THE RELATIONSHIP OF VEHICLE TYPE CHOICE TO PERSONALITY, LIFESTYLE, ATTITUDINAL, AND DEMOGRAPHIC VARIABLES

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EXECUTIVE SUMMARY

Traditionally, economists and market researchers have been interested in identifying the factors that affect consumers' car buying behaviors, and have developed various models of vehicle type choice to estimate market share. However, they do not usually consider consumers' travel attitudes, personality, lifestyle, and mobility as factors that may affect the vehicle type choice. The purpose of this research is to explore the travel attitude, personality, lifestyle, and mobility factors that affect individuals' vehicle type choices, and to develop a disaggregate choice model of vehicle type based on these factors as well as typical demographic variables. We first discuss key literature related to vehicle type choice models, vehicle use models, and mobility, and then describe the characteristics of our sample, the vehicle classification we used in this study, and key explanatory variables included in the vehicle type choice model. The relationships of vehicle type to travel attitude, personality, lifestyle, mobility, and demographic variables are individually explored using one-way ANOVA and chi-squared tests, and then a multinomial logit model for vehicle type choice is developed.

The literature review covers three topics: vehicle type choice, vehicle use, and attitudes toward mobility. Most studies of vehicle type choice reviewed for this report generally use disaggregate discrete choice models (multinomial logit and nested logit) for the vehicle type choice, and vehicle and household characteristics are mainly considered as explanatory variables in the models. Not surprisingly, the most common variable is vehicle price, which is significant across seven models. That is, all else equal, the more a vehicle costs, the lower its choice probability. Of greatest interest to the present study is the impact of demographic variables on vehicle type choice, and income or number of household members positively affects the choice probability of vehicle type in some models.

On the other hand, vehicle use models are more indirectly related to vehicle type choice. These models mainly consider vehicle attributes (including the vehicle type), primary driver characteristics, and household characteristics as explanatory variables. Interestingly, two models show that households owning a van tend to drive more than those with other vehicle types. These results imply that vehicle type is significantly associated with vehicle use such as VMT. Finally, review of previous work on attitudes toward mobility provides additional information on the context of the present study.

The data for this research comes from a 1998 mail-out/mail-back survey of 1,904 residents in three neighborhoods in the San Francisco Bay Area: Concord and Pleasant Hill represent two different kinds of suburban neighborhoods comprising about half the sample, and an area defined as North San Francisco represents an urban neighborhood comprising the remainder. The survey contained questions about objective and perceived mobility, attitudes toward travel, lifestyle, personality, relative desired mobility, travel liking, and demographic characteristics. The dependent variable, make and model of the vehicle the respondent drives most often, is classified into nine vehicle type categories: small, compact, mid-sized, large, luxury, sports, minivan/van, pickup, and sport utility vehicle (SUV). The explanatory variables used in the vehicle type choice model are travel-related attitudes, personality, lifestyle, mobility, travel liking, and demographic variables.

We first conducted ANOVA and chi-squared tests to identify whether the explanatory variables, plus two (attitudinal and personality/lifestyle) cluster membership variables created in previous work, individually are statistically different among groups classified by vehicle type. The Bonferroni multiple comparisons test was additionally conducted for the variables that had statistical differences among vehicle type groups based on the ANOVA test, to identify which categories are significantly different from other categories. All vehicle type groups, except the mid-sized car group, have distinct characteristics with

respect to travel attitude, personality, lifestyle, mobility, and demographic variables. The characteristics of travel attitude, personality, and lifestyle for each vehicle type are consistent with those of cluster memberships, showing a higher proportion of a given vehicle type in the corresponding cluster. The mid-sized car group tends to be "middle-of-the-road" in its characteristics. Also, no significant differences across vehicle types were found with respect to the relative desired mobility, commute time, and commute distance variables. A summary of the key characteristics associated with each vehicle type, based on the analysis of individual characteristics, is found in Section 4.5, p. 84.

Furthermore, we developed a disaggregate discrete choice model (specifically, a multinomial logit model) for vehicle type choice to estimate the joint effect of the key variables on the probability of choosing each vehicle type. As shown in Table ES-1, the final model (with the pickup vehicle type as base) includes 40 significant alternative-specific variables representing travel attitude, personality, lifestyle, mobility factors, and demographic variables together with the eight alternative-specific constants. We also examined whether the independence from irrelevant alternatives (IIA) assumption of the final model specification is violated or not by using two tests for IIA: the Hausman-McFadden and nested logit structure tests. The former test could not be completed due to the singularity of the V(r) – V(f) matrix (a common occurrence), while the latter test strongly indicates that the IIA property of the final model holds. Despite conceptual similarities among the nine vehicle types modeled, this is not necessarily surprising considering the fact that alternative-specific variables are generally recommended as one solution to IIA violations of a multinomial logit model.

The key results of the model are as follows:

- Those who have a stronger pro-high density attitude are more likely to drive *small* cars, while those who are workaholics or do not enjoy personal vehicle travel for

short distance are less likely to choose *small* cars. Additionally, those who have a stronger pro-high density attitude are more likely to drive *compact* cars, while those who perceive that they have a lot of overall long-distance travel are less likely to do so. Interestingly, those who have a stronger pro-high density attitude or tend to be organizers are more likely to drive *mid-sized* cars. Those who have higher household incomes are also more likely to choose *mid-sized* cars, but are even more likely to drive *luxury* cars and *SUVs*.

- No travel attitude, personality, lifestyle, mobility, or travel liking characteristics are significant to choosing *large* cars. On the other hand, those who have stronger travel dislike and pro-high density attitudes, tend to be status seeking, or not frustrated, are more likely to drive *luxury* cars. With respect to the mobility variables, those who travel long-distance by airplane a lot also tend to drive *luxury* cars.

- For sports cars and SUVs, those who tend to be status seekers, not workaholics, or younger are more likely to drive *sports* cars. Particularly, those who perceive their overall short-distance travel to be a lot but their long-distance personal vehicle travel to be lower are more likely to drive *sports* cars. Interestingly, those who have a stronger pro-high density attitude are more likely to drive *SUVs*, whereas those who are frustrated are less likely to drive *SUVs*. On the other hand, those who tend to be calm are more likely to drive *minivans*.

