2001 (%)					
	work	non-work	family personal	school church	social recr'l	All <sup>4)</sup>	work	Non-work	Family personal	school church	social recr'l	All <sup>4)</sup>	work	non-work	family personal	school Church	social recr'l	All <sup>4)</sup>
<b>Inside CC<sup>2)</sup></b>																		
< 250k	0.60	3.54	1.82	0.44	1.27	4.14	0.70	3.68	1.87	0.57	1.25	4.39	17.54	4.12	2.38	27.58	-1.58	6.07
250-499k	0.62	3.24	1.84	0.32	1.08	3.86	0.67	3.30	1.82	0.36	1.12	3.97	9.30	1.76	-1.33	14.74	3.23	2.97
500-999k	0.61	3.00	1.69	0.33	0.98	3.61	0.69	3.44	1.93	0.42	1.10	4.13	12.87	14.70	13.70	26.24	12.55	14.39
1-3m	0.65	3.03	1.75	0.31	0.97	3.68	0.70	3.21	1.79	0.36	1.05	3.91	7.77	6.01	2.53	16.35	8.96	6.32
> 3m	0.61	2.68	1.47	0.35	0.87	3.29	0.62	3.00	1.70	0.36	0.94	3.63	2.13	11.97	16.28	5.11	7.44	10.15
<b>Outside CC<sup>2)</sup></b>																		
< 250k	0.64	3.08	1.78	0.32	0.99	3.72	0.67	3.43	1.89	0.43	1.12	4.10	4.65	11.44	6.31	35.00	13.15	10.27
250-499k	0.62	3.09	1.67	0.38	1.04	3.71	0.62	3.34	1.82	0.42	1.10	3.96	-0.48	8.23	9.02	12.26	5.51	6.78
500-999k	0.67	3.21	1.88	0.39	0.95	3.89	0.63	3.40	1.84	0.41	1.15	4.03	-5.83	5.68	-1.98	4.53	21.30	3.68
1-3m	0.63	3.10	1.74	0.34	1.02	3.73	0.67	3.34	1.86	0.39	1.10	4.01	5.29	7.75	6.67	13.49	7.67	7.33
> 3m	0.66	3.06	1.73	0.31	1.02	3.71	0.64	3.24	1.76	0.40	1.09	3.89	-2.34	6.07	1.92	27.39	6.58	4.58

- 1) 1990 data are adjusted to account for major changes in survey methodology, the use of travel diary and household rostering, since 1995 NPTS. The adjustment is done following the way introduced in the Appendix 2 of (Hu and Young, 1999).
- 2) Place of residence information (central cities vs. suburbs) is given in 1990 data; whereas it is inferred from zipcode information of residence using GIS for 2001 NHTS data.
- 3) 0 to 4 year old persons are excluded from 2001 data because persons of the ages were not surveyed in the 1990 NPTS.
- 4) All trips column does not equal to total person trips because it excludes trips for such purposes work-related, pleasure driving, and vacation.



**Table 4.3.** Average daily person miles traveled by trip purpose, MSA size and place of residence, 1990 to 2001 (all modes)

Metro Size Groups	1990 Adjusted						2001						1990 - 2001 (%)					
	work	non-work	family personal	school church	social recr'l	All	work	Non-work	family personal	school church	social recr'l	All	work	non-work	family personal	school church	social recr'l	All
<b>Inside CC</b>																		
< 250k	3.97	25.56	10.47	1.61	13.48	29.53	5.42	27.83	13.23	2.52	12.08	33.26	36.50	8.90	26.29	56.78	-10.34	12.61
250-499k	4.60	22.14	10.44	1.24	10.46	26.74	5.14	22.06	11.09	1.55	9.42	27.20	11.85	-0.38	6.19	25.15	-9.96	1.72
500-999k	5.04	20.03	9.64	1.69	8.70	25.07	7.24	21.26	11.48	2.07	7.70	28.50	43.65	6.12	19.12	22.58	-11.50	13.66
1-3m	5.87	20.69	10.06	1.38	9.25	26.56	6.34	22.15	11.55	1.88	8.72	28.50	8.10	7.05	14.79	36.28	-5.73	7.28
> 3m	6.08	18.51	8.63	1.39	8.49	24.59	6.30	18.31	8.62	1.57	8.12	24.61	3.67	-1.05	-0.07	12.88	-4.34	0.11
<b>Outside CC</b>																		
< 250k	6.84	30.95	15.70	2.07	13.19	37.79	6.86	29.36	14.63	2.77	11.97	36.22	0.33	-5.14	-6.80	33.86	-9.27	-4.15
250-499k	7.05	26.32	12.12	2.40	11.79	33.37	6.59	27.65	13.16	2.97	11.52	34.23	-6.60	5.05	8.54	23.64	-2.32	2.59
500-999k	8.13	28.81	15.61	2.24	10.96	36.93	7.69	27.75	13.54	2.49	11.72	35.44	-5.32	-3.69	-13.29	11.20	6.94	-4.05
1-3m	7.14	29.79	13.36	1.82	14.60	36.92	7.87	28.01	13.53	2.44	12.03	35.87	10.25	-5.98	1.30	34.00	-17.63	-2.84
> 3m	7.94	24.84	11.94	1.75	11.14	32.78	9.01	25.41	12.46	2.09	10.86	34.42	13.46	2.31	4.34	19.12	-2.52	5.01

- 1) 1990 data are adjusted to account for major changes in survey methodology, the use of travel diary and household rostering, since 1995 NPTS. The adjustment is done following the way introduced in the Appendix 2 of (Hu and Young, 1999).
- 2) Place of residence information (central cities vs. suburbs) is given in 1990 data; whereas it is inferred from zipcode information of residence using GIS for 2001 NHTS data.
- 3) 0 to 4 year old persons are excluded from 2001 data because persons of the ages were not surveyed in the 1990 NPTS.
- 4) All trips column does not equal to total person trips because it excludes trips for such purposes work-related, pleasure driving, and vacation.

**Table 4.4.** Average daily person minutes traveled by trip purpose, MSA size and place of residence, 1990 to 2001 (all modes)

Metro Size Groups	1990 Adjusted						2001						1990 - 2001 (%)					
	work	Non-work	All			work	Non-work	All			work	non-work	All					
			family personal	school church	social recr'l			family personal	school church	social recr'l			family personal	school church	social recr'l			
<b>Inside CC</b>																		
< 250k	7.99	46.37	20.17	4.98	21.22	54.35	11.06	60.43	28.48	7.28	24.66	71.48	38.46	30.33	41.24	46.11	16.24	31.52
250-499k	9.15	44.25	21.37	4.21	18.67	53.40	11.34	54.40	27.10	5.47	21.83	65.74	23.99	22.93	26.85	29.77	16.91	23.11
500-999k	9.78	41.57	21.17	4.23	16.17	51.36	13.87	51.52	27.57	6.01	17.94	65.38	41.76	23.92	30.20	42.11	10.93	27.31
1-3m	12.13	42.75	22.05	4.38	16.32	54.89	14.87	54.03	27.34	6.22	20.47	68.90	22.58	26.37	24.00	41.88	25.41	25.53
> 3m	13.74	42.00	19.79	5.19	17.01	55.73	16.74	57.22	28.42	6.86	21.94	73.96	21.85	36.25	43.59	32.08	28.98	32.70
<b>Outside CC</b>																		
< 250k	11.89	49.33	24.56	4.55	20.21	61.21	12.17	56.39	27.69	6.95	21.75	68.56	2.36	14.33	12.73	52.65	7.63	12.00
250-499k	11.44	47.07	22.11	5.53	19.44	58.51	11.91	58.23	27.33	7.56	23.34	70.15	4.15	23.71	23.63	36.78	20.08	19.88
500-999k	13.02	51.08	27.05	5.41	18.62	64.10	13.67	59.08	28.56	6.57	23.95	72.75	5.04	15.65	5.58	21.38	28.61	13.49
1-3m	12.99	48.27	23.43	4.59	20.25	61.26	14.92	58.23	28.34	6.63	23.26	73.15	14.85	20.63	20.93	44.38	14.89	19.40
> 3m	15.20	46.01	22.59	4.34	19.09	61.21	17.61	57.89	28.00	6.45	23.43	75.49	15.85	25.80	23.99	48.54	22.77	23.33

- 1) 1990 data are adjusted to account for major changes in survey methodology, the use of travel diary and household rostering, since 1995 NPTS. The adjustment is done following the way introduced in the Appendix 2 of (Hu and Young, 1999).
- 2) Place of residence information (central cities vs. suburbs) is given in 1990 data; whereas it is inferred from zipcode information of residence using GIS for 2001 NHTS data.
- 3) 0 to 4 year old persons are excluded from 2001 data because persons of the ages were not surveyed in the 1990 NPTS.
- 4) All trips column does not equal to total person trips because it excludes trips for such purposes work-related, pleasure driving, and vacation.

**Table 4.5.** Number of tours by tour type and period of the week, 1995

	Commute									Non-commute			Other	All
	Direct	Chain						Direct	Chain					
			Chain1	Chain2	Chain3	Chain4	Chain5							
All (million)	58,681	45,868	12,813	6,456	1,885	2,874	1,037	560	205,870	168,193	37,677	8,248	272,799	
Mon-Thu AM peak	13,882	11,221	2,660	1,743	390	370	96	62	14,313	12,001	2,312	785	28,979	
Mon-Thu off-peak day	10,665	7,644	3,021	1,281	470	745	300	226	51,006	39,671	11,335	2,975	64,646	
Mon-Thu PM peak	11,519	8,425	3,094	1,464	462	799	274	96	23,338	19,434	3,905	1,234	36,091	
Mon-Thu off-peak night	6,199	5,490	709	423	64	189	25	8	19,700	17,370	2,330	805	26,704	
Friday AM peak	3,305	2,686	619	378	97	81	45	17	3,778	3,094	684	144	7,226	
Friday off-peak day	2,684	1,881	803	318	127	191	109	59	14,192	10,960	3,232	770	17,646	
Friday PM peak	2,553	1,897	656	272	143	142	73	26	6,778	5,569	1,209	296	9,626	
Friday off-peak night	1,434	1,251	183	93	20	51	8	10	6,620	5,766	854	176	8,229	
Saturday all day	3,875	3,198	677	294	75	216	55	38	33,976	27,208	6,768	672	38,523	
Sunday all day	2,567	2,176	391	190	38	91	52	20	32,168	27,121	5,048	393	35,128	
All (%)	21.5	16.8	4.7	2.4	0.7	1.1	0.4	0.2	75.5	61.7	13.8	3.0	100	
Mon-Thu AM peak	47.9	38.7	9.2	6.0	1.3	1.3	0.3	0.2	49.4	41.4	8.0	2.7	100	
Mon-Thu off-peak day	16.5	11.8	4.7	2.0	0.7	1.2	0.5	0.3	78.9	61.4	17.5	4.6	100	
Mon-Thu PM peak	31.9	23.3	8.6	4.1	1.3	2.2	0.8	0.3	64.7	53.8	10.8	3.4	100	
Mon-Thu off-peak night	23.2	20.6	2.7	1.6	0.2	0.7	0.1	0.0	73.8	65.0	8.7	3.0	100	
Friday AM peak	45.7	37.2	8.6	5.2	1.3	1.1	0.6	0.2	52.3	42.8	9.5	2.0	100	
Friday off-peak day	15.2	10.7	4.5	1.8	0.7	1.1	0.6	0.3	80.4	62.1	18.3	4.4	100	
Friday PM peak	26.5	19.7	6.8	2.8	1.5	1.5	0.8	0.3	70.4	57.9	12.6	3.1	100	
Friday off-peak night	17.4	15.2	2.2	1.1	0.2	0.6	0.1	0.1	80.4	70.1	10.4	2.1	100	
Saturday all day	10.1	8.3	1.8	0.8	0.2	0.6	0.1	0.1	88.2	70.6	17.6	1.7	100	
Sunday all day	7.3	6.2	1.1	0.5	0.1	0.3	0.1	0.1	91.6	77.2	14.4	1.1	100	
All (%)	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	
Mon-Thu AM peak	23.7	24.5	20.8	27.0	20.7	12.9	9.2	11.0	7.0	7.1	6.1	9.5	10.6	
Mon-Thu off-peak day	18.2	16.7	23.6	19.8	24.9	25.9	28.9	40.3	24.8	23.6	30.1	36.1	23.7	
Mon-Thu PM peak	19.6	18.4	24.2	22.7	24.5	27.8	26.4	17.1	11.3	11.6	10.4	15.0	13.2	
Mon-Thu off-peak night	10.6	12.0	5.5	6.6	3.4	6.6	2.4	1.4	9.6	10.3	6.2	9.8	9.8	
Friday AM peak	5.6	5.9	4.8	5.9	5.2	2.8	4.3	3.1	1.8	1.8	1.8	1.7	2.6	
Friday off-peak day	4.6	4.1	6.3	4.9	6.7	6.6	10.5	10.5	6.9	6.5	8.6	9.3	6.5	
Friday PM peak	4.4	4.1	5.1	4.2	7.6	4.9	7.1	4.6	3.3	3.3	3.2	3.6	3.5	
Friday off-peak night	2.4	2.7	1.4	1.4	1.1	1.8	0.8	1.8	3.2	3.4	2.3	2.1	3.0	
Saturday all day	6.6	7.0	5.3	4.6	4.0	7.5	5.3	6.7	16.5	16.2	18.0	8.1	14.1	
Sunday all day	4.4	4.7	3.1	2.9	2.0	3.2	5.0	3.5	15.6	16.1	13.4	4.8	12.9	

**Table 4.6.** Number of tours by tour type and period of the week, 2001

	Commute									Non-commute			Other	All
	Direct		Chain	Chain					Direct		Chain			
				Chain1	Chain2	Chain3	Chain4	Chain5						
All (million)	56,903	43,162	13,740	7,041	2,025	3,147	979	549		213,827	174,461	39,366	4,497	275,226
Mon-Thu AM peak	13,519	10,440	3,079	1,974	463	466	114	63		15,835	13,337	2,498	590	29,943
Mon-Thu off-peak day	10,793	7,613	3,180	1,336	493	849	305	198		53,041	41,250	11,792	762	64,596
Mon-Thu PM peak	11,198	8,059	3,139	1,469	444	855	260	111		23,470	19,672	3,798	594	35,262
Mon-Thu off-peak night	5,913	5,097	816	506	80	186	34	11		18,905	16,599	2,305	1,157	25,974
Friday AM peak	3,266	2,544	722	480	99	98	31	14		4,218	3,580	639	110	7,595
Friday off-peak day	2,749	1,927	822	318	135	192	96	81		14,744	11,304	3,440	171	17,664
Friday PM peak	2,476	1,761	715	345	146	143	45	36		6,725	5,504	1,221	175	9,375
Friday off-peak night	1,298	1,077	221	131	28	53	7	1		6,317	5,595	722	353	7,968
Saturday all day	3,443	2,813	630	326	74	157	55	18		36,016	28,563	7,453	356	39,815
Sunday all day	2,247	1,831	416	157	64	148	30	16		34,558	29,059	5,498	229	37,034
All (%)	20.7	15.7	5.0	2.6	0.7	1.1	0.4	0.2		77.7	63.4	14.3	1.6	100
Mon-Thu AM peak	45.1	34.9	10.3	6.6	1.5	1.6	0.4	0.2		52.9	44.5	8.3	2.0	100
Mon-Thu off-peak day	16.7	11.8	4.9	2.1	0.8	1.3	0.5	0.3		82.1	63.9	18.3	1.2	100
Mon-Thu PM peak	31.8	22.9	8.9	4.2	1.3	2.4	0.7	0.3		66.6	55.8	10.8	1.7	100
Mon-Thu off-peak night	22.8	19.6	3.1	1.9	0.3	0.7	0.1	0.0		72.8	63.9	8.9	4.5	100
Friday AM peak	43.0	33.5	9.5	6.3	1.3	1.3	0.4	0.2		55.5	47.1	8.4	1.5	100
Friday off-peak day	15.6	10.9	4.7	1.8	0.8	1.1	0.5	0.5		83.5	64.0	19.5	1.0	100
Friday PM peak	26.4	18.8	7.6	3.7	1.6	1.5	0.5	0.4		71.7	58.7	13.0	1.9	100
Friday off-peak night	16.3	13.5	2.8	1.6	0.4	0.7	0.1	0.0		79.3	70.2	9.1	4.4	100
Saturday all day	8.6	7.1	1.6	0.8	0.2	0.4	0.1	0.0		90.5	71.7	18.7	0.9	100
Sunday all day	6.1	4.9	1.1	0.4	0.2	0.4	0.1	0.0		93.3	78.5	14.8	0.6	100
All (%)	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0		100.0	100.0	100.0	100.0	100.0
Mon-Thu AM peak	23.8	24.2	22.4	28.0	22.9	14.8	11.6	11.4		7.4	7.6	6.3	13.1	10.9
Mon-Thu off-peak day	19.0	17.6	23.1	19.0	24.3	27.0	31.1	36.0		24.8	23.6	30.0	16.9	23.5
Mon-Thu PM peak	19.7	18.7	22.8	20.9	21.9	27.2	26.6	20.2		11.0	11.3	9.6	13.2	12.8
Mon-Thu off-peak night	10.4	11.8	5.9	7.2	3.9	5.9	3.5	2.0		8.8	9.5	5.9	25.7	9.4
Friday AM peak	5.7	5.9	5.3	6.8	4.9	3.1	3.2	2.6		2.0	2.1	1.6	2.5	2.8
Friday off-peak day	4.8	4.5	6.0	4.5	6.7	6.1	9.8	14.7		6.9	6.5	8.7	3.8	6.4
Friday PM peak	4.4	4.1	5.2	4.9	7.2	4.5	4.6	6.6		3.1	3.2	3.1	3.9	3.4
Friday off-peak night	2.3	2.5	1.6	1.9	1.4	1.7	0.8	0.3		3.0	3.2	1.8	7.8	2.9
Saturday all day	6.1	6.5	4.6	4.6	3.6	5.0	5.6	3.3		16.8	16.4	18.9	7.9	14.5
Sunday all day	3.9	4.2	3.0	2.2	3.2	4.7	3.1	3.0		16.2	16.7	14.0	5.1	13.5

**Table 4.7.** Person miles traveled (PMT) by tour type and period of the week, 1995

	Commute									Non-commute			Other	All
	Direct	Chain						Direct	Chain					
			Chain1	Chain2	Chain3	Chain4	Chain5							
All (billion)	769.7	512.9	257	99.2	42.9	64.0	28.5	22.1	2,469.3	1,636.2	833.2	171.5	3,410.5	
Mon-Thu AM peak	183.5	131.9	52	27.4	8.8	9.9	2.8	2.6	175.6	122.6	53.1	16.1	375.2	
Mon-Thu Daytime	125.3	65.8	59	17.6	9.2	15.3	8.0	9.4	545.1	326.6	218.5	53.4	723.9	
Mon-Thu PM peak	162.9	102.6	60	24.3	8.8	17.7	6.9	2.5	213.4	149.1	64.3	23.9	400.1	
Mon-Thu Nighttime	87.6	72.8	15	7.2	2.1	4.5	0.8	0.2	213.6	156.1	57.5	21.2	322.3	
Friday AM peak	42.9	31.5	11	4.7	1.7	1.5	2.6	0.8	67.1	39.8	27.3	4.0	113.9	
Friday Daytime	31.8	16.4	15	4.5	1.9	3.9	2.9	2.1	167.6	97.5	70.1	12.8	212.1	
Friday PM peak	32.5	20.6	12	4.3	2.6	2.8	1.6	0.7	79.6	56.5	23.1	7.2	119.3	
Friday Nighttime	21.9	17.1	5	1.8	0.6	1.8	0.3	0.3	75.2	57.8	17.4	5.2	102.3	
Saturday all day	49.9	32.5	17	4.5	5.0	4.7	1.8	1.4	479.7	315.3	164.4	14.3	543.8	
Sunday all day	31.4	21.5	10	3.0	2.1	1.8	0.8	2.0	452.6	314.8	137.7	13.6	497.5	
All (%)	22.6	15.0	7.5	2.9	1.3	1.9	0.8	0.6	72.4	48.0	24.4	5.0	100	
Mon-Thu AM peak	48.9	35.2	13.7	7.3	2.4	2.6	0.7	0.7	46.8	32.7	14.1	4.3	100	
Mon-Thu off-peak day	17.3	9.1	8.2	2.4	1.3	2.1	1.1	1.3	75.3	45.1	30.2	7.4	100	
Mon-Thu PM peak	40.7	25.6	15.1	6.1	2.2	4.4	1.7	0.6	53.3	37.3	16.1	6.0	100	
Mon-Thu off-peak night	27.2	22.6	4.6	2.2	0.7	1.4	0.3	0.1	66.3	48.4	17.8	6.6	100	
Friday AM peak	37.6	27.6	10.0	4.2	1.5	1.3	2.3	0.7	58.9	35.0	23.9	3.5	100	
Friday off-peak day	15.0	7.8	7.2	2.1	0.9	1.8	1.4	1.0	79.0	46.0	33.0	6.0	100	
Friday PM peak	27.3	17.3	10.0	3.6	2.2	2.3	1.3	0.6	66.7	47.4	19.3	6.0	100	
Friday off-peak night	21.4	16.7	4.7	1.7	0.6	1.8	0.3	0.3	73.5	56.6	17.0	5.1	100	
Saturday all day	9.2	6.0	3.2	0.8	0.9	0.9	0.3	0.3	88.2	58.0	30.2	2.6	100	
Sunday all day	6.3	4.3	2.0	0.6	0.4	0.4	0.2	0.4	91.0	63.3	27.7	2.7	100	
All (%)	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	
Mon-Thu AM peak	23.8	25.7	20.1	27.6	20.6	15.5	9.8	11.7	7.1	7.5	6.4	9.4	11.0	
Mon-Thu off-peak day	16.3	12.8	23.2	17.7	21.5	23.9	27.9	42.6	22.1	20.0	26.2	31.1	21.2	
Mon-Thu PM peak	21.2	20.0	23.5	24.5	20.5	27.7	24.3	11.5	8.6	9.1	7.7	13.9	11.7	
Mon-Thu off-peak night	11.4	14.2	5.8	7.2	4.9	7.0	2.8	0.9	8.6	9.5	6.9	12.4	9.5	
Friday AM peak	5.6	6.1	4.4	4.8	4.1	2.3	9.1	3.6	2.7	2.4	3.3	2.3	3.3	
Friday off-peak day	4.1	3.2	6.0	4.6	4.4	6.1	10.3	9.6	6.8	6.0	8.4	7.4	6.2	
Friday PM peak	4.2	4.0	4.6	4.3	6.0	4.4	5.6	3.1	3.2	3.5	2.8	4.2	3.5	
Friday off-peak night	2.8	3.3	1.9	1.8	1.3	2.9	1.1	1.4	3.0	3.5	2.1	3.0	3.0	
Saturday all day	6.5	6.3	6.8	4.5	11.7	7.3	6.3	6.3	19.4	19.3	19.7	8.3	15.9	
Sunday all day	4.1	4.2	3.8	3.0	4.9	2.9	2.8	9.2	18.3	19.2	16.5	7.9	14.6	

**Table 4.8.** Person miles traveled (PMT) by tour type and period of the week, 2001

	Commute									Non-commute			Other	All
	Direct		Chain	Chain					Direct		Chain			
				Chain1	Chain2	Chain3	Chain4	Chain5						
All (billion)	810.5	510.5	300	117.3	48.2	83.2	28.2	23.1		2,891.9	1,882.9	1,009.0	78.0	3,780.4
Mon-Thu AM peak	186.3	126.9	59	30.7	10.7	10.7	4.4	2.8		236.5	145.5	91.0	17.0	439.8
Mon-Thu Daytime	141.2	73.3	68	21.8	10.3	20.9	8.4	6.7		653.7	392.0	261.7	12.6	807.5
Mon-Thu PM peak	168.7	99.8	69	23.1	10.2	24.5	6.8	4.4		260.5	184.6	75.8	8.5	437.7
Mon-Thu Nighttime	94.5	71.2	23	10.8	3.1	7.6	0.6	1.2		216.0	160.5	55.5	19.9	330.4
Friday AM peak	45.5	31.1	14	8.6	2.3	2.2	0.6	0.6		59.6	40.4	19.2	2.8	107.8
Friday Daytime	40.0	20.3	20	5.4	3.4	3.5	2.7	4.6		207.6	117.4	90.1	2.4	250.0
Friday PM peak	37.1	22.8	14	5.7	2.9	3.1	1.2	1.4		98.3	72.1	26.2	1.4	136.7
Friday Nighttime	23.1	17.2	6	3.6	0.9	1.2	0.2	0.0		95.4	72.6	22.8	4.4	122.8
Saturday all day	44.3	29.6	15	5.0	2.6	4.3	2.1	0.7		557.8	357.8	200.1	5.6	607.7
Sunday all day	29.8	18.2	12	2.6	1.7	5.2	1.3	0.8		506.6	340.1	166.5	3.6	540.0
All (%)	21.4	13.5	7.9	3.1	1.3	2.2	0.7	0.6		76.5	49.8	26.7	2.1	100
Mon-Thu AM peak	42.4	28.9	13.5	7.0	2.4	2.4	1.0	0.6		53.8	33.1	20.7	3.9	100
Mon-Thu off-peak day	17.5	9.1	8.4	2.7	1.3	2.6	1.0	0.8		81.0	48.5	32.4	1.6	100
Mon-Thu PM peak	38.5	22.8	15.8	5.3	2.3	5.6	1.6	1.0		59.5	42.2	17.3	1.9	100
Mon-Thu off-peak night	28.6	21.6	7.0	3.3	1.0	2.3	0.2	0.4		65.4	48.6	16.8	6.0	100
Friday AM peak	42.2	28.9	13.3	8.0	2.2	2.0	0.6	0.5		55.3	37.4	17.9	2.6	100
Friday off-peak day	16.0	8.1	7.9	2.2	1.3	1.4	1.1	1.9		83.0	47.0	36.1	1.0	100
Friday PM peak	27.1	16.6	10.5	4.1	2.2	2.3	0.9	1.0		71.9	52.7	19.2	1.0	100
Friday off-peak night	18.8	14.0	4.8	2.9	0.7	1.0	0.1	0.0		77.7	59.1	18.6	3.6	100
Saturday all day	7.3	4.9	2.4	0.8	0.4	0.7	0.3	0.1		91.8	58.9	32.9	0.9	100
Sunday all day	5.5	3.4	2.1	0.5	0.3	1.0	0.2	0.1		93.8	63.0	30.8	0.7	100
All (%)	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0		100.0	100.0	100.0	100.0	100.0
Mon-Thu AM peak	23.0	24.9	19.8	26.2	22.3	12.9	15.6	12.1		8.2	7.7	9.0	21.7	11.6
Mon-Thu off-peak day	17.4	14.4	22.6	18.5	21.3	25.1	29.7	28.8		22.6	20.8	25.9	16.2	21.4
Mon-Thu PM peak	20.8	19.5	23.0	19.7	21.2	29.4	24.1	19.0		9.0	9.8	7.5	10.9	11.6
Mon-Thu off-peak night	11.7	13.9	7.8	9.2	6.5	9.2	2.0	5.0		7.5	8.5	5.5	25.5	8.7
Friday AM peak	5.6	6.1	4.8	7.3	4.8	2.6	2.2	2.5		2.1	2.1	1.9	3.5	2.9
Friday off-peak day	4.9	4.0	6.6	4.6	7.0	4.2	9.6	20.0		7.2	6.2	8.9	3.1	6.6
Friday PM peak	4.6	4.5	4.8	4.8	6.1	3.8	4.4	5.9		3.4	3.8	2.6	1.7	3.6
Friday off-peak night	2.8	3.4	2.0	3.1	1.9	1.4	0.6	0.1		3.3	3.9	2.3	5.6	3.2
Saturday all day	5.5	5.8	4.9	4.3	5.4	5.2	7.3	3.1		19.3	19.0	19.8	7.1	16.1
Sunday all day	3.7	3.6	3.9	2.2	3.5	6.2	4.6	3.4		17.5	18.1	16.5	4.6	14.3

**Table 5.1.** Determinants of trip distance per trip by trip purpose (POV modes)

Dependent: log(miles/trip+0.1)	Work (N=81,814)		Nonwork (N=295,866)		Family/personal (N=186,390)		School/church (N=20,729)		Social/ recr'l (N=88,747)	
	Beta	t	Beta	t	Beta	t	Beta	t	Beta	t
Intercept	1.369	23.43 ***	1.223	78.63 ***	1.154	56.37 ***	1.059	22.97 ***	1.448	51.90 ***
D female	-0.275	-35.98 ***	-0.059	-13.23 ***	-0.056	-9.99 ***	-0.044	-2.83 ***	-0.013	-1.56
D employed	0.327	6.53 ***	0.006	1.18	-0.023	-3.42 ***	0.128	7.45 ***	0.055	5.35 ***
D driver license	0.229	8.32 ***	0.018	1.50	-0.052	-3.22 ***	0.230	7.72 ***	0.064	3.07 ***
D age 16-24	-0.060	-5.21 ***	0.129	19.14 ***	0.112	12.17 ***	0.165	8.16 ***	-0.003	-0.24
D age 25-34	0.026	2.87 ***	0.118	20.38 ***	0.101	14.30 ***	0.203	8.81 ***	0.088	8.13 ***
D age 55-64	-0.068	-4.76 ***	-0.019	-2.31 **	-0.005	-0.49	-0.182	-5.80 ***	0.003	0.20
D age 65 +	-0.334	-11.81 ***	-0.111	-12.99 ***	-0.116	-10.91 ***	-0.307	-10.14 ***	-0.053	-3.30 ***
HH income	0.049	13.20 ***	0.026	12.53 ***	0.023	9.14 ***	0.029	4.26 ***	0.020	5.27 ***
HH income square	-0.002	-9.73 ***	-0.001	-8.70 ***	-0.001	-5.99 ***	-0.001	-3.60 ***	-0.001	-3.95 ***
D with child age 15 -	0.011	1.41	-0.089	-18.28 ***	-0.057	-9.40 ***	-0.104	-6.19 ***	-0.072	-7.99 ***
D #vehicles < #drivers	-0.082	-7.08 ***	-0.061	-9.74 ***	-0.051	-6.60 ***	-0.107	-5.34 ***	-0.030	-2.45 **
D #vehicles > #drivers	0.099	10.97 ***	0.061	11.51 ***	0.055	8.34 ***	0.002	0.10	0.086	8.91 ***
D Central City	-0.207	-25.22 ***	-0.156	-33.07 ***	-0.160	-27.33 ***	-0.183	-11.08 ***	-0.134	-15.34 ***
D MSA 250K -	-0.264	-20.21 ***	-0.006	-0.86	0.022	2.33 **	-0.083	-3.31 ***	-0.067	-4.95 ***
D MSA 250K-500K	-0.149	-11.49 ***	0.063	8.60 ***	0.079	8.64 ***	0.105	4.27 ***	0.008	0.59
D MSA 500K-1M	-0.065	-5.00 ***	0.070	9.53 ***	0.103	11.18 ***	0.007	0.28	0.017	1.25
D MSA 1M-3M	-0.013	-1.40	0.065	11.95 ***	0.082	12.22 ***	0.046	2.39 **	0.029	2.94 ***
D Year 2001	0.027	3.41 ***	0.035	7.48 ***	0.073	12.48 ***	0.042	2.63 ***	-0.042	-4.82 ***
R-Square	0.050		0.013		0.012		0.045		0.009	
Adj R-Sq	0.049		0.013		0.012		0.044		0.009	

1) Reference group for age dummy is age 35 to 54; for number of vehicles, #vehicles = #drivers; for metro size, 3M+; for year 2001, 1990.