- Similar to the previous studies on vehicle type choice, demographic characteristics are also related to vehicle type choice. The respondent's age is negatively associated with driving *small* or *sports* cars and *SUVs*, and drivers of *pickups* and *large* cars tend to be less-educated than drivers of the other vehicle types. Household income is positively related to expensive cars such as *luxury* cars and *SUVs*, while personal

income is negatively related to small cars. Clearly, the number of people under age 19 in a household is strongly positively associated with *minivans*, and the number of people age 65 or older in a household is positively related to larger cars such as *large* and *luxury* cars.

- Interestingly, females are less likely to drive *pickups* than any other vehicle type. As expected, the urban neighborhood variable has a positive sign for *small* and *luxury* cars. Unemployed individuals such as homemakers and retired people may tend to drive family vehicles or bigger and more comfortable cars such as *minivans* and *luxury* cars. Being a salesperson is strongly positively related to driving a *luxury* car, suggesting the need to appear successful in such an occupation.

These results strongly support our hypotheses that travel attitudes, personality, lifestyle, and mobility factors affect individuals' vehicle type choices. Thus, the specific relationships identified in this study provide useful insight for vehicle manufacturers, as well as for decision makers and transportation planners developing transportation policies related to vehicle ownership, traffic congestion, and energy consumption. The general conclusion is also important: in addition to traditional demographic variables, travel attitude, personality, lifestyle, and mobility factors significantly affect an individual's vehicle type choice. Future models of vehicle type choice can be substantially more powerful with the inclusion of such variables.

Table ES-1: Final Multinomial Logit Model for Vehicle Type Choice (Base Alternative = Pickup)

Explanatory Variables	Small	Compact	Mid-sized	Large	Luxury	Sports	Minivan/Van	SUV
Travel Attitudes								
Travel Dislike					0.461 (2.74)			
Pro-high Density	0.491 (6.11)	0.491 (6.11)	0.491 (6.11)		0.694 (5.62)			0.694 (5.62)
Personality								
Organizer			0.181 (2.22)					
Calm							0.333 (2.45)	
Lifestyle								
Frustrated					-0.507 (-2.25)			-0.238 (-2.26)
Workaholic	-0.222 (-2.43)					-0.425 (-3.22)		
Status Seeking					0.756 (4.12)	0.445 (3.81)		
Objective Mobility								
Sum of log-miles by airplane for LD					0.004 (2.85)			
Perceived Mobility								
Overall SD						0.208 (2.28)		
Overall LD		-0.182 (-2.35)						
Personal Vehicle for LD						-0.221 (-2.90)		
Travel Liking								
Personal Vehicle for SD	-0.151 (-2.00)							

Note: The number in parentheses indicates the t-value of that coefficient (at a level of α=0.05 a critical t-value = 1.96).

(Table ES-1 continued)

Explanatory Variables	Small	Compact	Mid-sized	Large	Luxury	Sports	Minivan/Van	SUV
Demographics								
Age	-0.324 (-3.31)					-0.367 (-2.64)		-0.582 (-4.51)
Education	0.258 (3.65)	0.364 (5.09)	0.258 (3.65)		0.364 (5.09)	0.364 (5.09)	0.258 (3.65)	0.364 (5.09)
Household Income			0.203 (4.09)		0.449 (3.49)			0.292 (4.59)
Personal Income	-0.169 (-3.37)							
No. of People < 19			0.240 (2.98)				0.904 (9.44)	
No. of People > 64			0.350 (2.74)	0.901 (5.07)	0.830 (3.54)			
Female (dummy)	2.419 (9.03)	2.176 (8.20)	2.419 (9.03)	2.176 (8.20)	2.703 (6.70)	2.176 (8.20)	2.176 (8.20)	2.176 (8.20)
Urban (dummy)	0.667 (4.81)				0.826 (2.48)			
Employed (dummy)			-0.579 (-3.03)		-0.989 (-2.42)		-0.799 (-3.16)	
Sales (dummy)			0.621 (3.01)		0.978 (2.27)			
Constants	0.697 (1.40)	-1.127 (-3.06)	-1.582 (-4.19)	-2.278 (-10.46)	-5.931 (-7.42)	-1.273 (-2.03)	-2.113 (-5.82)	-1.674 (-3.10)
No. of Observations					1571			
Log-likelihood at 0					-3451.8			
Log-likelihood at Market Share					-3183.5			
Log-likelihood at Convergence					-2839.2			
ρ_o^2 (Adjusted ρ_o^2)					0.177 (0.174)			
ρ_c^2 (Adjusted ρ_c^2)					0.108 (0.105)			
χ_o^2					1225.2			
χ_c^2					688.5			

Note: The number in parentheses indicates the t-value of that coefficient (at a level of α=0.05 a critical t-value = 1.96).

CHAPTER 1. INTRODUCTION

The U.S. is a highly motorized society. As such, each year nearly two hundred new vehicle models are produced by domestic and foreign vehicle manufacturers, and millions of new vehicles are sold. There is a wide range of makes and models, and people make choices based on their own preferences and needs when choosing which car to buy. Historically, different vehicle types have been popular in various time periods: for example, small and compact cars in the mid-1970s, minivans in the 1980s, pickups/SUVs in the 1990s. What determines the preference for and choice of a certain kind of car? What characteristics do people who drive the same kind of car have in common? What can attitudes, personality, and lifestyle characteristics tell us about vehicle type choices, compared to the role of demographics?

Traditionally, economists and market researchers have been interested in identifying the factors that affect consumers' car buying behaviors to estimate market share, and have developed various models of vehicle type choice. Specifically, such disaggregate choice models as multinomial logit and nested logit have been used to explain vehicle type choice. These models are generally focused on vehicle attributes (such as operating and capital costs, horsepower, and fuel efficiency), household characteristics (such as number of household members, number of vehicles, and household income), and principal driver characteristics (such as age, education, and income) (Train, 1986; Golob, *et al*., 1997). However, they do not usually consider consumers' travel attitudes, personality, lifestyle, and mobility as factors that may affect the vehicle type choice.

Of course, there are stereotypes for what kind of person drives a certain vehicle make and model, assuming that attitudes influence the vehicle type choice. However, a better understanding of the relationships between travel attitude, personality, or lifestyle factors and vehicle type choices will improve vehicle type choice models. Furthermore, a better understanding of these relationships will be useful background for decision makers and

transportation planners developing transportation policies related to vehicle ownership, traffic congestion, and energy consumption.