2) In all tables reporting regression results, \*\*\* significant at 0.01 percent level; \*\* significant at 0.05 percent level; \* significant at 0.1 percent.

**Table 5.2.** Determinants of trip duration per trip by trip purpose (POV modes)

Dependent: log(miles/trip+0.1)	Work (N=81,814)		Nonwork (N=295,866)		Family/personal (N=186,390)		School/church (N=20,729)		Social/ recr'l (N=88,747)	
	Beta	t	Beta	t	Beta	t	Beta	t	Beta	t
Intercept	2.585	62.16 ***	2.458	227.35 ***	2.400	167.98 ***	2.334	74.90 ***	2.630	135.72 ***
D female	-0.167	-30.72 ***	-0.028	-9.10 ***	-0.017	-4.33 ***	-0.019	-1.82 *	-0.013	-2.28 **
D employed	0.230	6.47 ***	-0.002	-0.65	-0.013	-2.75 ***	0.072	6.17 ***	0.017	2.40 **
D driver license	0.033	1.68 *	-0.124	-15.06 ***	-0.160	-14.12 ***	0.069	3.42 ***	-0.124	-8.54 ***
D age 16-24	-0.126	-15.27 ***	0.027	5.87 ***	0.006	0.90	0.119	8.70 ***	-0.073	-8.91 ***
D age 25-34	-0.016	-2.51 **	0.033	8.14 ***	0.019	3.85 ***	0.081	5.22 ***	0.018	2.41 **
D age 55-64	0.007	0.65	0.065	11.53 ***	0.078	11.35 ***	-0.075	-3.53 ***	0.076	7.20 ***
D age 65 +	-0.131	-6.52 ***	0.069	11.51 ***	0.074	10.01 ***	-0.051	-2.49 **	0.088	7.92 ***
HH income	0.012	4.63 ***	-0.011	-7.48 ***	-0.015	-8.25 ***	-0.014	-2.99 ***	-0.008	-3.00 ***
HH income square	0.000	-3.13 ***	0.000	4.85 ***	0.001	5.60 ***	0.001	2.74 ***	0.000	1.25
D with child age 15 -	-0.003	-0.61	-0.055	-16.28 ***	-0.040	-9.40 ***	-0.097	-8.57 ***	-0.023	-3.69 ***
D #vehicles < #drivers	-0.040	-4.89 ***	0.014	3.08 ***	0.028	5.07 ***	-0.023	-1.72 *	0.016	1.85 *
D #vehicles > #drivers	0.049	7.63 ***	0.021	5.66 ***	0.021	4.53 ***	0.002	0.18	0.024	3.66 ***
D Central City	-0.064	-10.92 ***	-0.016	-4.82 ***	-0.016	-4.03 ***	-0.015	-1.37	-0.009	-1.54
D MSA 250K -	-0.343	-36.84 ***	-0.123	-23.87 ***	-0.105	-16.17 ***	-0.209	-12.32 ***	-0.155	-16.39 ***
D MSA 250K-500K	-0.227	-24.60 ***	-0.056	-11.01 ***	-0.051	-7.94 ***	-0.056	-3.40 ***	-0.076	-8.00 ***
D MSA 500K-1M	-0.175	-19.03 ***	-0.036	-6.95 ***	-0.010	-1.59	-0.124	-7.28 ***	-0.070	-7.43 ***
D MSA 1M-3M	-0.109	-16.23 ***	-0.032	-8.43 ***	-0.025	-5.26 ***	-0.076	-5.76 ***	-0.038	-5.52 ***
D Year 2001	0.140	24.96 ***	0.194	59.84 ***	0.222	54.64 ***	0.182	16.72 ***	0.139	23.16 ***
R-Square	0.055		0.021		0.025		0.038		0.016	
Adj R-Sq	0.055		0.021		0.025		0.037		0.016	

1) Reference group for age dummy is age 35 to 54; for number of vehicles, #vehicles = #drivers; for metro size, 3M+; for year 2001, 1990.

**Table 5.3.** Determinants of non-work trip distance per trip by time of day/week (POV modes)

Dependent: log(miles/trip+0.1)	M-T AM peak (N=17,155)		M-T Daytime (N=80,182)		M-T PM peak (N=36,622)		M-T Nighttime (N=26,331)		Saturday (N=47,701)	
	Beta	t	Beta	t	Beta	t	Beta	t	Beta	t
Intercept	1.028	15.48 ***	1.194	38.83 ***	1.035	23.32 ***	0.950	18.45 ***	1.261	31.83 ***
D female	-0.060	-3.29 ***	-0.108	-12.73 ***	-0.030	-2.49 **	0.013	0.87	-0.039	-3.48 ***
D employed	-0.008	-0.38	-0.021	-2.18 **	0.025	1.64 *	0.010	0.52	-0.012	-0.80
D driver license	0.017	0.32	-0.034	-1.41	0.115	3.35 ***	0.114	2.93 ***	0.163	5.48 ***
D age 16-24	0.249	9.21 ***	0.070	5.10 ***	0.140	7.62 ***	0.222	11.22 ***	0.087	5.15 ***
D age 25-34	0.159	6.91 ***	0.092	7.97 ***	0.178	11.52 ***	0.168	9.15 ***	0.123	8.24 ***
D age 55-64	-0.064	-1.81 *	-0.032	-2.21 **	-0.009	-0.38	0.045	1.57	-0.016	-0.79
D age 65 +	-0.144	-3.82 ***	-0.089	-6.10 ***	-0.011	-0.45	0.051	1.51	-0.194	-8.44 ***
HH income	0.043	5.32 ***	0.021	5.43 ***	0.036	6.26 ***	0.036	5.47 ***	0.016	3.00 ***
HH income square	-0.002	-4.47 ***	-0.001	-3.43 ***	-0.001	-3.99 ***	-0.001	-3.04 ***	0.000	-1.63
D with child age 15 -	-0.256	-12.30 ***	-0.056	-5.75 ***	-0.098	-7.44 ***	-0.087	-5.68 ***	-0.089	-7.21 ***
D #vehicles < #drivers	-0.063	-2.58 ***	-0.027	-2.23 **	-0.100	-5.79 ***	-0.098	-4.76 ***	-0.029	-1.76 *
D #vehicles > #drivers	0.138	6.29 ***	0.073	7.31 ***	0.067	4.61 ***	0.046	2.70 ***	0.082	6.14 ***
D Central City	-0.120	-6.23 ***	-0.138	-15.44 ***	-0.153	-11.82 ***	-0.132	-8.71 ***	-0.240	-19.76 ***
D MSA 250K -	0.099	3.32 ***	0.040	2.90 ***	-0.019	-0.92	-0.054	-2.23 **	0.040	2.04 **
D MSA 250K-500K	0.155	5.28 ***	0.063	4.52 ***	0.043	2.13 **	0.079	3.27 ***	0.104	5.40 ***
D MSA 500K-1M	0.208	6.83 ***	0.063	4.59 ***	0.049	2.42 **	0.103	4.22 ***	0.154	7.93 ***
D MSA 1M-3M	0.145	6.53 ***	0.122	11.84 ***	0.069	4.63 ***	0.055	3.12 ***	0.055	4.07 ***
D Year 2001	0.015	0.73	0.045	5.06 ***	0.070	5.56 ***	0.092	6.29 ***	-0.023	-1.92 *
R-Square	0.032		0.012		0.018		0.019		0.018	
Adj R-Sq	0.031		0.012		0.018		0.018		0.017	

Dependent: log(miles/trip+0.1)	Fri. AM peak (N=4,005)		Fri. Daytime (N=21,033)		Fri. PM peak (N=9,911)		Fri. Nighttime (N=8,091)		Sunday (N=43,561)	
	Beta	t	Beta	t	Beta	t	Beta	t	Beta	t
Intercept	1.055	7.95 ***	1.331	23.30 ***	1.551	18.64 ***	1.056	11.51 ***	1.449	36.92 ***
D female	-0.172	-4.48 ***	-0.117	-6.91 ***	-0.097	-4.03 ***	0.111	4.18 ***	-0.014	-1.15
D employed	-0.098	-2.19 **	-0.120	-5.98 ***	-0.023	-0.76	0.135	3.84 ***	-0.042	-2.78 ***
D driver license	0.081	0.78	0.021	0.47	0.015	0.24	0.192	2.73 ***	-0.054	-1.88 *
D age 16-24	0.525	8.95 ***	0.022	0.77	0.092	2.48 **	0.143	3.93 ***	0.106	5.93 ***
D age 25-34	0.004	0.09	-0.034	-1.51	0.106	3.51 ***	0.118	3.50 ***	0.108	7.12 ***
D age 55-64	0.152	2.14 **	-0.069	-2.35 **	0.076	1.68 *	-0.025	-0.44	0.033	1.54
D age 65 +	-0.102	-1.36	-0.211	-7.22 ***	-0.236	-4.88 ***	0.036	0.55	-0.088	-3.64 ***
HH income	0.067	4.12 ***	0.009	1.18	-0.027	-2.39 **	-0.033	-2.58 ***	0.040	7.15 ***
HH income square	-0.004	-3.81 ***	0.000	-0.95	0.002	2.41 **	0.002	2.84 ***	-0.002	-6.29 ***
D with child age 15 -	0.129	3.05 ***	-0.042	-2.22 **	-0.020	-0.77	-0.022	-0.76	-0.075	-5.86 ***
D #vehicles < #drivers	-0.434	-8.39 ***	0.001	0.04	-0.226	-6.97 ***	-0.120	-3.27 ***	-0.011	-0.65
D #vehicles > #drivers	-0.198	-4.28 ***	0.104	5.16 ***	0.088	3.01 ***	0.171	5.24 ***	-0.020	-1.39
D Central City	-0.198	-4.88 ***	-0.117	-6.49 ***	-0.190	-7.34 ***	-0.072	-2.49 **	-0.132	-10.55 ***
D MSA 250K -	0.089	1.32	-0.040	-1.51	-0.188	-4.92 ***	0.062	1.35	-0.053	-2.63 ***
D MSA 250K-500K	-0.068	-1.17	0.146	5.54 ***	-0.033	-0.84	0.075	1.74 *	0.009	0.47
D MSA 500K-1M	0.102	1.62	0.068	2.39 **	0.044	1.07	0.166	3.71 ***	-0.048	-2.47 **
D MSA 1M-3M	-0.017	-0.37	-0.046	-2.23 **	0.027	0.92	0.096	2.83 ***	0.016	1.12
D Year 2001	-0.013	-0.29	0.052	2.78 ***	0.087	3.36 ***	0.062	2.23 **	0.001	0.10
R-Square	0.058		0.012		0.026		0.017		0.008	
Adj R-Sq	0.053		0.011		0.024		0.015		0.007	

1) Reference group for age dummy is age 35 to 54; for number of vehicles, #vehicles = #drivers; for metro size, 3M+; for year 2001, 1990.



**Table 5.4.** Determinants of non-work trip duration per trip by time of day/week (POV modes)

Dependent: log(minutes/trip+0.1)	M-T AM peak (N=17,155)		M-T Daytime (N=80,182)		M-T PM peak (N=36,622)		M-T Nighttime (N=26,331)		Saturday (N=47,701)	
	Beta	t	Beta	t	Beta	t	Beta	t	Beta	t
Intercept	2.428	51.53 ***	2.457	115.58 ***	2.459	78.14 ***	2.276	63.78 ***	2.442	88.35 ***
D female	-0.052	-4.00 ***	-0.046	-7.77 ***	-0.013	-1.50	0.010	1.01	-0.024	-3.03 ***
D employed	-0.034	-2.24 **	-0.022	-3.28 ***	-0.002	-0.21	-0.018	-1.36	-0.028	-2.66 ***
D driver license	-0.118	-3.20 ***	-0.132	-7.96 ***	-0.078	-3.23 ***	-0.046	-1.69 *	-0.081	-3.89 ***
D age 16-24	0.153	7.95 ***	-0.009	-0.98	0.022	1.72 *	0.069	5.00 ***	0.032	2.68 ***
D age 25-34	0.076	4.69 ***	-0.009	-1.12	0.062	5.72 ***	0.044	3.43 ***	0.075	7.19 ***
D age 55-64	0.023	0.93	0.029	2.89 ***	0.040	2.47 **	0.094	4.77 ***	0.091	6.41 ***
D age 65 +	-0.018	-0.69	0.054	5.35 ***	0.084	4.69 ***	0.144	6.17 ***	0.046	2.86 ***
HH income	-0.009	-1.61	-0.019	-7.14 ***	-0.010	-2.59 ***	-0.004	-0.92	0.002	0.59
HH income square	0.000	1.24	0.001	5.07 ***	0.000	1.86 *	0.000	1.40	0.000	-1.71 *
D with child age 15 -	-0.170	-11.54 ***	-0.059	-8.82 ***	-0.091	-9.76 ***	-0.024	-2.25 **	-0.032	-3.69 ***
D #vehicles < #drivers	-0.012	-0.71	0.024	2.90 ***	-0.007	-0.57	-0.066	-4.60 ***	0.067	5.83 ***
D #vehicles > #drivers	0.070	4.48 ***	0.011	1.63	0.033	3.23 ***	0.005	0.46	0.043	4.57 ***
D Central City	0.002	0.18	-0.018	-2.95 ***	-0.019	-2.03 **	0.001	0.07	-0.049	-5.74 ***
D MSA 250K -	-0.088	-4.18 ***	-0.089	-9.48 ***	-0.161	-11.25 ***	-0.161	-9.49 ***	-0.106	-7.71 ***
D MSA 250K-500K	-0.039	-1.88 *	-0.040	-4.16 ***	-0.113	-7.87 ***	-0.060	-3.57 ***	-0.018	-1.35
D MSA 500K-1M	0.022	1.04	-0.017	-1.77 *	-0.079	-5.55 ***	-0.011	-0.65	0.036	2.63 ***
D MSA 1M-3M	0.024	1.53	0.007	1.00	-0.034	-3.19 ***	-0.056	-4.53 ***	-0.036	-3.83 ***
D Year 2001	0.137	9.57 ***	0.202	32.52 ***	0.217	24.23 ***	0.236	23.19 ***	0.150	17.81 ***
R-Square	0.028		0.025		0.029		0.031		0.015	
Adj R-Sq	0.027		0.024		0.029		0.030		0.015	

Dependent: log(minutes/trip+0.1)	Fri. AM peak (N=4,005)		Fri. Daytime (N=21,033)		Fri. PM peak (N=9,911)		Fri. Nighttime (N=8,091)		Sunday (N=43,561)	
	Beta	t	Beta	t	Beta	t	Beta	t	Beta	t
Intercept	2.372	24.79 ***	2.443	61.60 ***	2.466	41.74 ***	2.436	39.22 ***	2.571	95.07 ***
D female	-0.081	-2.94 ***	-0.041	-3.49 ***	0.001	0.04	0.075	4.14 ***	-0.018	-2.26 **
D employed	-0.035	-1.08	-0.039	-2.80 ***	0.064	2.95 ***	0.079	3.33 ***	-0.028	-2.68 ***
D driver license	-0.101	-1.35	-0.129	-4.13 ***	-0.018	-0.41	-0.132	-2.78 ***	-0.162	-8.18 ***
D age 16-24	0.312	7.37 ***	0.024	1.22	0.009	0.35	0.044	1.78 *	-0.021	-1.68 *
D age 25-34	-0.049	-1.41	-0.058	-3.73 ***	0.049	2.30 **	0.046	2.01 **	0.037	3.50 ***
D age 55-64	0.132	2.58 ***	0.069	3.41 ***	0.135	4.25 ***	0.097	2.49 **	0.110	7.42 ***
D age 65 +	0.035	0.64	0.063	3.13 ***	0.064	1.87 *	0.206	4.70 ***	0.109	6.51 ***
HH income	0.004	0.36	-0.022	-4.12 ***	-0.044	-5.47 ***	-0.048	-5.58 ***	-0.004	-1.07
HH income square	0.000	-0.54	0.001	3.02 ***	0.002	5.45 ***	0.002	4.93 ***	0.000	-0.17
D with child age 15 -	0.047	1.54	-0.021	-1.61	-0.017	-0.92	-0.005	-0.24	-0.035	-3.99 ***
D #vehicles < #drivers	-0.210	-5.63 ***	0.044	2.74 ***	-0.054	-2.35 **	0.049	1.97 **	0.035	2.96 ***
D #vehicles > #drivers	-0.165	-4.93 ***	0.053	3.83 ***	0.000	-0.02	0.111	5.00 ***	-0.001	-0.15
D Central City	-0.034	-1.15	0.024	1.91 *	-0.009	-0.48	0.024	1.22	0.001	0.15
D MSA 250K -	-0.093	-1.91 *	-0.107	-5.78 ***	-0.172	-6.33 ***	-0.067	-2.14 **	-0.151	-10.83 ***
D MSA 250K-500K	-0.143	-3.42 ***	0.005	0.27	-0.080	-2.91 ***	0.034	1.16	-0.110	-8.18 ***
D MSA 500K-1M	-0.091	-2.01 **	-0.029	-1.49	-0.046	-1.57	0.015	0.49	-0.145	-10.89 ***
D MSA 1M-3M	-0.088	-2.64 ***	-0.047	-3.28 ***	-0.035	-1.64 *	0.006	0.26	-0.086	-8.56 ***
D Year 2001	0.175	5.27 ***	0.217	16.81 ***	0.203	11.02 ***	0.202	10.69 ***	0.188	22.14 ***
R-Square	0.048		0.028		0.026		0.030		0.026	
Adj R-Sq	0.044		0.027		0.024		0.028		0.025	

1) Reference group for age dummy is age 35 to 54; for number of vehicles, #vehicles = #drivers; for metro size, 3M+; for year 2001, 1990.

**Table 5.5.** Determinants of non-work trip frequency by time of day/week (POV modes)

Dependent: log(# non-work trips+0.1)	M-T AM peak (N=62,604)		M-T Daytime (N=62,604)		M-T PM peak (N=62,604)		M-T Nighttime (N=62,604)		Saturday (N=14,269)	
	Beta	t	Beta	t	Beta	t	Beta	t	Beta	t
Intercept	-2.452	-100.58 ***	-1.944	-51.39 ***	-2.283	-70.26 ***	-2.091	-68.11 ***	-1.232	-14.81 ***
D female	0.079	9.57 ***	0.229	17.81 ***	0.222	20.02 ***	-0.013	-1.24	0.140	4.91 ***
D employed	-0.166	-15.31 ***	-0.771	-45.87 ***	-0.004	-0.25	0.030	2.21 **	0.029	0.79
D driver license	0.338	20.54 ***	1.078	42.19 ***	0.539	24.57 ***	0.391	18.87 ***	1.116	19.93 ***
D age 16-24	0.161	12.77 ***	0.034	1.72 *	0.054	3.24 ***	0.305	19.23 ***	0.068	1.57
D age 25-34	0.012	1.06	-0.046	-2.75 ***	-0.001	-0.08	0.105	7.67 ***	-0.041	-1.07
D age 55-64	0.007	0.48	0.109	4.74 ***	-0.132	-6.70 ***	-0.148	-7.94 ***	-0.103	-1.99 **
D age 65 +	-0.035	-2.15 **	0.248	9.87 ***	-0.114	-5.29 ***	-0.212	-10.41 ***	-0.303	-5.54 ***
HH income	0.022	5.71 ***	0.041	6.91 ***	0.063	12.49 ***	0.042	8.77 ***	0.119	9.03 ***
HH income square	-0.001	-4.08 ***	-0.002	-4.83 ***	-0.003	-10.43 ***	-0.002	-7.66 ***	-0.006	-7.58 ***
D with child age 15 -	0.310	34.34 ***	0.096	6.89 ***	0.108	8.97 ***	-0.018	-1.60	0.022	0.70
D #vehicles < #drivers	-0.027	-2.37 **	-0.247	-13.80 ***	-0.095	-6.20 ***	-0.104	-7.16 ***	-0.292	-7.34 ***
D #vehicles > #drivers	0.017	1.68 *	0.040	2.55 **	0.026	1.93 *	0.042	3.27 ***	-0.040	-1.17
D Central City	-0.007	-0.75	-0.050	-3.67 ***	-0.032	-2.76 ***	0.007	0.65	-0.118	-3.89 ***
D MSA 250K -	0.091	6.45 ***	0.211	9.61 ***	0.149	7.89 ***	0.046	2.60 ***	0.148	2.94 ***
D MSA 250K-500K	0.085	6.08 ***	0.153	7.05 ***	0.134	7.18 ***	0.058	3.27 ***	-0.014	-0.28
D MSA 500K-1M	0.063	4.40 ***	0.177	8.00 ***	0.161	8.48 ***	0.036	2.00 **	0.022	0.46
D MSA 1M-3M	0.018	1.76 *	0.063	3.97 ***	0.102	7.51 ***	0.049	3.79 ***	0.123	3.50 ***
D Year 2001	0.198	23.28 ***	0.312	23.70 ***	0.052	4.63 ***	-0.048	-4.52 ***	0.349	11.87 ***
R-Square	0.043		0.088		0.029		0.026		0.066	
Adj R-Sq	0.043		0.087		0.029		0.025		0.065	

Dependent: log(# non-work trips+0.1)	Fri. AM peak (N=14,144)		Fri. Daytime (N=14,144)		Fri. PM peak (N=14,144)		Fri. Nighttime (N=14,144)		Sunday (N=15,051)	
	Beta	t	Beta	t	Beta	t	Beta	t	Beta	t
Intercept	-2.404	-45.68 ***	-1.983	-23.68 ***	-2.193	-30.14 ***	-2.081	-29.12 ***	-1.034	-12.97 ***
D female	0.114	6.48 ***	0.227	8.10 ***	0.229	9.40 ***	0.054	2.23 **	0.190	6.82 ***
D employed	-0.172	-7.46 ***	-0.606	-16.48 ***	0.057	1.79 *	0.109	3.47 ***	-0.052	-1.45
D driver license	0.304	8.57 ***	0.983	17.43 ***	0.457	9.32 ***	0.346	7.19 ***	1.035	19.61 ***
D age 16-24	0.159	5.87 ***	0.032	0.73	0.013	0.34	0.433	11.75 ***	0.052	1.23
D age 25-34	0.007	0.29	-0.042	-1.16	0.019	0.60	0.157	5.03 ***	0.064	1.77 *
D age 55-64	-0.020	-0.65	0.125	2.49 **	-0.084	-1.92 *	-0.276	-6.43 ***	-0.089	-1.79 *
D age 65 +	-0.062	-1.85 *	0.285	5.29 ***	-0.163	-3.49 ***	-0.359	-7.82 ***	-0.240	-4.46 ***
HH income	0.016	2.10 **	0.066	5.33 ***	0.065	6.00 ***	0.094	8.80 ***	0.035	2.80 ***
HH income square	0.000	-0.72	-0.002	-3.28 ***	-0.002	-3.70 ***	-0.004	-6.46 ***	-0.001	-1.54
D with child age 15 -	0.246	12.87 ***	0.078	2.56 **	0.110	4.17 ***	-0.105	-4.06 ***	0.092	3.07 ***
D #vehicles < #drivers	-0.094	-3.92 ***	-0.194	-5.07 ***	-0.014	-0.43	-0.053	-1.61	-0.233	-5.98 ***
D #vehicles > #drivers	-0.019	-0.86	-0.025	-0.74	-0.067	-2.27 **	-0.016	-0.55	-0.052	-1.53
D Central City	0.015	0.82	-0.038	-1.27	-0.054	-2.09 **	0.023	0.91	-0.137	-4.70 ***
D MSA 250K -	-0.018	-0.62	0.246	5.18 ***	0.305	7.39 ***	0.102	2.52 **	0.188	3.90 ***
D MSA 250K-500K	0.093	3.19 ***	0.286	6.17 ***	0.194	4.82 ***	0.137	3.47 ***	0.061	1.35
D MSA 500K-1M	0.028	0.96	0.139	2.96 ***	0.034	0.83	0.029	0.72	0.200	4.23 ***
D MSA 1M-3M	-0.003	-0.16	0.075	2.15 **	0.092	3.04 ***	0.042	1.42	0.045	1.32
D Year 2001	0.254	13.89 ***	0.372	12.79 ***	0.137	5.42 ***	-0.075	-3.01 ***	0.289	10.32 ***
R-Square	0.044		0.074		0.034		0.049		0.050	
Adj R-Sq	0.042		0.073		0.033		0.048		0.048	

1) Reference group for age dummy is age 35 to 54; for number of vehicles, #vehicles = #drivers; for metro size, 3M+; for year 2001, 1990.

**Table 5.6.** Binomial logit models for the likelihood of trip chaining in commute tours, 1995 and 2001 (direct=0, chain=1)

	A) All time period			B) Mon-Thu sample			C) M_Th AM peak			D) M_Th day off peak			E) M_Th PM peak			F) M_Th night off peak		
	Beta	e <sup>Beta</sup>		Beta	e <sup>Beta</sup>		Beta	e <sup>Beta</sup>		Beta	e <sup>Beta</sup>		Beta	e <sup>Beta</sup>		Beta	e <sup>Beta</sup>	
Intercept	-3.0066	***	0.05	-3.0464	***	0.05	-4.2885	***	0.01	-2.4281	***	0.09	-2.1938	***	0.11	-3.6726	***	0.03
# day trips	0.2102	***	1.23	0.2169	***	1.24	0.2782	***	1.32	0.1641	***	1.18	0.2285	***	1.26	0.233	***	1.26
Distance to work	0.0131	***	1.01	0.0121	***	1.01	0.0105	***	1.01	0.0285	***	1.03	0.00455	***	1.00	0.0115	***	1.01
D Transit	-0.3042	***	0.74	-0.2578	***	0.77	-0.3663	***	0.69	-0.1943	**	0.82	-0.2515	***	0.78	-0.0861		0.92
D Walk	-0.4947	***	0.61	-0.5419	***	0.58	-0.5003	***	0.61	-0.3297	***	0.72	-0.7059	***	0.49	-0.3421		0.71
D Others	-0.3315	***	0.72	-0.1894	**	0.83	-0.1603	***	0.85	-0.1324	***	0.88	-0.3145	**	0.73	-0.0685		0.93
D female	0.4715	***	1.60	0.4972	***	1.64	0.6113	***	1.84	0.3859	***	1.47	0.5463	***	1.73	0.3798	***	1.46
D age 16-24	-0.0932	***	0.91	-0.0876	***	0.92	0.265	***	1.30	-0.3083	***	0.73	-0.1605	***	0.85	0.2582	***	1.29
D age 25-34	0.1709	***	1.19	0.1731	***	1.19	0.3264	***	1.39	0.0336		1.03	0.1282	***	1.14	0.3961	***	1.49
D age 55-64	-0.011		0.99	-0.00238		1.00	0.1297	*	1.14	0.1375	**	1.15	-0.2787	***	0.76	0.0271		1.03
D age 65 +	-0.0463		0.95	-0.00203		1.00	-0.0717		0.93	0.0655		1.07	-0.113		0.89	-0.1553		0.86
HH income	0.00349		1.00	0.0142		1.01	0.00254		1.00	0.0469	***	1.05	-0.00301		1.00	-0.00534		0.99
HH income square	0.000636		1.00	0.000138		1.00	0.00116		1.00	-0.00129		1.00	0.000144		1.00	0.00339	*	1.00
D Part time	-0.1421	***	0.87	-0.1882	***	0.83	0.2036	***	1.23	0.011		1.01	-0.6377	***	0.53	-0.6245	***	0.54
D with child age 15 -	0.2661	***	1.30	0.2908	***	1.34	1.0679	***	2.91	-0.00448		1.00	-0.0352		0.97	0.00389		1.00
D MSA 250K -	-0.1157	***	0.89	-0.1118	***	0.89	-0.051		0.95	-0.0374		0.96	-0.3759	***	0.69	0.2776	**	1.32
D MSA 250K-500K	-0.1145	***	0.89	-0.1071	***	0.90	-0.1208	*	0.89	-0.0358		0.96	-0.183	***	0.83	0.0118		1.01
D MSA 500K-1M	0.0269		1.03	-0.0209		0.98	0.0271		1.03	0.0807		1.08	-0.102	*	0.90	-0.2492	**	0.78
D MSA 1M-3M	-0.00662		0.99	-0.0117		0.99	-0.0956	**	0.91	0.0548		1.06	-0.011		0.99	0.0359		1.04
D Second	-0.0485	*	0.95	-0.0121		0.99	0.1224	**	1.13	-0.1042	*	0.90	0.0179		1.02	-0.0672		0.94
D Suburban	-0.0312		0.97	-0.00249		1.00	0.1857	***	1.20	-0.0587		0.94	-0.0871	*	0.92	-0.0701		0.93
D Town	-0.0617	**	0.94	0.00169		1.00	0.0194		1.02	-0.00005		1.00	0.0667		1.07	-0.2607	**	0.77
D Rural	0.0751	**	1.08	0.1678	***	1.18	0.2716	***	1.31	0.2405	***	1.27	0.1639	**	1.18	-0.357	**	0.70
D year 2001	0.1309	***	1.14	0.102	***	1.11	0.3377	***	1.40	-0.0582	*	0.94	0.0102		1.01	0.2875	***	1.33
D M-T off-peak day	0.3865	***	1.47	0.3196	***	1.38												
D M-T PM peak	0.4687	***	1.60	0.4038	***	1.50												
D M-T off-peak night	-0.54	***	0.58	-0.5999	***	0.55												
D Fri. AM peak	-0.2212	***	0.80															
D Fri. off-peak day	0.3653	***	1.44															
D Fri. PM peak	0.3613	***	1.44															
D Fri. off-peak night	-0.3344	***	0.72															
D Saturday	-0.292	***	0.75															
D Sunday	-0.1406	***	0.87															
Number of Obs.	106,975			79,945			27,125			20,318			21,826			10,676		
-2 Log L	106001.110			80006.452			23488.822			23262.190			24409.322			7400.083		
Max-rescaled R	0.144			0.149			0.226			0.103			0.124			0.121		

1) Reference group for age dummy is age 35 to 54; for number of vehicles, #vehicles = #drivers; for metro size, 3M +; for year 2001, 1995.