The purpose of this research is to explore the travel attitude, personality, lifestyle, and mobility factors that affect individuals' vehicle type choices, and to develop a disaggregate choice model of vehicle type based on these factors as well as typical demographic variables. The data for this research comes from a 1998 mail-out/mail-back survey of 1,904 residents in the San Francisco Bay Area. The dependent variable, make and model of the vehicle the respondent drives most often, is classified into nine vehicle type categories (described in more detail in Chapter 3): small, compact, mid-sized, large, luxury, sports, minivan/van, pickup, and sport utility vehicle (SUV). Based on these vehicle categories, we explore questions such as how travel attitude affects type of vehicle driven, what kind of person chooses a particular vehicle type, or whether mobility affects the type of vehicle driven. We can hypothesize a number of potential relationships of travel attitudes, personality, lifestyle, and mobility to vehicle type (the specific variables available to this study are described in more detail in Chapter 3).

1. Travel Attitudes

Alternate hypotheses are plausible. On the one hand, an individual may enjoy traveling *because* she drives a luxurious car, or a fun car (sports or SUV categories). Or, an innate love of travel may prompt a person to buy a car that supports that feeling. On the other hand, those who dislike travel may be more likely to use a larger car (large, luxury, and SUV categories) because they seek to be more comfortable and to minimize travel fatigue even for short-distance trips. Those who have the freedom to travel anywhere they want and relatively low travel stress may be more likely to use a more powerful car or a leisure car (sports and SUV categories).

Those who strongly support pro-environmental policies are more likely to prioritize reducing mobile source emissions and therefore to drive a smaller car (small and compact

categories). Those who like living in high-density areas may choose a smaller car (small and compact categories) because they have accessible public transit and restrictions on parking, making them less likely to commute by car. Those who recognize benefits of commuting may be more likely to use a more comfortable or versatile car (luxury category) that allows them to do other activities such as playing CDs while driving.

2. Personality

Adventure seekers may be more likely to use a powerful car (sports and SUV categories) that allows them the flexibility needed for a variety of activities and outdoor adventures. Conversely, calm people may be less likely to use a powerful car (sports and SUV categories) because they are not aggressive, even while traveling. Loners are probably less likely to use a family car (minivan/van category).

3. Lifestyle

Frustrated people may be less likely to use a more powerful car (sports and SUV categories) because such cars may be a symbol of confidence and control. Family-oriented people are more likely to use a family car (minivan/van category). Status seekers are more likely to drive an expensive car (luxury and sports categories) because such cars are common status symbols in modern society.

4. Mobility

The relationships of various measures of mobility to vehicle type are potentially more indirect, with mobility serving as an indicator or proxy for an underlying cause or effect. For example, those who travel a lot by airplane may be more likely to drive a comfortable or expensive car (luxury category) because both characteristics are indicative of a high-income lifestyle, or because frequent flyers may place a higher value on comfort and time while traveling. Those who perceive they do a lot of travel may be more likely to use a larger and more powerful car (pickup and SUV categories) because both factors could be indicative of a love of travel.

Similar to the travel liking attitude, the relationship of relative desired mobility (see Chapter 3) to vehicle type is ambiguous. Those who want to reduce the amount they travel may be more likely to use a larger and more comfortable car (large and luxury categories) to make the unpleasantness of travel more palatable. On the other hand, those who want to increase their travel may prefer similar kinds of cars, to make their travel even more enjoyable.

This report consists of six chapters. The following chapter discusses key literature related to vehicle type choice models, vehicle use models, and mobility. The third chapter describes the characteristics of our sample, the vehicle classification we used in this study, and key explanatory variables included in the vehicle type choice model. The fourth chapter relates vehicle type to travel attitude, personality, lifestyle, mobility, and demographic variables individually, using one-way ANOVA and chi-squared tests. The fifth chapter presents a multinomial logit model for vehicle type choice. Finally, we summarize the results and suggest further research.

CHAPTER 2. LITERATURE REVIEW

In this chapter, we conduct a literature review of three topics: vehicle type choice, vehicle use, and attitudes toward mobility. The first topic is directly related to vehicle type choice models. Most published studies of vehicle type choice concentrate on vehicle attributes, household and primary driver characteristics, and brand loyalty. There is little open literature on vehicle type choice focusing on travel attitude, personality, and lifestyle factors (there are doubtless numerous proprietary studies of the role of these factors in vehicle type choice). Nevertheless, the review of this topic is helpful in identifying the types of models that have been used in this area, and the explanatory variables that have previously been found to affect vehicle type choice. The second topic, vehicle use, is more indirectly related to vehicle type choice. It is sometimes used as an explanatory variable in vehicle type choice models. This review is mainly focused on studies of vehicle miles traveled by vehicle type. Finally, the section on attitudes toward mobility briefly reviews previous work on this project, and provides a context from which to view the current work.

2.1 Vehicle Type Choice Models

We reviewed 11 studies, spanning two decades, involving vehicle type choice models. Two of them (Tardiff, 1980; Mannering and Train, 1985) present a review of previous research and suggest future directions. Eight papers (Lave and Train, 1979; Manski and Sherman, 1980; Hocherman, *et al*., 1983; Berkovec and Rust, 1985; Berkovec, 1985; Mannering and Winston, 1985; Kitamura, *et al*., 2000; Mannering, *et al*., 2002) introduce disaggregate discrete-alternative models such as multinomial logit and nested logit for vehicle type choice, and the other paper (Murtaugh and Gladwin, 1980) develops a hierarchical decision process model for vehicle type choice. We discuss each of these papers in turn, followed by a summary of vehicle type choice models, with Table 2.1 at the end of this section providing a direct comparison of the models of the last nine papers.

2.1.1 Vehicle Choice Models: Review of Previous Studies and Directions for Further Research – Timothy J. Tardiff (1980)

In this review paper, the author classifies the existing models by the kind of vehicle choice under study (vehicle ownership levels, purchased new vehicle type, joint ownership level and mode choice, and vehicle type owned), and assesses them on the basis of nature of vehicle choice, explanatory variables, and functional forms. Tardiff points out that the models for vehicle ownership levels have limitations in dealing with vehicle type and change in vehicle ownership levels because they are estimated separately and use single equation models. On the other hand, the joint choice models addressing vehicle ownership levels and mode choice simultaneously involve difficulty in obtaining appropriate data for the models and in interpreting their complicated structures.