**Table 5.7.** Multinomial logit models for the likelihood of trip chaining in commute tours, 1995 and 2001 (relative to direct commute)

	A) All time period		B) Mon-Thu sample		C) M_Th AM peak		D) M_Th day off peak		E) M_Th PM peak		F) M_Th night off peak	
	w/o stop>30 Beta	with stop>30 Beta	w/o stop>30 Beta	with stop>30 Beta	w/o stop>30 Beta	with stop>30 Beta	w/o stop>30 Beta	with stop>30 Beta	w/o stop>30 Beta	with stop>30 Beta	w/o stop>30 Beta	with stop>30 Beta
Intercept	-3.6862 ***	-3.6852 ***	-3.6936 ***	-3.7847 ***	-4.7025 ***	-5.3844 ***	-3.1414 ***	-3.082 ***	-3.0186 ***	-2.6709 ***	-3.8962 ***	-5.2642 ***
# day trips	0.2289 ***	0.1732 ***	0.2339 ***	0.182 ***	0.2839 ***	0.2578 ***	0.1844 ***	0.1361 ***	0.2495 ***	0.1948 ***	0.2479 ***	0.1961 ***
Distance to work	0.0127 ***	0.0139 ***	0.0118 ***	0.0127 ***	0.0114 ***	0.00823 ***	0.0284 ***	0.0287 ***	0.00459 ***	0.00459 ***	0.0103 ***	0.0142 ***
D Transit	-0.5392 ***	0.0184	-0.4633 ***	0.042	-0.6119 ***	0.1892	-0.3287 ***	-0.0419	-0.4483 ***	-0.0453	-0.2362	0.2386
D Walk	-0.6347 ***	-0.2839 ***	-0.7146 ***	-0.2805 ***	-0.6173 ***	-0.1111	-0.8051 ***	0.1201	-0.5277 ***	-0.9806 ***	-0.7202 **	0.3066
D Others	-0.6319 ***	0.0595	-0.5587 ***	0.2607 ***	-0.7705 ***	0.8351 ***	-0.8335 ***	0.4004 ***	-0.2175	-0.4521 **	-0.4809	0.5572 *
D female	0.5373 ***	0.3521 ***	0.5763 ***	0.3486 ***	0.8036 ***	-0.0702	0.3728 ***	0.3984 ***	0.6155 ***	0.4438 ***	0.3069 ***	0.5508 ***
D age 16-24	-0.1655 ***	0.00734	-0.1654 ***	0.0218	0.0293	0.7061 ***	-0.3396 ***	-0.2727 ***	-0.29 ***	-0.00347	0.2286 **	0.336 **
D age 25-34	0.1959 ***	0.1185 ***	0.2056 ***	0.1024 ***	0.348 ***	0.1805 **	0.0762	-0.0301	0.1489 ***	0.0947 *	0.3129 ***	0.598 ***
D age 55-64	-0.024	0.00763	-0.0263	0.0285	-0.0359	0.4637 ***	0.0908	0.1865 **	-0.2172 ***	-0.3575 ***	0.1199	-0.2748
D age 65 +	-0.0964	0.00314	-0.0623	0.0485	-0.00961	-0.2604	-0.089	0.2167 *	-0.0969	-0.1313	-0.767	0.6784
HH income	-0.00606	0.0221 *	0.007	0.0298 **	-0.00329	0.0299	0.0431 **	0.0547 **	-0.00448	-0.00143	-0.0263	0.0566
HH income square	0.000836	0.000217	0.000188	-0.00006	0.000998	0.00134	-0.00183	-0.00083	0.000276	-9.27E-06	0.00334	0.00256
D Part time	-0.2506 **	0.0278	-0.322 ***	0.0265	-0.2553 ***	1.248 ***	0.0019	0.0241	-0.6909 ***	-0.5597 ***	-0.6233 ***	-0.6181 ***
D with child age 15 -	0.4706 ***	-0.1236 ***	0.522 ***	-0.1668 ***	1.2946 ***	0.2342 ***	0.1533 ***	-0.2207 ***	0.1906 ***	-0.3818 ***	0.0231	-0.0425
D MSA 250K -	-0.0879 **	-0.1813 ***	-0.0987 **	-0.1479 ***	-0.05	-0.0755	-0.0403	-0.0346	-0.3609 ***	-0.4014 ***	0.2394 *	0.334
D MSA 250K-500K	-0.1735 ***	-0.0107	-0.1509 ***	-0.0277	-0.2015 ***	0.148	-0.0298	-0.0464	-0.1893 **	-0.1752 **	-0.2903 *	0.6393 ***
D MSA 500K-1M	0.00256	0.0707 *	-0.0365	0.0101	0.0609	-0.1093	0.0972	0.0575	-0.1665 **	-0.00902	-0.4585 ***	0.2212
D MSA 1M-3M	0.00515	-0.0297	-0.00792	-0.0214	-0.0906 *	-0.1022	0.035	0.0791	0.0419	-0.0928 *	-0.00348	0.1342
D Second	0.0111	-0.1556 ***	0.0429	-0.1118 **	0.1467 **	0.00415	-0.0423	-0.1926 **	0.0693	-0.0457	-0.0091	-0.2205
D Suburban	-0.0141	-0.06 *	0.0261	-0.0512	0.203 ***	0.1224	-0.1247 *	0.0194	0.00619	-0.2144 ***	-0.0961	-0.00014
D Town	-0.00559	-0.1657 ***	0.0422	-0.0707	0.0593	-0.146	0.00844	-0.0122	0.1617 **	-0.0656	-0.3084 **	-0.15
D Rural	0.1286 ***	-0.0236	0.228 ***	0.0526	0.2627 ***	0.2734 *	0.348 ***	0.0719	0.2329 ***	0.0768	-0.188	-0.845 ***
D year 2001	0.176 ***	0.0487 **	0.1279 ***	0.0531 *	0.3329 ***	0.3397 ***	-0.0124	-0.117 **	-0.00606	0.0347	0.3649 ***	0.0984
D M-T off-peak day	0.2551 ***	0.6427 ***	0.151 ***	0.6477 ***								
D M-T PM peak	0.4162 ***	0.608 ***	0.3095 ***	0.623 ***								
D M-T off-peak night	-0.4311 ***	-0.6963 ***	-0.5297 ***	-0.6799 ***								
D Fri. AM peak	0.00306	-0.7647 ***										
D Fri. off-peak day	0.1653 ***	0.7068 ***										
D Fri. PM peak	0.3578 ***	0.4279 ***										
D Fri. off-peak night	-0.3154 ***	-0.3089 ***										
D Saturday	-0.3522 ***	-0.1307 ***										
D Sunday	-0.2788 ***	0.1182 **										
Number of Obs.	106,975		79,945		27,125		20,318		21,826		10,676	
-2 Log L	136078.32		102772.53		28175.59		31254.73		32678.87		8951.32	
Max-rescaled R	0.152		0.158		0.240		0.103		0.122		0.119	

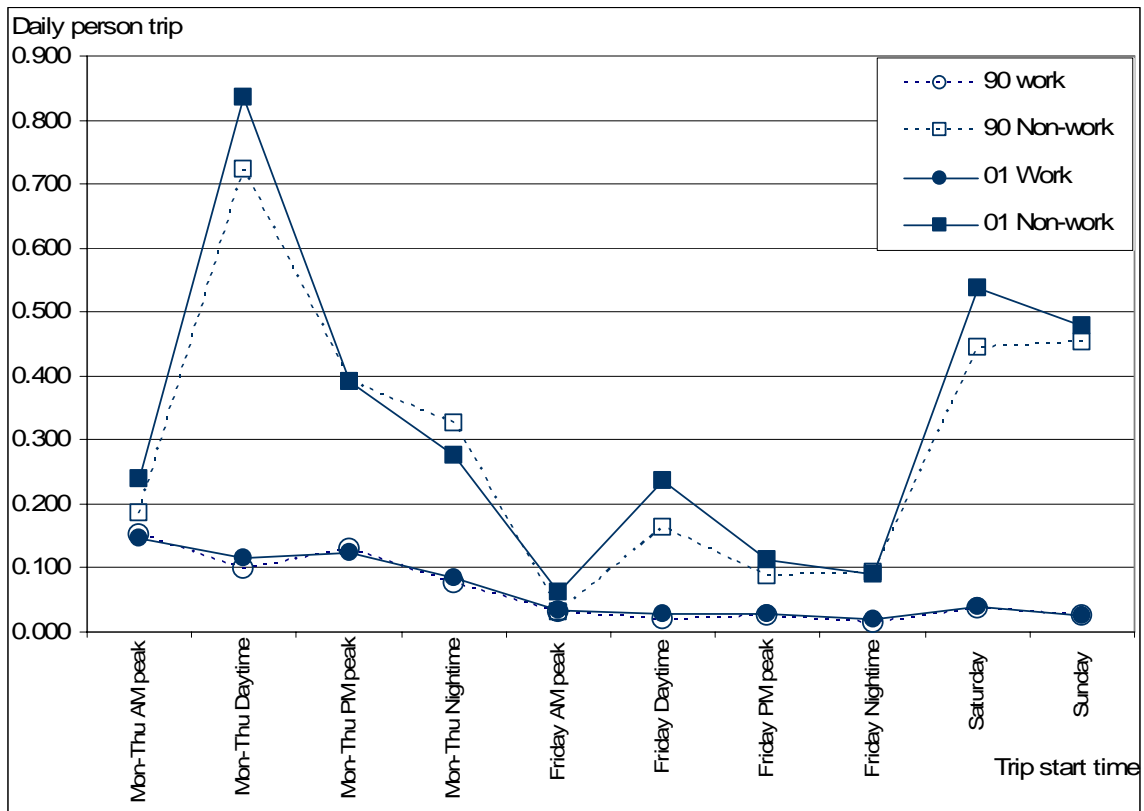
1) Reference group for age dummy is age 35 to 54; for number of vehicles, #vehicles = #drivers; for metro size, 3M +; for year 2001, 1995.

**Table 5.8.** Binomial logit models for the likelihood of trip chaining in non-commute tours, 1995 and 2001 (direct=0, chain=1)

Parameter	A) All time period			B) Mon-Thu sample			C) M_Th AM peak			D) M_Th day off peak			E) M_Th PM peak			F) M_Th night off peak		
	Beta	e <sup>Beta</sup>		Beta	e <sup>Beta</sup>		Beta	e <sup>Beta</sup>		Beta	e <sup>Beta</sup>		Beta	e <sup>Beta</sup>		Beta	e <sup>Beta</sup>	
Intercept	-2.4669	***	0.08	-2.4162	***	0.09	-2.1702	***	0.11	-1.9715	***	0.14	-2.5901	***	0.08	-3.262	***	0.04
# day trips	0.1538	***	1.17	0.1534	***	1.17	0.1524	***	1.16	0.1583	***	1.17	0.1357	***	1.15	0.1632	***	1.18
D Transit	-0.4909	***	0.61	-0.4893	***	0.61	-0.5541	***	0.57	-0.4767	***	0.62	-0.429	***	0.65	-0.6163	***	0.54
D Walk	-1.1399	***	0.32	-1.1096	***	0.33	-1.4215	***	0.24	-1.1099	***	0.33	-0.8527	***	0.43	-1.1717	***	0.31
D Others	-0.5177	***	0.60	-0.5389	***	0.58	-0.3115	***	0.73	-0.5726	***	0.56	-0.6055	***	0.55	-0.4737	***	0.62
D female	0.1301	***	1.14	0.1599	***	1.17	0.0518	***	1.05	0.1796	***	1.20	0.1803	***	1.20	0.1254	***	1.13
D age 16-24	-0.0691	***	0.93	-0.0711	***	0.93	-0.3217	***	0.72	-0.1238	***	0.88	-0.0282	***	0.97	0.1976	***	1.22
D age 25-34	0.0134	***	1.01	-0.0171	***	0.98	0.2067	***	1.23	-0.0646	***	0.94	0.0203	***	1.02	-0.0362	***	0.96
D age 55-64	-0.035	**	0.97	-0.0141	***	0.99	-0.0326	***	0.97	0.0412	***	1.04	-0.0723	***	0.93	-0.3145	***	0.73
D age 65 +	-0.0604	***	0.94	-0.0626	***	0.94	-0.1432	*	0.87	-0.0423	***	0.96	-0.216	***	0.81	-0.0459	***	0.96
HH income	-0.00273	***	1.00	-0.0148	**	0.99	-0.0717	***	0.93	-0.00523	***	0.99	-0.0142	***	0.99	-0.00094	***	1.00
HH income square	-0.00014	***	1.00	0.000436	***	1.00	0.00219	*	1.00	-0.00011	***	1.00	0.00073	***	1.00	0.000535	***	1.00
D Employed	-0.0977	***	0.91	-0.1406	***	0.87	-0.0726	***	0.93	-0.2348	***	0.79	0.000249	***	1.00	0.0346	***	1.04
D with child age 15 -	-0.1047	***	0.90	-0.1097	***	0.90	0.1729	***	1.19	-0.169	***	0.84	-0.0985	***	0.91	-0.0994	**	0.91
D MSA 250K -	-0.0072	***	0.99	-0.0231	***	0.98	-0.1466	*	0.86	-0.0279	***	0.97	-0.0569	***	0.94	0.1789	***	1.20
D MSA 250K-500K	-0.0281	***	0.97	-0.0629	***	0.94	-0.0474	***	0.95	-0.1539	***	0.86	-0.056	***	0.95	0.3147	***	1.37
D MSA 500K-1M	-0.0278	*	0.97	-0.0801	***	0.92	-0.0679	***	0.93	-0.1195	***	0.89	-0.0506	***	0.95	0.0377	***	1.04
D MSA 1M-3M	0.0283	**	1.03	0.0387	**	1.04	0.0415	***	1.04	0.0549	***	1.06	-0.0593	***	0.94	0.1196	**	1.13
D Second	-0.0277	*	0.97	-0.00421	***	1.00	-0.0163	***	0.98	-0.0387	***	0.96	0.1422	***	1.15	-0.0493	***	0.95
D Suburban	0.00839	***	1.01	-0.00552	***	0.99	0.039	***	1.04	-0.0758	***	0.93	0.2218	***	1.25	-0.0575	***	0.94
D Town	0.0442	***	1.05	0.0173	***	1.02	0.2412	***	1.27	-0.0531	*	0.95	0.1178	**	1.13	0.0152	***	1.02
D Rural	0.0985	***	1.10	0.155	***	1.17	0.412	***	1.51	0.1226	***	1.13	0.204	***	1.23	0.064	***	1.07
D year 2001	0.0817	***	1.09	0.0891	***	1.09	0.055	***	1.06	0.0858	***	1.09	0.0837	***	1.09	0.1074	***	1.11
D M-T off-peak day	0.3715	***	1.45	0.3785	***	1.46												
D M-T PM peak	-0.0856	***	0.92	-0.0722	***	0.93												
D M-T off-peak night	-0.4888	***	0.61	-0.4687	***	0.63												
D Fri. AM peak	0.0403	***	1.04															
D Fri. off-peak day	0.313	***	1.37															
D Fri. PM peak	-0.0382	***	0.96															
D Fri. off-peak night	-0.4848	***	0.62															
D Saturday	0.1914	***	1.21															
D Sunday	0.0272	**	1.03															
Number of Obs.	314,777			168,253			17,461			85,156			35,183			30,453		
-2 Log L	292226.28			156540.43			16115.54			88514.75			30732.51			21308.35		
Max-rescaled R	0.090			0.100			0.120			0.092			0.061			0.078		

1) Reference group for age dummy is age 35 to 54; for number of vehicles, #vehicles = #drivers; for metro size, 3M +; for year 2001, 1995.

**Figure 1.** Average daily person trips per person by trip purpose and by time of week, 1990 to 2001



1) Persons of age 0 to 4 are excluded from 2001 data because they were not surveyed in the 1990 NPTS.

## APPENDIX

**Table A1.** Average daily person trips per person by trip purpose and period of the week, 1990 to 2001

	<b>Work</b>	<b>Non-work</b>	Family/ personal	School/ church	Social/ recreation	<b>All</b>
<b>1990 All</b>	0.608	2.902	1.613	0.344	0.945	3.510
Mon-Thu AM peak	0.151	0.186	0.083	0.086	0.017	0.336
Mon-Thu Daytime	0.098	0.723	0.497	0.089	0.137	0.821
Mon-Thu PM peak	0.129	0.392	0.237	0.027	0.128	0.521
Mon-Thu Nighttime	0.076	0.328	0.147	0.023	0.158	0.403
Friday AM peak	0.031	0.031	0.015	0.014	0.003	0.063
Friday Daytime	0.020	0.163	0.114	0.015	0.034	0.184
Friday PM peak	0.025	0.087	0.052	0.002	0.033	0.112
Friday Nighttime	0.015	0.092	0.036	0.002	0.054	0.108
Saturday all day	0.037	0.446	0.242	0.009	0.194	0.482
Sunday all day	0.026	0.454	0.190	0.077	0.188	0.480
<b>2001 All</b>	0.645	3.253	1.792	0.401	1.061	3.898
Mon-Thu AM peak	0.146	0.239	0.119	0.089	0.031	0.384
Mon-Thu Daytime	0.114	0.834	0.566	0.091	0.177	0.948
Mon-Thu PM peak	0.125	0.390	0.209	0.038	0.143	0.514
Mon-Thu Nighttime	0.083	0.276	0.115	0.023	0.137	0.359
Friday AM peak	0.035	0.062	0.032	0.022	0.008	0.097
Friday Daytime	0.029	0.236	0.163	0.020	0.053	0.265
Friday PM peak	0.028	0.112	0.061	0.007	0.045	0.141
Friday Nighttime	0.019	0.089	0.034	0.004	0.052	0.108
Saturday all day	0.040	0.536	0.292	0.018	0.227	0.577
Sunday all day	0.026	0.478	0.201	0.089	0.188	0.504
<b>Growth 1990-2001</b>	6.0%	12.1%	11.1%	16.6%	12.2%	11.0%
Mon-Thu AM peak	-3.5%	28.6%	43.8%	3.1%	83.8%	14.2%
Mon-Thu Daytime	17.0%	15.3%	13.8%	3.0%	28.8%	15.5%
Mon-Thu PM peak	-3.8%	-0.5%	-11.9%	43.1%	11.7%	-1.3%
Mon-Thu Nighttime	9.6%	-15.8%	-21.7%	2.5%	-13.0%	-11.0%
Friday AM peak	11.2%	99.8%	119.1%	57.1%	209.5%	55.4%
Friday Daytime	41.3%	44.7%	42.6%	32.5%	57.3%	44.4%
Friday PM peak	13.7%	29.0%	18.0%	182.1%	35.3%	25.5%
Friday Nighttime	26.9%	-3.7%	-6.9%	55.5%	-4.0%	0.6%
Saturday all day	9.5%	20.4%	20.3%	93.4%	16.9%	19.5%
Sunday all day	0.3%	5.3%	6.0%	16.6%	0.1%	5.1%

- 1) 1990 data are adjusted to be comparable with 2001 data because new survey techniques such as travel diary and 'household rostering' are used since 1995 NPTS (Hu and Young, 1999).
- 2) Persons of age 0 to 4 are excluded from 2001 data because they were not surveyed in the 1990 NPTS.
- 3) Trips for which day of week or time of day are unknown are excluded.
- 4) All trips column does not equal to total person trips because it excludes trips for such purposes work-related, pleasure driving, and vacation.

**Table A2.** Direct and chained person trips by trip purpose and period of the week, 2001

Number of trips (billions)	<b>Work</b>		<b>Non- work</b>		Family/ personal		School/ church		Social/ recreational		<b>All</b>		
	Direct Chain		Direct Chain		Direct Chain		Direct Chain		Direct Chain		Direct Chain		All
	Direct	Chain	Direct	Chain	Direct	Chain	Direct	Chain	Direct	Chain	Direct	Chain	All
Mon-Thu AM peak	11.2	2.5	14.5	7.9	5.1	6.1	7.3	1.0	2.2	0.8	25.8	10.3	36.1
Mon-Thu off-peak day	9.0	1.7	45.1	33.3	26.8	26.4	7.3	1.2	10.9	5.7	54.1	35.0	89.1
Mon-Thu PM peak	9.4	2.3	22.9	13.8	9.7	9.9	2.9	0.7	10.3	3.2	32.3	16.1	48.4
Mon-Thu off-peak night	6.9	0.9	18.8	7.2	6.5	4.3	1.8	0.4	10.4	2.5	25.7	8.1	33.7
Friday AM peak	2.7	0.6	3.9	2.0	1.5	1.6	1.8	0.2	0.6	0.2	6.6	2.6	9.1
Friday off-peak day	2.3	0.5	12.5	9.8	7.7	7.7	1.6	0.3	3.2	1.8	14.7	10.2	24.9
Friday PM peak	2.1	0.6	6.3	4.3	2.8	3.0	0.5	0.1	3.0	1.1	8.4	4.8	13.2
Friday off-peak night	1.5	0.3	6.1	2.2	1.9	1.3	0.3	0.1	4.0	0.9	7.7	2.5	10.2
Saturday all day	3.3	0.5	30.9	19.4	13.9	13.5	1.4	0.3	15.7	5.6	34.3	19.9	54.2
Sunday all day	2.2	0.3	31.3	13.5	10.9	8.0	7.3	1.1	13.2	4.4	33.5	13.8	47.3
All	50.6	10.0	192.3	113.3	86.7	81.7	32.2	5.4	73.5	26.2	243.0	123.3	366.3

Number of trips (%)	<b>Work</b>		<b>Non- work</b>		Family/ personal		School/ church		Social/ recreational		<b>All</b>		
	Direct Chain		Direct Chain		Direct Chain		Direct Chain		Direct Chain		Direct Chain		All
	Direct	Chain	Direct	Chain	Direct	Chain	Direct	Chain	Direct	Chain	Direct	Chain	All
Mon-Thu AM peak	82.1	17.9	64.8	35.2	45.3	54.7	87.8	12.2	74.1	25.9	71.4	28.6	
Mon-Thu off-peak day	83.9	16.1	57.5	42.5	50.4	49.6	85.5	14.5	65.6	34.4	60.7	39.3	
Mon-Thu PM peak	80.2	19.8	62.4	37.6	49.4	50.6	81.2	18.8	76.5	23.5	66.7	33.3	
Mon-Thu off-peak night	88.3	11.7	72.4	27.6	60.5	39.5	83.3	16.7	80.4	19.6	76.1	23.9	
Friday AM peak	82.6	17.4	66.2	33.8	48.0	52.0	89.2	10.8	77.1	22.9	72.1	27.9	
Friday off-peak day	83.0	17.0	56.1	43.9	50.1	49.9	84.7	15.3	63.7	36.3	59.0	41.0	
Friday PM peak	78.4	21.6	59.8	40.2	48.3	51.7	79.3	20.7	72.6	27.4	63.5	36.5	
Friday off-peak night	85.3	14.7	73.4	26.6	59.7	40.3	82.2	17.8	81.8	18.2	75.5	24.5	
Saturday all day	87.4	12.6	61.4	38.6	50.7	49.3	80.8	19.2	73.8	26.2	63.3	36.7	
Sunday all day	89.5	10.5	69.8	30.2	57.6	42.4	86.5	13.5	74.9	25.1	70.8	29.2	
All	83.5	16.5	62.9	37.1	51.5	48.5	85.5	14.5	73.7	26.3	66.3	33.7	

- 1) Direct: direct trips between anchor destinations with more than 30 minute dwell time; Chain: chained trips with 30 minutes or less stops within a tour.
- 2) Trips for which day of week or time of day is unknown and that are made by persons of age 0 to 4 are excluded.
- 3) The column of all trips does not equal to total person trips because it excludes trips for such purposes work-related, pleasure driving, and vacation.



**Table A3.** Direct and chained person trips by trip purpose, MSA size and place of residence, 2001

(billions)	Work		Non-work		Family/ personal		School/ church		Social/ recreational		All		
	Direct	Chain	Direct	Chain	Direct	Chain	Direct	Chain	Direct	Chain	Direct	Chain	All
Inside CC	12.8	2.3	47.3	25.5	22.2	18.3	7.5	1.3	17.5	5.9	60.1	27.8	87.9
< 250 k	1.0	0.2	3.9	2.5	1.6	1.7	0.8	0.2	1.5	0.6	4.9	2.7	7.6
250-499k	1.3	0.2	4.6	2.5	2.2	1.8	0.7	0.1	1.8	0.6	5.9	2.7	8.6
500-999k	1.2	0.2	4.5	2.6	2.1	1.9	0.7	0.2	1.7	0.6	5.7	2.9	8.5
1-3m	3.5	0.7	12.1	7.1	5.6	5.1	1.8	0.4	4.7	1.6	15.7	7.8	23.5
> 3m	5.8	1.0	22.1	10.8	10.8	7.9	3.5	0.5	7.9	2.4	27.9	11.8	39.7
Outside CC	27.8	5.7	107.8	63.7	47.9	46.0	17.9	2.9	42.1	14.8	135.6	69.4	205.1
< 250 k	2.7	0.5	9.8	6.3	4.3	4.6	1.7	0.3	3.9	1.4	12.5	6.8	19.3
250-499k	2.8	0.6	11.3	6.9	4.9	5.0	2.0	0.3	4.4	1.6	14.1	7.5	21.5
500-999k	2.6	0.6	10.9	6.1	4.9	4.4	1.8	0.2	4.2	1.6	13.6	6.7	20.3
1-3m	7.5	1.5	27.8	17.3	12.6	12.5	4.5	0.8	10.7	4.1	35.3	18.9	54.2
> 3m	12.3	2.5	47.9	27.0	21.2	19.4	7.9	1.3	18.8	6.3	60.2	29.5	89.7
All MSA	40.6	8.1	155.1	89.2	70.1	64.3	25.4	4.2	59.6	20.7	195.7	97.2	293.0
< 250 k	3.7	0.7	13.8	8.8	5.8	6.3	2.5	0.5	5.4	2.0	17.4	9.5	26.9
250-499k	4.0	0.8	15.9	9.4	7.0	6.8	2.7	0.4	6.2	2.2	19.9	10.2	30.1
500-999k	3.8	0.8	15.4	8.8	7.0	6.3	2.5	0.4	5.9	2.1	19.3	9.6	28.8
1-3m	11.0	2.2	40.0	24.4	18.3	17.6	6.3	1.1	15.4	5.7	51.0	26.7	77.7
> 3m	18.1	3.5	70.0	37.8	32.0	27.3	11.4	1.8	26.7	8.7	88.1	41.3	129.5
(%)	Work		Non-work		Family/ personal		School/ church		Social/ recreational		All		
	Direct	Chain	Direct	Chain	Direct	Chain	Direct	Chain	Direct	Chain	Direct	Chain	All
Inside CC	84.7	15.3	65.0	35.0	54.9	45.1	84.9	15.1	74.9	25.1	68.4	31.6	
< 250 k	83.0	17.0	61.5	38.5	48.9	51.1	82.7	17.3	70.8	29.2	65.0	35.0	
250-499k	86.0	14.0	64.9	35.1	55.2	44.8	86.6	13.4	73.7	26.3	68.5	31.5	
500-999k	83.8	16.2	62.9	37.1	52.3	47.7	81.3	18.7	74.7	25.3	66.4	33.6	
1-3m	83.9	16.1	63.1	36.9	52.4	47.6	83.3	16.7	74.2	25.8	66.8	33.2	
> 3m	85.3	14.7	67.2	32.8	57.8	42.2	86.8	13.2	76.6	23.4	70.3	29.7	
Outside CC	82.9	17.1	62.9	37.1	51.0	49.0	86.1	13.9	73.9	26.1	66.1	33.9	
< 250 k	83.8	16.2	60.9	39.1	48.0	52.0	83.5	16.5	74.0	26.0	64.6	35.4	
250-499k	82.9	17.1	62.0	38.0	49.0	51.0	87.6	12.4	73.7	26.3	65.3	34.7	
500-999k	82.4	17.6	64.1	35.9	52.9	47.1	88.8	11.2	73.1	26.9	66.9	33.1	
1-3m	82.9	17.1	61.6	38.4	50.3	49.7	85.6	14.4	72.4	27.6	65.2	34.8	
> 3m	82.8	17.2	64.0	36.0	52.2	47.8	85.9	14.1	75.0	25.0	67.1	32.9	
All MSA	83.5	16.5	63.5	36.5	52.2	47.8	85.7	14.3	74.2	25.8	66.8	33.2	
< 250 k	83.5	16.5	61.1	38.9	48.3	51.7	83.2	16.8	73.1	26.9	64.7	35.3	
250-499k	83.9	16.1	62.8	37.2	50.8	49.2	87.3	12.7	73.7	26.3	66.2	33.8	
500-999k	82.9	17.1	63.7	36.3	52.7	47.3	86.6	13.4	73.6	26.4	66.8	33.2	
1-3m	83.2	16.8	62.0	38.0	50.9	49.1	84.9	15.1	73.0	27.0	65.7	34.3	
> 3m	83.6	16.4	64.9	35.1	54.0	46.0	86.2	13.8	75.5	24.5	68.1	31.9	

1) Direct: direct trips; Chain: chained trips with 30 minutes or less stops within a tour.

2) It excludes trips made by persons of age 0 to 4 or by non-MSA residents are excluded.

The column of all trips does not equal to total person trips because it excludes trips for such purposes work-related, pleasure driving, and vacation.

**Table A4.** Binomial logit models for the likelihood of trip chaining in commute tours, 1995 (direct=0, chain=1)

	A) All time period		B) Mon-Thu sample		C) M_Th AM peak		D) M_Th day off peak		E) M_Th PM peak		F) M_Th night off peak							
	Beta	e <sup>Beta</sup>	Beta	e <sup>Beta</sup>	Beta	e <sup>Beta</sup>	Beta	e <sup>Beta</sup>	Beta	e <sup>Beta</sup>	Beta	e <sup>Beta</sup>						
Intercept	-2.8977	***	0.06	-2.9642	***	0.05	-4.2876	***	0.01	-2.541	***	0.08	-1.9022	***	0.15	-3.3994	***	0.03
# day trips	0.1944	***	1.21	0.2001	***	1.22	0.2562	***	1.29	0.1552	***	1.17	0.2167	***	1.24	0.1865	***	1.21
Distance to work	0.00963	***	1.01	0.0106	***	1.01	0.00791	***	1.01	0.0252	***	1.03	0.00413	*	1.00	0.00448		1.00
D Transit	-0.3627	***	0.70	-0.3655	***	0.69	-0.3401	**	0.71	-0.1286		0.88	-0.4848	***	0.62	-0.5892		0.55
D Walk	-0.8713	***	0.42	-0.8071	***	0.45	-1.3281	***	0.26	-0.2858		0.75	-1.1344	***	0.32	-0.7724	*	0.46
D Others	-0.4633	***	0.63	-0.3282	***	0.72	-0.2583		0.77	-0.109		0.90	-0.4763	**	0.62	-0.8226	**	0.44
D female	0.5152	***	1.67	0.5741	***	1.78	0.7434	***	2.10	0.4539	***	1.57	0.5854	***	1.80	0.4728	***	1.60
D age 16-24	-0.0567		0.94	-0.0419		0.96	0.255	**	1.29	-0.2693	***	0.76	-0.1044		0.90	0.4492	***	1.57
D age 25-34	0.1436	***	1.15	0.1726	***	1.19	0.2317	***	1.26	0.0448		1.05	0.1331	**	1.14	0.5194	***	1.68
D age 55-64	-0.0191		0.98	-0.0139		0.99	0.2674	**	1.31	0.0623		1.06	-0.2467	**	0.78	-0.246		0.78
D age 65 +	-0.2146	**	0.81	-0.1459		0.86	-0.2258		0.80	-0.0211		0.98	-0.266		0.77	-0.5449		0.58
HH income	0.00542		1.01	0.0175		1.02	0.021		1.02	0.0783	***	1.08	-0.0304		0.97	0.0363		1.04
HH income square	0.000129		1.00	-0.00031		1.00	0.000494		1.00	-0.00371	**	1.00	0.00187		1.00	-0.00153		1.00
D Part time	-0.1789	***	0.84	-0.2334	***	0.79	0.1741	*	1.19	-0.0472		0.95	-0.6752	***	0.51	-0.6855	***	0.50
D with child age 15 -	0.2676	***	1.31	0.3207	***	1.38	1.166	***	3.21	0.0926	*	1.10	-0.1199	**	0.89	0.0845		1.09
D MSA 250K -	-0.0288		0.97	0.0111		1.01	0.1732	*	1.19	-0.0076		0.99	-0.2931	***	0.75	0.3751	**	1.46
D MSA 250K-500K	-0.1281	***	0.88	-0.1192	**	0.89	-0.035		0.97	-0.0764		0.93	-0.3439	***	0.71	0.2358		1.27
D MSA 500K-1M	0.0866	**	1.09	0.0487		1.05	0.1314		1.14	0.0569		1.06	-0.0397		0.96	0.011		1.01
D MSA 1M-3M	0.0197		1.02	0.0477		1.05	0.116	*	1.12	0.0522		1.05	0.0302		1.03	-0.2555	*	0.77
D Second	-0.0864	**	0.92	-0.1008	**	0.90	-0.0626		0.94	-0.018		0.98	-0.1672	*	0.85	0.00283		1.00
D Suburban	-0.0555		0.95	-0.0863	*	0.92	0.0986		1.10	-0.00555		0.99	-0.273	***	0.76	-0.1579		0.85
D Town	-0.077	*	0.93	-0.068		0.93	-0.1304		0.88	0.1415		1.15	-0.0978		0.91	-0.3546	*	0.70
D Rural	0.0671		1.07	0.1551	**	1.17	0.2911	**	1.34	0.2147	*	1.24	0.1565		1.17	-0.3749		0.69
D M-T off-peak day	0.5041	***	1.66	0.4161	***	1.52												
D M-T PM peak	0.577	***	1.78	0.4873	***	1.63												
D M-T off-peak night	-0.6062	***	0.55	-0.6965	***	0.50												
D Fri. AM peak	-0.2444	***	0.78															
D Fri. off-peak day	0.4265	***	1.53															
D Fri. PM peak	0.3455	***	1.41															
D Fri. off-peak night	-0.3513	***	0.70															
D Saturday	-0.2477	***	0.78															
D Sunday	-0.2949	***	0.74															
Number of Obs.	42,494			31,236			10,798			7,624			8,666			4,148		
-2 Log L	41546.794			30945.948			8872.788			8973.108			9820.584			2735.136		
Max-rescaled R <sup>2</sup>	0.147			0.157			0.228			0.101			0.129			0.094		

- 1) In all tables reporting regression results, \* significant at 0.1 percent level; \*\* significant at 0.05 percent level; \*\*\* significant at 0.01 percent level.
- 2) Reference group for age dummy is age 35 to 54; for number of vehicles, #vehicles = #drivers; for metro size, 3M +.