The author emphasizes the interdependence among kinds of vehicle choices, and suggests that simultaneous equation models or joint models (e.g. number of vehicles and vehicle types) are more useful than conditional choice models. Further, because most existing models use cross sectional data for estimation, they cannot provide information on the effects of previous vehicle choices or vehicle ownership behavior. Finally, Tardiff proposes further research focused on vehicle purchases and holdings: 1) vehicle purchase models are needed that use a stratified sample or auto characteristics that vary with location, 2) vehicle holdings models are needed that are joint models of level and type (e.g. one vehicle-small car) with simplified vehicle types, 3) a sequential choice model is needed that considers vehicle types owned as vehicle purchase decisions and estimates submodels (such as primary and secondary vehicle models) for each vehicle type, 4) dynamic choice models are also needed that explain vehicle purchase, sales, and use based on a time series of cross-sectional data or panel data.

2.1.2 Recent Directions in Automobile Demand Modeling – Fred Mannering and Kenneth Train (1985)

This paper reviews previous research with respect to seven issues: relationship of number and type of autos owned, vehicle ownership and usage, miles traveled on each vehicle in multi-vehicle households, dynamic components of vehicle demand, handling of makes and models of vehicles, market equilibration, and data from hypothetical choice situations. Several studies on these issues are introduced to explore previous and current directions in the models. In particular, the authors point out that before 1980, studies of automobile demand generally modeled either number of vehicles or vehicle type, but not both, although they are certainly associated. For example, models for vehicle type choice have limitations in determining which value of vehicle characteristics to assign to each household without predicting the number of vehicles owned in the future. Conversely, models for number of vehicles generally consider the cost of owning vehicles as a fixed value, even if operating costs vary across each vehicle type.

In contrast, current research improves on the previous models by jointly considering the number of vehicles and the vehicle types, using a nested logit model in which vehicle type is conditional on number of vehicles. Additionally, the nested logit models conditional on transaction type focus on the vehicle type choices when buying an additional vehicle and/or selling a vehicle currently owned. On the other hand, although vehicle usage variables such as vehicle miles traveled are related to the number of vehicles and vehicle types chosen, these variables are considered as exogenous variables in the vehicle type choice model. Thus, the vehicle type choice models are subject to simultaneity bias in the parameter estimation. In other studies, vehicle usage models for each vehicle in multi-vehicle households are developed using simultaneous equation models. Mannering and Train observe that in the discrete choice models, forecasting the demand for each make and model (normally involving forecasting the characteristics of each make/model combination, and then calculating the probability that each household in the sample chooses each make/model) is difficult due to the large number of alternatives.

The authors suggest some directions for automobile demand models based on their review: 1) the relationships among number of vehicles owned, vehicle types owned, and vehicle usage need to be better understood, 2) dynamic approaches to modeling automobile demand need to be developed such as a disaggregate choice model conditional on vehicle holding (whether selling or keeping a vehicle owned) over time, and 3) models based on hypothetical choice need to be improved for estimation of the potential market for new technologies.

2.1.3 A Disaggregate Model of Auto-Type Choice – Charles A. Lave and Kenneth Train (1979)

The authors develop a disaggregate model of vehicle type choice for households buying a new car. They conducted home interviews with a stratified random sample (approximately equal sample sizes across vehicle classes of small, medium, and large) of 541 new car buyers in seven U.S. cities in 1976. Vehicle types are classified into 10 categories including subdivisions within categories based on size and price: subsubcompact, sports, subcompact A and B, compact A and B, intermediate, standard A and B, and luxury. On the basis of these categories, a multinomial logit model is developed using car characteristics (e.g. price, weight, fuel efficiency, horsepower), household characteristics (e.g. income, number of household members, number of miles driven), and driving environment (e.g. gasoline price) as explanatory variables. The model consists of many interaction terms of car characteristics associated with socioeconomic variables (e.g. cost/income, gas price/miles per gallon, weight*age) since car characteristics do not vary across the respondents, and respondent characteristics do not vary across the vehicle alternatives.

The results of the model indicate that larger households are more likely to choose subsubcompact and subcompact cars. Interestingly, households with more miles driven are more likely to choose large vehicles, although this effect was not significant in the model. Older people tend to choose larger cars, and households with high incomes are likely to choose large and expensive cars. On the other hand, vehicle price negatively affects the

choice of each vehicle type, and households owning more than two vehicles tend to choose smaller cars when they buy another.

2.1.4 An Empirical Analysis of Household Choice among Motor Vehicles – Charles F. Manski and Leonard Sherman (1980)

This paper presents multinomial logit models of vehicle type choice conditional on the number of vehicles owned, and focuses on single-vehicle and two-vehicle households. The authors use a nationwide U.S. sample of 1,200 households from a consumer panel survey in 1976. The vehicles are classified into 600 different types by make, model, and vintage, but the models use only 26 alternative vehicle types which include the chosen alternative and 25 others randomly selected from the universal choice set.

The vehicle type choice models (for currently-owned cars) are estimated separately for single-vehicle and two-vehicle households (the latter case models the joint choice of two vehicles). Vehicle attributes (including cost, passenger-carrying, load-carrying, performance, and class characteristics) and household characteristics (including number of household members, income, age) are used as explanatory variables in the models. According to the estimated models, seating space and luggage space positively affect the vehicle type choices, especially in larger single-vehicle households, while scrappage rate (a proxy for the probability of mechanical vehicle failure) turns out to be a negative factor for the vehicle choices. Households headed by someone older than 45 are more likely to consider vehicle weight in their vehicle type choices, whereas households with low incomes are less likely to hold vehicles with higher operating cost. The transaction cost variable in the models is a dummy variable taking on the value zero for the alternative currently owned by the household, and one for all other available vehicle types. This transaction cost variable negatively affects the choice probability, indicating the inertia effect of tending to retain an existing vehicle. Interestingly, the authors find that acceleration time significantly positively affects the vehicle type choice. This result is counterintuitive and the authors suggest that it may be due either to data problems such as correlation with excluded

variables, or may reflect the relative unimportance of acceleration time to consumer preferences.

2.1.5 Estimation and Use of Dynamic Transaction Models of Automobile Ownership – Irit Hocherman, Joseph N. Prashker, and Moshe Ben-Akiva (1983)

This paper presents dynamic transaction models for automobile ownership level and type choice. The authors use a stratified random sample of 500 households that did not buy a car and 800 households that bought a car in 1979 in the Haifa urban area of Israel. The vehicle type choice model is embedded in a two-stage nested logit model of vehicle type choice conditioned on transaction type (buying a first car or replacing an existing car). Hocherman, *et al*. estimated a vehicle type choice model using the households purchasing a car, and car purchase decision models for households with and without a vehicle (using the entire sample), incorporating an inclusive value derived from the vehicle type choice model as an explanatory variable for the "buy" and "replace" alternatives in the upper (transaction type) level of the model. The car purchase decision models assumed that the auto ownership level and vehicle type owned in the previous time influence decisions of transaction types in the current time period.