**Table A5.** Binomial logit models for the likelihood of trip chaining in commute tours, 2001 (direct=0, chain=1)

	A) All time period		B) Mon-Thu sample		C) M_Th AM peak		D) M_Th day off peak		E) M_Th PM peak		F) M_Th night off peak	
	Beta	e <sup>Beta</sup>	Beta	e <sup>Beta</sup>	Beta	e <sup>Beta</sup>	Beta	e <sup>Beta</sup>	Beta	e <sup>Beta</sup>	Beta	e <sup>Beta</sup>
Intercept	-2.9872 ***	0.05	-3.0348 ***	0.05	-4.0063 ***	0.02	-2.3652 ***	0.09	-2.4867 ***	0.08	-3.5904 ***	0.03
# day trips	0.2273 ***	1.26	0.2347 ***	1.26	0.3046 ***	1.36	0.1741 ***	1.19	0.24 ***	1.27	0.2773 ***	1.32
Distance to work	0.0161 ***	1.02	0.0133 ***	1.01	0.0131 ***	1.01	0.0312 ***	1.03	0.00494 ***	1.00	0.0141 ***	1.01
D Transit	-0.2704 ***	0.76	-0.1865 ***	0.83	-0.3952 ***	0.67	-0.2739 **	0.76	-0.0445	0.96	0.0749	1.08
D Walk	-0.2525 ***	0.78	-0.3698 ***	0.69	0.0025	1.00	-0.3725 ***	0.69	-0.3764 **	0.69	-0.0822	0.92
D Others	-0.0814	0.92	0.1471	1.16	0.1791	1.20	-0.245	0.78	-0.0061	0.99	0.6775 **	1.97
D female	0.4349 ***	1.54	0.4325 ***	1.54	0.508 ***	1.66	0.3233 ***	1.38	0.517 ***	1.68	0.3364 ***	1.40
D age 16-24	-0.1211 ***	0.89	-0.1253 ***	0.88	0.2697 ***	1.31	-0.345 ***	0.71	-0.2293 ***	0.80	0.118	1.13
D age 25-34	0.1974 ***	1.22	0.1749 ***	1.19	0.4208 ***	1.52	0.0113	1.01	0.1193 **	1.13	0.3169 ***	1.37
D age 55-64	-0.00866	0.99	-0.00014	1.00	0.0305	1.03	0.1735 **	1.19	-0.3164 ***	0.73	0.1466	1.16
D age 65 +	0.0794	1.08	0.1103	1.12	0.00817	1.01	0.1108	1.12	0.000358	1.00	0.1416	1.15
HH income	0.0044	1.00	0.0179	1.02	-0.0090	0.99	0.0256	1.03	0.0258	1.03	-0.0008	1.00
HH income square	0.0000	1.00	0.0000	1.00	0.0000	1.00	0.0000	1.00	0.0000	1.00	0.0000	1.00
D Part time	-0.1138 ***	0.89	-0.1536 ***	0.86	0.2261 ***	1.25	0.0633	1.07	-0.61 ***	0.54	-0.6219 ***	0.54
D Multi jobs	-0.1234	0.88	0.1391	1.15	1.1838 ***	3.27	-0.3549	0.70	0.5774 *	1.78	-0.9976 *	0.37
D with child age 15 -	0.2709 ***	1.31	0.2703 ***	1.31	1.0019 ***	2.72	-0.0884 **	0.92	0.0434	1.04	-0.03	0.97
D MSA 250K -	-0.2139 ***	0.81	-0.2483 ***	0.78	-0.2784 ***	0.76	-0.0858	0.92	-0.4632 ***	0.63	0.0292	1.03
D MSA 250K-500K	-0.1112 ***	0.89	-0.1087 **	0.90	-0.2334 ***	0.79	-0.00528	0.99	-0.0559	0.95	-0.1459	0.86
D MSA 500K-1M	-0.0285	0.97	-0.0784 *	0.92	-0.061	0.94	0.0809	1.08	-0.1431 *	0.87	-0.4745 ***	0.62
D MSA 1M-3M	-0.0341	0.97	-0.0656 **	0.94	-0.2572 ***	0.77	0.0488	1.05	-0.0337	0.97	0.1397	1.15
D Second	-0.021	0.98	0.053	1.05	0.2675 ***	1.31	-0.1993 ***	0.82	0.1914 ***	1.21	-0.1804	0.83
D Suburban	-0.00836	0.99	0.0609 *	1.06	0.2469 ***	1.28	-0.123 *	0.88	0.0895	1.09	-0.0435	0.96
D Town	-0.0524	0.95	0.0501	1.05	0.1503 **	1.16	-0.1449 *	0.87	0.2208 ***	1.25	-0.283 **	0.75
D Rural	0.0818 *	1.09	0.1763 ***	1.19	0.263 ***	1.30	0.2438 ***	1.28	0.1798 *	1.20	-0.3446 *	0.71
D M-T off-peak day	0.2917 ***	1.34	0.2404 ***	1.27								
D M-T PM peak	0.3745 ***	1.45	0.3313 ***	1.39								
D M-T off-peak night	-0.4854 ***	0.62	-0.5228 ***	0.59								
D Fri. AM peak	-0.2045 ***	0.82										
D Fri. off-peak day	0.3075 ***	1.36										
D Fri. PM peak	0.3713 ***	1.45										
D Fri. off-peak night	-0.3229 ***	0.72										
D Saturday	-0.3315 ***	0.72										
D Sunday	0.000826	1.00										
Number of Obs.	64,483		48,711		16,329		12,694		13,160		6,528	
-2 Log L	65481.953		49858.639		14923.210		14404.360		14716.547		4729.599	
Max-rescaled R <sup>2</sup>	0.147		0.148		0.230		0.110		0.129		0.164	

1) Reference group for age dummy is age 35 to 54; for number of vehicles, #vehicles = #drivers; for metro size, 3M +.

**Table A6.** Multinomial logit models for the likelihood of trip chaining in commute tours, 1995 (direct=0; relative to direct commute)

	A) All time period		B) Mon-Thu sample		C) M_Th AM peak		D) M_Th day off peak		E) M_Th PM peak		F) M_Th night off peak	
	w/o stop>30 Beta	with stop>30 Beta	w/o stop>30 Beta	with stop>30 Beta	w/o stop>30 Beta	with stop>30 Beta	w/o stop>30 Beta	with stop>30 Beta	w/o stop>30 Beta	with stop>30 Beta	w/o stop>30 Beta	with stop>30 Beta
Intercept	-3.6404 ***	-3.4796 ***	-3.5988 ***	-3.7268 ***	-4.7817 ***	-5.0821 ***	-3.112 ***	-3.3737 ***	-2.6473 ***	-2.4006 ***	-3.7866 ***	-4.5842 ***
# day trips	0.2115 ***	0.1609 ***	0.2136 ***	0.1718 ***	0.2612 ***	0.2345 ***	0.16 ***	0.1483 ***	0.2379 ***	0.1751 ***	0.2076 ***	0.135 ***
Distance to work	0.00819 ***	0.0121 ***	0.00987 ***	0.0119 ***	0.0102 ***	-0.00268	0.0219 ***	0.0293 ***	-0.00076 ***	-0.00059 ***	0.00509	0.0033
D Transit	-0.5269 ***	-0.1506	-0.5621 ***	-0.0839	-0.4166 **	-0.2019	-0.2147	-0.0249	-0.8642 ***	-0.2512	-1.3708 **	0.208
D Walk	-0.9036 ***	-0.8189 ***	-0.8626 ***	-0.7026 ***	-1.0708 ***	-2.9947 *	-0.808 ***	0.1922	-0.7876 ***	-0.9183 ***	-0.5752	-1.6001
D Others	-0.7361 ***	-0.1168	-0.6343 ***	0.0591	-0.6766 **	0.5745 *	-0.7804 ***	0.4241 **	-0.4416 *	-0.6978 **	-1.0173 **	-0.4598
D female	0.583 ***	0.3958 ***	0.6666 ***	0.4005 ***	0.9623 ***	-0.0845	0.4719 ***	0.4291 ***	0.6101 ***	0.5302 ***	0.4853 ***	0.4423 **
D age 16-24	-0.1647 ***	0.1015 *	-0.179 ***	0.1698 **	-0.0821	0.9277 ***	-0.2668 **	-0.2739 **	-0.3733 ***	0.123	0.2366	0.9322 ***
D age 25-34	0.1513 ***	0.127 ***	0.1652 ***	0.1888 ***	0.2321 ***	0.1904	0.054	0.0362	0.0807	0.2262 ***	0.4411 ***	0.7354 ***
D age 55-64	-0.1116 *	0.1183 *	-0.1548 **	0.1924 **	-0.0202	0.8281 ***	-0.0603	0.1903	-0.275 **	-0.1725	-0.5843 *	0.3197
D age 65 +	-0.32 **	-0.0835	-0.2438 *	-0.0142	0.012	-0.972 *	-0.2173	0.1589	-0.4005	0.0441	-1.8152	0.5999
HH income	0.0147	-0.0088	0.0228	0.00927	0.00789	0.0633	0.0861 ***	0.0688 *	-0.00382	-0.0714 **	0.0347	0.0437
HH income square	-0.00053	0.0012	-0.00083	0.00058	0.00058	0.00069	-0.00427 **	-0.00298	0.000733	0.00441 **	-0.00264	0.0001
D Part time	-0.2607 ***	-0.0591	-0.3396 ***	-0.0684	-0.3017 ***	1.3284 ***	-0.0861	0.00263	-0.5409 ***	-0.8041 ***	-0.7237 ***	-0.6125 **
D with child age 15 -	0.4374 ***	-0.0498	0.527 ***	-0.0917 **	1.3816 ***	0.3428 ***	0.2393 ***	-0.1065	0.0268	-0.3588 ***	0.2318 *	-0.2623
D MSA 250K -	-0.0215	-0.0452	-0.00928	0.0477	0.1199	0.3188	-0.1671	0.206 *	-0.2713 **	-0.4055 ***	0.4291 **	0.2403
D MSA 250K-500K	-0.2003 ***	-0.0052	-0.1927 ***	0.0149	-0.112	0.2295	-0.1363	0.00401	-0.4438 ***	-0.2338 *	0.1147	0.484
D MSA 500K-1M	0.0453	0.1608 **	0.0432	0.0625	0.1706 *	-0.0254	-0.034	0.1804	-0.0653	-0.0984	0.00531	0.0336
D MSA 1M-3M	0.0605	-0.0613	0.0384	0.0657	0.1686 **	-0.1331	-0.0518	0.187 **	0.0201	0.0512	-0.2342	-0.3326
D Second	-0.0292	-0.1827 ***	-0.0719	-0.1551 **	0.0372	-0.3815 **	0.0203	-0.084	-0.1664	-0.00074	0.0308	-0.0741
D Suburban	0.0275	-0.1957 ***	-0.0277	-0.194 ***	0.2211 **	-0.31 *	-0.0701	0.0669	-0.1691 *	-0.3636 ***	-0.2791	0.1037
D Town	0.017	-0.2393 ***	-0.0204	-0.1554 **	0.00855	-0.6496 ***	0.1499	0.1192	0.0372	-0.136	-0.5478 **	0.046
D Rural	0.2111 ***	-0.1963 **	0.2523 ***	-0.0333	0.4222 ***	-0.1221	0.3823 ***	-0.0459	0.1867	0.2912 **	-0.2348	-0.956 *
D M-T off-peak day	0.3913 ***	0.7307 ***	0.244 ***	0.7497 ***								
D M-T PM peak	0.5569 ***	0.6719 ***	0.4022 ***	0.6983 ***								
D M-T off-peak night	-0.4877 ***	-0.7601 ***	-0.64 ***	-0.7354 ***								
D Fri. AM peak	-0.01	-0.7906 ***										
D Fri. off-peak day	0.1974 ***	0.7945 ***										
D Fri. PM peak	0.2851 ***	0.507 ***										
D Fri. off-peak night	-0.332 ***	-0.3141 **										
D Saturday	-0.3619 ***	-0.0203										
D Sunday	-0.3956 ***	-0.0827										
Number of Obs.	42,494		31,236		10,798		7,624		9,090		4,148	
-2 Log L	53220.34		39698.57		10443.68		12115.84		13594.86		3265.86	
Max-rescaled R <sup>2</sup>	0.154		0.165		0.248		0.100		0.130		0.101	

1) Reference in dependent variable is direct commute. Alternative choices are chained commute with and without a stop of more than 30 minutes.

**Table A7. Multinomial logit models for the likelihood of trip chaining in commute tours, 2001 (direct=0; relative to direct commute)**

	A) All time period		B) Mon-Thu sample		C) M_Th AM peak		D) M_Th day off peak		E) M_Th PM peak		F) M_Th night off peak	
	w/o stop>30 Beta	with stop>30 Beta	w/o stop>30 Beta	with stop>30 Beta	w/o stop>30 Beta	with stop>30 Beta	w/o stop>30 Beta	with stop>30 Beta	w/o stop>30 Beta	with stop>30 Beta	w/o stop>30 Beta	with stop>30 Beta
Intercept	-3.5601 ***	-3.8695 ***	-3.6565 ***	-3.834 ***	-4.3848 ***	-5.2967 ***	-3.159 ***	-2.9221 ***	-3.3434 ***	-2.9772 ***	-3.6229 ***	-5.7524 ***
# day trips	0.2474 ***	0.187 ***	0.2553 ***	0.1928 ***	0.312 ***	0.2805 ***	0.208 ***	0.1235 ***	0.2601 ***	0.2088 ***	0.2874 ***	0.248 ***
Distance to work	0.016 ***	0.0165 ***	0.013 ***	0.014 ***	0.0132 ***	0.0135 ***	0.0337 ***	0.0276 ***	0.00461 ***	0.00547 ***	0.0124 ***	0.018 ***
D Transit	-0.5553 ***	0.138 *	-0.3979 ***	0.13	-0.7625 ***	0.3968 **	-0.4668 ***	-0.0638	-0.1823	0.0996	0.052	0.1011
D Walk	-0.4537 ***	0.0489	-0.6202 ***	-0.0138	-0.2562	0.6591 **	-0.866 ***	0.1021	-0.2205	-0.5839 **	-0.9659 **	1.0382 ***
D Others	-0.4115 ***	0.3624 **	-0.3182 *	0.6484 ***	-0.9077 **	1.2566 ***	-0.9696 *	0.2267	0.0284	-0.0446	0.0957	1.3535 ***
D female	0.4961 ***	0.3181 ***	0.4977 ***	0.3071 ***	0.6767 ***	-0.0575	0.2775 ***	0.3772 ***	0.6231 ***	0.3676 ***	0.2098 **	0.667 ***
D age 16-24	-0.1679 ***	-0.0704	-0.1544 ***	-0.1016 *	0.1037	0.5494 ***	-0.4254 ***	-0.2584 ***	-0.2532 ***	-0.2136 **	0.2303 *	-0.2548
D age 25-34	0.2444 ***	0.0965 ***	0.2486 ***	0.0154	0.4583 ***	0.2204 **	0.0968	-0.1271 *	0.2163 ***	-0.0328	0.2343 **	0.5041 ***
D age 55-64	0.0363	-0.091 *	0.0583	-0.1112 *	-0.0515	0.1957	0.1909 **	0.1447	-0.1608 *	-0.5273 ***	0.3572 **	-0.842 **
D age 65 +	0.0686	0.0638	0.0877	0.0856	-0.0246	-0.021	-0.00055	0.228	0.1528	-0.2017	-0.2755	0.8201
HH income	-0.0226 *	0.0587 ***	-0.0029	0.0617 ***	-0.0038	-0.0133	0.0071	0.0572 **	-0.0139	0.0866 ***	-0.0356	0.1100
HH income square	0.0000 ***	0.0000 *	0.0000	0.0000 *	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 ***	0.0000	0.0000
D Part time	-0.248 ***	0.1087 **	-0.3194 ***	0.1228 **	-0.2239 **	1.2015 ***	0.0806	0.0462	-0.8643 ***	-0.28 ***	-0.6125 ***	-0.5875 **
D Multi jobs	-0.1395	-0.0909	0.0404	0.3307	1.227 ***	1.0458 **	-0.0636	-1.1297 *	-0.0116	1.132 ***	-12.9268	0.3195
D with child age 15 -	0.5023 ***	-0.1802 ***	0.522 ***	-0.2267 ***	1.2308 ***	0.176 **	0.0888	-0.3281 ***	0.3491 ***	-0.4121 ***	-0.1008	0.1424
D MSA 250K -	-0.1587 ***	-0.3604 ***	-0.197 ***	-0.3865 ***	-0.2373 ***	-0.4553 ***	0.0761	-0.3612 ***	-0.4805 ***	-0.4366 ***	-0.0659	0.1926
D MSA 250K-500K	-0.1624 ***	-0.018	-0.1322 ***	-0.0682	-0.3206 ***	0.0471	0.0642	-0.0965	0.0226	-0.1673	-0.5438 ***	0.6606 ***
D MSA 500K-1M	-0.0339	-0.0158	-0.1001 **	-0.0343	-0.0257	-0.2179	0.2178 **	-0.1035	-0.3021 ***	0.0667	-0.8471 ***	0.3548
D MSA 1M-3M	-0.0387	-0.0241	-0.0461	-0.1047 **	-0.2874 ***	-0.1341	0.1151 *	-0.0288	0.084	-0.2097 ***	0.0605	0.3511 **
D Second	0.0407	-0.143 ***	0.1301 ***	-0.0903	0.2323 ***	0.3843 ***	-0.1088	-0.3217 ***	0.3536 ***	-0.0289	-0.0856	-0.4509 *
D Suburban	-0.0434	0.0532	0.0647	0.0584	0.1778 **	0.5114 ***	-0.1948 **	-0.039	0.1857 **	-0.0302	-0.0117	-0.1294
D Town	-0.0199	-0.1192 **	0.0852 *	-0.0117	0.1056	0.3339 **	-0.1433	-0.1459	0.361 ***	0.0308	-0.2532 *	-0.3595
D Rural	0.0678	0.1111 *	0.2139 ***	0.1117	0.1424	0.6732 ***	0.2967 ***	0.166	0.34 ***	-0.0348	-0.1448	-0.873 **
D M-T off-peak day	0.1467 ***	0.5749 ***	0.0747 ***	0.5652 ***								
D M-T PM peak	0.2954 ***	0.5551 ***	0.2287 ***	0.5592 ***								
D M-T off-peak night	-0.3871 ***	-0.635 ***	-0.4431 ***	-0.6339 ***								
D Fri. AM peak	0.0166	-0.7516 ***										
D Fri. off-peak day	0.1252 **	0.6358 ***										
D Fri. PM peak	0.4122 ***	0.353 ***										
D Fri. off-peak night	-0.306 ***	-0.299 ***										
D Saturday	-0.3389 ***	-0.2508 ***										
D Sunday	-0.1737 ***	0.3101 ***										
Number of Obs.	64,483		48,711		16,329		12,694		13,160		6,528	
-2 Log L	84143.636		64089.54		18131.12		19198.173		19610.316		5714.783	
Max-rescaled R <sup>2</sup>	0.1574		0.1604		0.2435		0.1185		0.1342		0.1724	

1) Reference in dependent variable is direct commute. Alternative choices are chained commute with and without a stop of more than 30 minutes.

**Table A8.** Binomial logit models for the likelihood of trip chaining in non-commute tours, 1995 (direct=0, chain=1)

	A) All time period			B) Mon-Thu sample			C) M_Th AM peak			D) M_Th day off peak			E) M_Th PM peak			F) M_Th night off peak		
	Beta	e <sup>Beta</sup>		Beta	e <sup>Beta</sup>		Beta	e <sup>Beta</sup>		Beta	e <sup>Beta</sup>		Beta	e <sup>Beta</sup>		Beta	e <sup>Beta</sup>	
Intercept	-2.5290	***	0.08	-2.4811	***	0.08	-2.5747	***	0.08	-1.9982	***	0.14	-2.7252	***	0.07	-3.1898	***	0.04
# day trips	0.1557	***	1.17	0.1565	***	1.17	0.1558	***	1.17	0.1573	***	1.17	0.1396	***	1.15	0.1796	***	1.20
D Transit	-0.3219	***	0.72	-0.3799	***	0.68	-0.2887		0.75	-0.3318	***	0.72	-0.3903	**	0.68	-0.8020	***	0.45
D Walk	-1.0523	***	0.35	-0.9641	***	0.38	-1.1016	***	0.33	-0.9898	***	0.37	-0.7092	***	0.49	-0.9400	***	0.39
D Others	-0.6950	***	0.50	-0.6598	***	0.52	-0.3355	**	0.71	-0.5800	***	0.56	-1.0138	***	0.36	-0.9966	***	0.37
D female	0.1541	***	1.17	0.1513	***	1.16	0.0705		1.07	0.1501	***	1.16	0.2529	***	1.29	0.0741		1.08
D age 16-24	-0.0732	***	0.93	-0.0667	**	0.94	-0.1684	*	0.85	-0.1051	**	0.90	-0.1046		0.90	0.1771	**	1.19
D age 25-34	0.0147		1.01	-0.0673	**	0.93	0.1459		1.16	-0.0681	*	0.93	-0.1114	*	0.89	-0.1022		0.90
D age 55-64	-0.00506		0.99	-0.0193		0.98	-0.1754		0.84	0.0379		1.04	-0.0922		0.91	-0.2135	*	0.81
D age 65 +	-0.0451		0.96	-0.0869	**	0.92	0.0468		1.05	-0.1086	**	0.90	-0.2431	**	0.78	-0.1189		0.89
HH income	-0.00872		0.99	-0.00989		0.99	-0.00540		0.99	0.00628		1.01	-0.0272		0.97	-0.0464		0.95
HH income square	0.000685		1.00	0.000400		1.00	-0.00138		1.00	-0.00061		1.00	0.00133		1.00	0.00393	**	1.00
D Employed	-0.1169	***	0.89	-0.2032	***	0.82	-0.1356	*	0.87	-0.3221	***	0.72	-0.0261		0.97	0.0200		1.02
D with child age 15 -	-0.0932	***	0.91	-0.0878	***	0.92	0.2015	***	1.22	-0.1995	***	0.82	0.0219		1.02	-0.0266		0.97
D MSA 250K -	0.0245		1.02	-0.0264		0.97	-0.3498	***	0.70	-0.0297		0.97	0.0901		1.09	0.0947		1.10
D MSA 250K-500K	-0.0276		0.97	-0.0754	**	0.93	-0.0574		0.94	-0.1699	***	0.84	-0.0812		0.92	0.3243	***	1.38
D MSA 500K-1M	0.0180		1.02	-0.0689	*	0.93	-0.00771		0.99	-0.1039	**	0.90	-0.0869		0.92	0.0281		1.03
D MSA 1M-3M	0.0402	**	1.04	0.0411		1.04	-0.00709		0.99	0.0745	**	1.08	-0.0606		0.94	0.0955		1.10
D Second	0.0102		1.01	0.1068	***	1.11	0.3164	***	1.37	0.0680		1.07	0.3200	***	1.38	-0.1299		0.88
D Suburban	0.0405	*	1.04	0.0403		1.04	0.1791	*	1.20	-0.0255		0.97	0.3487	***	1.42	-0.1755	**	0.84
D Town	0.0853	***	1.09	0.1075	***	1.11	0.4534	***	1.57	0.0514		1.05	0.1835	**	1.20	0.0420		1.04
D Rural	0.1428	***	1.15	0.2468	***	1.28	0.5579	***	1.75	0.2343	***	1.26	0.3386	***	1.40	0.0179		1.02
D M-T off-peak day	0.3620	***	1.44	0.3760	***	1.46												
D M-T PM peak	-0.1028	***	0.90	-0.0812	***	0.92												
D M-T off-peak night	-0.5160	***	0.60	-0.4836	***	0.62												
D Fri. AM peak	0.1241	**	1.13															
D Fri. off-peak day	0.2649	***	1.30															
D Fri. PM peak	-0.1402	***	0.87															
D Fri. off-peak night	-0.4070	***	0.67															
D Saturday	0.1929	***	1.21															
D Sunday	0.0427	**	1.04															
Number of Obs.	121,310			65,697			6,397			33,239			13,546			12,515		
-2 Log L	112721.930			61068.745			6062.571			34596.217			11768.671			8622.310		
Max-rescaled R <sup>2</sup>	0.089			0.099			0.111			0.088			0.071			0.088		

1) Reference group for age dummy is age 35 to 54; for number of vehicles, #vehicles = #drivers; for metro size, 3M +.

**Table A9.** Binomial logit models for the likelihood of trip chaining in non-commute tours, 2001 (direct=0, chain=1)

	A) All time period		B) Mon-Thu sample		C) M_Th AM peak		D) M_Th day off peak		E) M_Th PM peak		F) M_Th night off peak	
	Beta	e <sup>Beta</sup>	Beta	e <sup>Beta</sup>	Beta	e <sup>Beta</sup>	Beta	e <sup>Beta</sup>	Beta	e <sup>Beta</sup>	Beta	e <sup>Beta</sup>
Intercept	-2.3307 ***	0.10	-2.2725 ***	0.10	-1.8311 ***	0.16	-1.8671 ***	0.15	-2.3798 ***	0.09	-3.2072 ***	0.04
# day trips	0.1526 ***	1.16	0.1514 ***	1.16	0.1521 ***	1.16	0.1590 ***	1.17	0.1337 ***	1.14	0.1526 ***	1.16
D Transit	-0.6182 ***	0.54	-0.5705 ***	0.57	-0.7524 ***	0.47	-0.5847 ***	0.56	-0.4767 ***	0.62	-0.4886 ***	0.61
D Walk	-1.1889 ***	0.30	-1.1954 ***	0.30	-1.6163 ***	0.20	-1.1893 ***	0.30	-0.9217 ***	0.40	-1.2521 ***	0.29
D Others	-0.2117 ***	0.81	-0.3078 ***	0.74	-0.2295 ***	0.79	-0.5476 ***	0.58	-0.0158 ***	0.98	0.2818 *	1.33
D female	0.1098 ***	1.12	0.1672 ***	1.18	0.0432 ***	1.04	0.2049 ***	1.23	0.1278 ***	1.14	0.1614 ***	1.18
D age 16-24	-0.0681 ***	0.93	-0.0822 ***	0.92	-0.4681 ***	0.63	-0.1431 ***	0.87	0.0216 ***	1.02	0.1959 ***	1.22
D age 25-34	0.0164 ***	1.02	0.0327 ***	1.03	0.2764 ***	1.32	-0.0526 *	0.95	0.1325 ***	1.14	0.0133 ***	1.01
D age 55-64	-0.0559 ***	0.95	-0.00678	0.99	0.0535 ***	1.05	0.0489 ***	1.05	-0.0605 ***	0.94	-0.4046 ***	0.67
D age 65 +	-0.0725 ***	0.93	-0.0385 ***	0.96	-0.2780 ***	0.76	0.0195 ***	1.02	-0.1989 ***	0.82	-0.0291 ***	0.97
HH income	-0.00225	1.00	-0.0214 ***	0.98	-0.1263 ***	0.88	-0.0142 ***	0.99	-0.00825	0.99	0.0217	1.02
HH income square	-0.00042	1.00	0.000673	1.00	0.00513 ***	1.01	0.000299	1.00	0.000422	1.00	-0.00110	1.00
D Employed	-0.0777 ***	0.93	-0.0824 ***	0.92	-0.0174 ***	0.98	-0.1577 ***	0.85	0.0188 ***	1.02	0.0429 ***	1.04
D with child age 15 -	-0.1143 ***	0.89	-0.1298 ***	0.88	0.1480 **	1.16	-0.1439 ***	0.87	-0.2044 ***	0.82	-0.1630 ***	0.85
D MSA 250K -	-0.0347 ***	0.97	-0.0216 ***	0.98	0.0281 ***	1.03	-0.0267 ***	0.97	-0.2149 ***	0.81	0.2729 ***	1.31
D MSA 250K-500K	-0.0283 ***	0.97	-0.0507 *	0.95	-0.0320 ***	0.97	-0.1378 ***	0.87	-0.0392 ***	0.96	0.3169 ***	1.37
D MSA 500K-1M	-0.0677 ***	0.93	-0.0932 ***	0.91	-0.1107 ***	0.90	-0.1322 ***	0.88	-0.0397 ***	0.96	0.0431 ***	1.04
D MSA 1M-3M	0.0208 ***	1.02	0.0348 *	1.04	0.0786 ***	1.08	0.0433 ***	1.04	-0.0779 *	0.93	0.1442 **	1.16
D Second	-0.0605 ***	0.94	-0.1017 ***	0.90	-0.2926 ***	0.75	-0.1363 ***	0.87	-0.0101 ***	0.99	0.0275 ***	1.03
D Suburban	-0.0168 ***	0.98	-0.0428 *	0.96	-0.0475 ***	0.95	-0.1227 ***	0.88	0.1209 **	1.13	0.0586 ***	1.06
D Town	0.0135 ***	1.01	-0.0533 *	0.95	0.0789 ***	1.08	-0.1395 ***	0.87	0.0638 ***	1.07	0.0175 ***	1.02
D Rural	0.0654 **	1.07	0.0788 **	1.08	0.3247 ***	1.38	0.0263 ***	1.03	0.0796 ***	1.08	0.0985 ***	1.10
D M-T off-peak day	0.3820 ***	1.47	0.3799 ***	1.46								
D M-T PM peak	-0.0693 ***	0.93	-0.0652 ***	0.94								
D M-T off-peak night	-0.4614 ***	0.63	-0.4525 ***	0.64								
D Fri. AM peak	-0.0319 ***	0.97										
D Fri. off-peak day	0.3578 ***	1.43										
D Fri. PM peak	0.0436 ***	1.04										
D Fri. off-peak night	-0.5627 ***	0.57										
D Saturday	0.1913 ***	1.21										
D Sunday	0.0175 ***	1.02										
Number of Obs.	193,467		102,556		11,064		51,917		21,637		17,938	
-2 Log L	182046.240		96713.568		10061.148		54582.652		19174.672		12832.390	
Max-rescaled R <sup>2</sup>	0.092		0.103		0.138		0.097		0.059		0.077	

1) Reference group for age dummy is age 35 to 54; for number of vehicles, #vehicles = #drivers; for metro size, 3M +.