The vehicle types were classified by make, model, body type, and vintage (using vintage dummy variables for less than 2 years, 2-9 years, 10-14 years, and 15 years or older). In addition to the chosen alternative, 19 alternative vehicle types were randomly selected from 950 different types identified for the models. Household characteristics such as income, age, and work status, previous car attributes (such as engine size and average mileage), alternative car attributes (such as cost, size, and performance) and transaction costs (such as search costs, information costs, and brand loyalty) were employed as explanatory variables.

The authors found that, in the case of vehicle type choice conditioned on purchase, the purchase price and operating cost variables generally affected vehicle type choice negatively except in households where the head of household is 45 or older, in which case

the effect was not statistically significant. People who are older or high-income tended to choose more expensive cars. When considering vehicle performance, the 30 to 45 age group placed high value on horsepower and the weight of a car. Vintage dummy variables (taking vintage less than 2 years as the base category) had a highly significant and negative effect on the choice of each vehicle type. That is, the older the car, the higher the transaction cost and the less likely the car was to be chosen. Brand loyalty and the number of vehicles of the same make positively affected the vehicle type choice. In the purchase decision model for households without a vehicle, higher income households and people with long commutes by bus were more likely to buy a car, while households with older household heads were less likely to buy a car. For households with a vehicle, attributes of the previous car such as engine size and vintage affected the decision to replace a car: e.g. smaller engine size and older vehicle age positively affected the replacement decision.

2.1.6 A Nested Logit Model of Automobile Holdings for One Vehicle Households – James Berkovec and John Rust (1985)

This paper develops a nested logit model for the type of vehicle currently owned by single-vehicle households. A nationwide U.S. sample of 237 single-vehicle households (owning neither vans, pickups, utility vehicles, nor vehicles older than 1967), from 1,095 households responding to a home interview travel survey in 1978, is used to estimate the model. The vehicle types are classified into 15 categories based on size (subcompact, compact, intermediate, standard, and luxury/sports) and age (new (1977-78), mid (1973-76), and old (1967-1972)), and the nested logit structure models choice of vehicle size category conditional on vehicle age. The model considers vehicle attributes (such as capital and operating costs, capacity, and performance), household attributes (such as income and age), and a transaction variable (defined as a dummy variable that is one if the currently-held vehicle was owned since last year and zero otherwise) as explanatory variables. Additionally, the authors estimate two other models with and without the transaction variable using a subset of the specification in the first model, to analyze whether or not the vehicle choice process is a sequence of independent discrete decisions (i.e. with a

negligible transaction cost). The authors estimate the three models using a two-step estimation technique (a sequential maximum likelihood estimate for the lower level plus one Newton-step estimate for the upper level).

The authors find that the transaction variable is a significantly positive factor in the models with a transaction variable. That is, all else equal, the vehicle owned last year has a higher probability of being chosen (kept) this year. Berkovec and Rust also point out that the transaction variables have different magnitudes but the same sign in the two models due to the misspecification or correlation between the transaction variable and the error terms in the nested model structure. From both results, the authors conclude that "there is clear evidence of strong inertia in vehicle holdings: in each period a consumer is significantly more likely to keep a currently held automobile than to trade for a new one". In addition, all cost (such as purchase price and operating cost) and vehicle age variables negatively affect the choice of each vehicle type. In the first model, vehicle size variables such as turning radius negatively affect the choice of each vehicle type in urban as opposed to rural areas, perhaps due to the greater difficulty of parking in urban areas. Vehicle performance such as horsepower is more attractive to the group age 45 or younger. In the case of manufacturers, Fords and foreign vehicles are valued significantly positively in the models with a transaction variable, while other domestic vehicle brands are valued significantly negatively (with respect to the base of GM vehicles).

2.1.7 Forecasting Automobile Demand Using Disaggregate Choice Models – James Berkovec (1985)

The paper presents a simulation model to forecast automobile market demand (including vehicle holdings, new car sales, and used car scrappage rates) under various gas price policies. This model consists of a disaggregate discrete choice model for vehicle type, a regression model for vehicle scrappage rate, and a simple function of vehicle price for new car supply. The vehicle scrappage rate is defined a probability of vehicle failure needing to be repaired and negatively relating to the vehicle value in a given period. The author uses a

nationwide U.S. sample of 1,048 households from a home interview survey conducted in 1978. Vehicles are classified into 131 different types based on make, model, and vintage plus an old car group of all pre-1969 vehicles.

Berkovec first estimates a general linear model for natural log of scrappage rate based on vehicle price, model year, and class. Then, he develops a nested logit model for vehicle type conditional on household vehicle ownership. The vehicle type choice model considers vehicle attributes (such as costs and seating space) and household attributes (such as income and number of household members) as explanatory variables. In this model, capital cost negatively affects the vehicle type choice, while number of seats in a vehicle positively affects the vehicle type choice. Using these models, he also predicts automobile demand for each vehicle type, for 12 different consumer groups (defined by three income levels and four household sizes) under different gasoline price scenarios. Overall, the simulation model results indicate that households are less likely to change vehicle types owned, as gas price increases. Thus, the total sales of new vehicles decrease and the scrappage rates of older vehicles increase due to fuel inefficiency (less vehicle value) as the gasoline price increases.

2.1.8 A Dynamic Empirical Analysis of Household Vehicle Ownership and Utilization - Fred Mannering and Clifford Winston (1985)

This paper focuses mainly on a dynamic model for vehicle type choice (a multinomial logit model) and utilization (a general linear model) such as vehicle miles traveled over time, for single-vehicle and two-vehicle households, using lagged utilization variables. The authors use a nationwide U.S. sample of 3,842 households from the National Interim Energy Consumption Survey in 1978 and the Household Transportation Panel Survey in 1979 to 1980. The vehicle types are classified by make, model, and year (e.g. Ford Maverick 1972). The dependent choice set includes the chosen alternative and nine others randomly selected from more than 2,000 different types. The vehicle type choice models consider vehicle characteristics, brand loyalty and preference (such as lagged utilization variables of the

same vehicle or same make, and make indicator variables), and household characteristics as explanatory variables.

Separate vehicle type choice models were estimated for both single-vehicle and two-vehicle households. In the latter case, the joint choice of the two vehicle types was modeled. In both cases, the results indicate that households' brand loyalty variables (lagged utilization variables of the same vehicle or same make) positively affect their choices of a particular vehicle make. On the other hand, capital and operating costs negatively affect the choice of vehicle type. The choice probability is more elastic with respect to income and capital cost for newer vehicles, and the choice probability is more elastic with respect to operating cost for domestic cars than for foreign cars. The authors also find that estimates of the choice probability with respect to income and capital cost are less elastic for two-vehicle households than for single vehicle households.

2.1.9 Accessibility and Auto Use in a Motorized Metropolis – Ryuichi Kitamura, Thomas F. Golob, Toshiyuki Yamamoto, and Ge Wu (2000)

This paper presents a recent vehicle type choice model using automobile and transit accessibility indices[1] and residential density as key explanatory variables. The authors use a sample of 1,898 households from a random digit dialing telephone survey of the South Coast (Los Angeles) metropolitan area in 1993. The choice studied is the vehicle that is currently used in single-vehicle households or that is most recently acquired in multi-vehicle households. Vehicle types are classified into 6 categories: four-door sedan, two-door coupe, van/wagon, sports car, sport utility vehicle (SUV), and pickup truck.

Based on the accessibility indices, residential density, primary driver attributes, and household attributes, a multinomial logit model for vehicle type choice is developed. The authors also develop a vehicle use model for annual vehicle mileage (discussed in Section 2.2.1). Their findings for the vehicle type choice model are as follows. Four-door sedans

and vans/wagons are more likely to be chosen in areas with high transit accessibility, and sports cars are more likely to be chosen in areas with high residential density. In the case of the primary users and household attributes, males are more likely to use pickup trucks, and younger people are more likely to use sports cars, SUVs, and pickup trucks. People with college degrees or long-distance commuters are more likely to use four-door sedans. Households with high incomes are more likely to use SUVs, whereas households with low incomes are more likely to use pickup trucks and two-door coupes. Especially, larger households are more likely to use vans/wagons.

2.1.10 An Exploratory Analysis of Automobile Leasing in the United States – Fred Mannering, Clifford Winston, and William Starkey (2002)

This paper presents a nested logit model of vehicle type choice conditional on vehicle acquisition methods such as leasing, financing, and paying cash. The authors develop separate vehicle type choice models for each vehicle acquisition method. Based on a nationwide (U.S.) household panel survey, a sample of 654 households buying new vehicles between 1993 and 1995 is used. The vehicle type choice model specifically considers newly-purchased vehicles regardless of the number of vehicles owned. The vehicle types are based on makes and models. Invoking the independence of irrelevant alternatives (IIA) property of the multinomial logit model, the vehicle type choice model for each acquisition method uses only ten alternative vehicle types: the chosen alternative plus nine others randomly selected from an universal set of 150-175 types for each year.

The models contain vehicle attributes including vehicle size classes (subcompact, compact, mid-sized, large, minivan, SUV) associated with manufacturers (domestic and foreign) and residual values, household attributes, and brand loyalty (such as the number of previous consecutive purchases of a given make) as explanatory variables. The vehicle's residual value is defined as "the percentage of the manufacturer's suggested retail price that the vehicle is expected to retain after its first three years of use". The results of the models

[1] The accessibility indices are the log-sum measures of multinomial logit destination choice models for home-

indicate that regardless of acquisition type, households are more likely to choose a vehicle with higher brand loyalty and residual values. In the case of leasing a vehicle, households leasing a vehicle tend to place a high value on vehicle attributes such as a passenger side airbag and horsepower, and they are more likely to choose larger vehicles and SUVs.

2.1.11 A Hierarchical Decision-Process Model for Forecasting Automobile Type-choice – Michael Murtaugh and Hugh Gladwin (1980)

This paper presents a hierarchical decision process model for vehicle type choice, using an inductive process rather than a statistical model. The model is based on a sample of 45 new car buyers in Orange County, California in 1978. Car types are classified into ten categories based on vehicle sizes and prices: minicompact, sports specialty (two-seaters), subcompact, sporty low-priced subcompacts, compacts, sports sedans, intermediate, large 1 (less than $5,700, such as Buick LeSabre), large 2 (over $5,700, such as Chrysler New Yorker), and luxury. The model consists of two stages represented on flowcharts. In the first stage, several demographic questions based on the survey results are asked in a logical sequence to find a preferred vehicle group: e.g. “parent in household with children?”, “ total of children’s ages ≥ 27?”, “household has more than one car?” and so on. The assumption behind this sequential process is that households with older children tend to choose large cars because they need more space than those with younger children. At the end of the first stage, the model classifies vehicle groups into four categories based on the previous questions: car for large family, car for small family, family car for limited use, and single person car. In the second stage, cost categories are presented to find the size of a car that can be purchased, and preferences for foreign or domestic cars, fuel economy, and age of the consumer are also asked to decide a specific vehicle type choice. Through this decision process, the model predicts an individual’s choice of vehicle type to purchase.

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based non-work trips.

2.1.12 Summary of Vehicle Type Choice Models

Table 2.1 summarizes the vehicle type choice models reviewed, comparing model types, dependent variables, explanatory variables, and data. As mentioned before, disaggregate choice models (multinomial logit and nested logit models) are generally used for the vehicle type choice, and vehicle and household characteristics are mainly considered as explanatory variables in the models. These vehicle type choice models can be further divided into two categories, vehicle holdings and vehicle purchase models, depending on whether the chosen vehicle type is viewed as already owned or newly purchased. The models for vehicle holdings usually include scrappage rate, transaction cost, and vehicle age as explanatory variables, differing from those for vehicle purchase.

However, it is difficult to compare significant variables across the vehicle type choice models because each model has a different set of vehicle type categories such as vehicle classes and makes/models. Not surprisingly, the most common variable is vehicle price, which is significant across all models except two (Kitamura, *et al.*, 2000; Murtaugh and Gladwin, 1980). That is, all else equal, the more a vehicle costs, the lower its choice probability. Of greatest interest to the present study is the impact of demographic variables on vehicle type choice, and income or number of household members positively affects the choice probability of vehicle type in some models.

The data used in our study were not collected with a vehicle type choice model in mind, so we do not have a full inventory of all households' vehicles, including their acquisition history. We have only the make, model, and year of the single vehicle driven most often by the respondent. However, if we selected the households in our sample having only one vehicle, it would be possible to develop a vehicle type choice model similar to some of those reviewed here. In addition to the demographic and vehicle characteristics normally used in such models, we have unique data on attitudes, personality, and lifestyle that are also relevant to vehicle choice. Such a model is beyond the scope of the present study, as it would involve the generation of vehicle type choice sets and the acquisition of data for each

type of vehicle modeled (whether chosen or non-chosen). We *are* able, however, to develop models of most-often-driven vehicle class (for the entire sample), using the full range of individual characteristics available in our data set. The outcome of this effort is presented in Chapter 5.

Table 2.1: Summary of Vehicle Type Choice Models

Reference	Lave and Train (1979)	Manski and Sherman (1980)	Hocherman, *et al*. (1983)
Data Location (Year)	7 U.S. cities (1976)	U.S. (1976)	Haifa urban area, Israel (1979)
Sample Size	541 new car buyers	1,200 single-vehicle or two-vehicle households	800 households buying a new or used car plus 500 households not buying a car
Model Type	Multinomial logit model of vehicle type purchased	Multinomial logit model of vehicle holdings	Two-stage nested logit model of vehicle type purchased, conditional on a purchase being made
Dependent Variable	10 vehicle classes - subsubcompact - sports - subcompact-A - subcompact-B - compact-A - compact-B - intermediate - standard-A - standard-B - luxury	Chosen alternative plus 25 alternative makes/models/ vintage (randomly selected from 600 vehicle types)	Upper level: Buying a first car or replacing an existing car Lower level: Chosen alternative plus 19 alternative makes/models/ vintages (randomly selected from 950 vehicle types)
Explanatory Variables Tested	Vehicle attributes - purchase price - operating cost - no. of seats - weight - horsepower to weight Primary driver attributes - age - education Household attributes - no. of household members - income - no. of vehicles - vehicle miles traveled	Vehicle attributes - purchase price - operating cost - no. of seats - weight - luggage space - acceleration time - vehicle age - turning radius - braking distance - noise level - scrappage rate - transaction-search cost - foreign/domestic Household attributes - no. of household members - no. of workers - income - age - education - location (city or not)	Vehicle attributes - purchase price - operating cost - vehicle size - engine size - luggage space - horsepower to weight - transaction cost - vehicle age Primary driver attributes - age Household attributes - no. of household members - income - no. of vehicles - age Brand loyalty - brand loyalty - no. of same make cars
Significant Results	- purchase price /income (–) - weight*age (+) - no. of household members (+, for subsubcompact and subcompact A) - no. of vehicles (+)	- purchase price (–) - no. of seats (+) - vehicle weight and age (+) - acceleration time (+) - luggage space (+) - scrappage rate (–) - transaction-search cost (–) - operating cost and low income HH (–)	- purchase price (–) - operating cost (–) - engine size (+) - vehicle age (–) - income (+) - brand loyalty (+) - no. of same make cars (+) - horsepower to weight (+)

Note: Sign in parentheses means positive or negative effect on the choice of the associated vehicle type.

(Table 2.1 continued)

Reference	Berkovec and Rust (1985)	Berkovec (1985)	Mannering and Winston (1985)
Data Location (Year)	U.S. (1978)	U.S. (1978)	U.S. (1978 to 1980)
Sample Size	237 single-vehicle households	1,048 households	3,842 single-vehicle or two-vehicle households
Model Type	Nested logit model of vehicle holdings	Nested logit model of vehicle holdings	Multinomial logit model of vehicle holdings
Dependent Variable	Upper level: vehicle age groups - new (1977-78) - mid (1973-76) - old (1967-72) Lower level: 5 vehicle classes - subcompact - compact - intermediate - standard - luxury/sports	Upper level: No. of vehicles (0, 1, 2, and 3) Lower level: 131 vehicle classes and vintages - 10 years (1969-1978) - 13 vehicle classes each year: (domestic) subcompact, compact, sporty, intermediate, standard, luxury, pickup truck, van, and utility vehicle; (foreign) subcompact, larger, sports, and luxury - all models before 1969	Chosen alternative plus 9 alternative makes/models/ vintages (randomly selected from 2,000 vehicle types)
Explanatory Variables Tested	Vehicle attributes - purchase price - operating cost - no. of seats - vehicle age - turning radius - horsepower to weight - transaction (kept last year's car or not) - manufacturer Household attributes - no. of household members - income - age	Vehicle attributes - purchase price - operating cost - no. of seats - shoulder room - proportion of makes/models in class to total makes/models - new or used Household attributes - no. of household members - income	Vehicle attributes - purchase price - operating cost - vehicle age - shoulder room - luggage space - horsepower to engine displacement Household attributes - no. of household members - income - age Brand loyalty - lagged utilization of same vehicle or same make - manufacturer
Significant Results	- purchase price (–) - operating cost (–) - no. of seats (+) - vehicle age (–) - turning radius in urban (–) - horsepower to weight (+) - transaction (+)	- purchase price (–) - no. of seats (+) - proportion of makes/models in class to total make/models (+)	- purchase price/income (–) - operating cost/income (–) - lagged utilization of same vehicle or same make (+)

Note: Sign in parentheses means positive or negative effect on the choice of the associated vehicle type.

(Table 2.1 continued)

Reference	Kitamura, *et al*. (2000)	Mannering, *et al*. (2002)	Murtaugh and Gladwin (1980)
Data Location (Year)	South Coast (Los Angeles) metropolitan area (1993)	U.S. (1993 to 1995)	Orange County, CA (1978)
Sample Size	1,898 households	654 households buying new vehicles	45 households buying new vehicles
Model Type	Multinomial logit model of vehicle holdings (most recent vehicle for multi-vehicle households)	Nested logit model of vehicle purchased	Hierarchical decision-process model (flowchart) of vehicle purchased
Dependent Variable	6 vehicle classes - 4-door sedan - 2-door coupe - van/wagon - sports car - sports utility - pickup truck	Upper level: Vehicle acquisition type - cash, non-cash (lease, finance) Lower level: Chosen alternative plus 9 alternative makes and models (randomly selected from 175 vehicle types)	10 vehicle categories - minicompact - sports-specialty - subcompact - sporty - compact - sports sedan - intermediate - large 1 and 2 - luxury
Explanatory Variables Tested	Primary driver attributes - age - gender - education - employment status - acquisition decision - commute distance Household attributes - no. of household members - no. of workers - no. of vehicles - income - type (single, group) Residence attributes - accessibility (auto, transit) - residential density	Vehicle attributes - purchase price - operating cost - passenger side airbag - horsepower - turning radius - vehicle reliability - vehicle residual value - vehicle size: two-seater, mini-compact, pickup, subcompact, compact, mid-sized, large, minivan, SUV Household attributes - income Brand loyalty - consecutive purchases - manufacturer	Vehicle attributes - purchase price - foreign or U.S. - traded-in - vehicle age Household attributes - no. of household members - total age of children - education - location (city or not)
Significant Results	- age (+, for 4-door, 2-door, and van/wagon) - male (– , for all but pickup) - college degree (+, for 4-door) - no. of household members (+, for van/wagon) - income (+, for SUV) - transit accessibility (+, for 4-door)	- purchase price/income (–) - passenger side airbag (+) - horsepower (+) - vehicle residual value (+) - consecutive purchases (+)	Not applicable for this model

Note: Sign in parentheses means positive or negative effect on the choice of the associated vehicle type.

2.2 Vehicle Use Models

In this section, three papers developing vehicle use models are reviewed. They are distinguished from the many other extant vehicle use models as being relevant to the current study, in that these papers relate the amount of vehicle use in terms of vehicle miles traveled or annual vehicle mileage to vehicle type. The first two papers are based on U.S. data and the other on Australian data. The models are developed using ordinary least squares or structural equation methods.

2.2.1 Accessibility and Auto Use in a Motorized Metropolis – Ryuichi Kitamura, Thomas F. Golob, Toshiyuki Yamamoto and Ge Wu (2000)

In addition to the vehicle type choice model discussed in Section 2.1.9, this paper presents ordinary least squares models for vehicle use. The annual mileage of the vehicle most recently purchased is estimated using accessibility indices, residential density, primary and secondary driver attributes, and household attributes. The authors use selectivity bias correction terms to deal with the potential correlation between the error terms of vehicle type choice and vehicle use in the model. They estimate three models, containing zero, one, and six correction terms, respectively, and then these correction terms turn out to be insignificant in the last two models. That is, there is no selectivity bias in the model without correction terms. The results show that none of the accessibility indices are significant in the models. On the other hand, number of vehicles available and age of primary driver negatively affect vehicle use, while commute distance and household income positively affect vehicle use. The van/station wagon category is more likely to have higher annual mileage than the other vehicle categories.

2.2.2 A Vehicle Use Forecasting Model Based on Revealed and Stated Vehicle Type Choice and Utilisation Data – Thomas F. Golob, David S. Bunch and David Brownstone (1997)

This paper describes structural equation models of household annual vehicle miles traveled (VMT) based on vehicle type. A sample of 4,747 California households taken by computer-aided telephone interview (CATI) in 1993 is used for the analysis. The authors estimate structural equation models for single-vehicle households and two-vehicle households separately. We mainly discuss the model for single-vehicle households because both models have similar results except for an additional direct effect between gender and age of principal driver in the model for two-vehicle households. Endogenous variables in the model are natural log of VMT per year, age, gender, and employment status of principal driver, and exogenous variables are household (such as income and average age of head) and vehicle (vehicle type and operating cost) characteristics. The vehicle type variable is classified into 13 categories: mini, subcompact, compact, mid-sized, full-size, sports, compact pickup, full-size pickup, minivan, full-size van, luxury, compact SUV, and full-size SUV. The model indicates that women tend to drive less, while workers tend to drive more. Households that own mini or sports cars drive less than those with other cars. The model also explains that vehicle age has a negative effect on VMT. Further, households with older heads tend to drive less, while those with more children or high income drive more.

2.2.3 An Econometric Model of Vehicle Use in the Household Sector – David A. Hensher (1985)

This paper develops simultaneous equations models for household vehicle use in the short and long run using the three-stage least squares method. The models use a sample of 1,436 households from the first wave household panel survey in the Sydney, Australia metropolitan area from 1981 to 1982. Endogenous variables are annual vehicle kilometers, fuel cost per kilometer, and fuel efficiency of vehicle (liters per 100 km). Exogenous variables in the models are vehicle attributes including vehicle types (such as a station wagon or a panel van) and household attributes including those of the primary driver. Six

simultaneous equation models are estimated separately: for one-, two-, and three-vehicle households, each for the short and long run. Each model consists of equations for annual VKT, fuel cost/km, and fuel efficiency for *each* vehicle in the household. The results show that only for the three-vehicle households is vehicle type significant. In particular, three-vehicle households that own a panel van or a utility vehicle tend to drive more than those with other vehicle types. The author also finds that the vehicle registration type strongly affects vehicle use. That is, vehicles registered for household-business are driven more than those registered for other-business. Vehicle age and operating cost negatively affect vehicle use, while vehicle weight positively affects vehicle use.

2.2.4 Summary of Vehicle Use Models

Table 2.2 summarizes the vehicle use models reviewed, comparing model types, dependent variables, explanatory variables, and data. Generally, least squares or structural equation models are used to estimate vehicle use. These models mainly consider vehicle attributes (including the vehicle type), primary driver characteristics, and household characteristics as explanatory variables. Interestingly, two models show that households owning a van tend to drive more than those with other vehicle types. These results imply that vehicle type is significantly associated with vehicle use such as VMT. Similar to vehicle use, our data contains objective mobility variables such as travel distance and frequency. The relationship between vehicle type and objective mobility in our sample is discussed in Chapter 4.

Table 2.2: Summary of Vehicle Use Models

Reference	Kitamura, *et al*. (2000)	Golob, *et al*. (1997)	Hensher (1985)
Data Location (Year)	South Coast (Los Angeles) metropolitan area (1993)	California (1993)	Sydney Australia metropolitan area (1981-1982)
Sample Size	1,898 households	4,747 households	1,436 households
Model Type	Ordinary least squares models	Structural equation models for single-vehicle and two-vehicle households	Simultaneous equations model using three-stage least squares
Dependent Variable(s)	Annual mileage for the vehicle last acquired	Natural log of vehicle miles traveled per year	Annual vehicle kilometers Fuel cost per kilometer Fuel efficiency of vehicle
Explanatory Variables Tested	Vehicle attributes - vehicle type: van/wagon - brand new - ownership Primary driver attributes - age - need a car for work - participated in the acquisition decision - commute distance Secondary driver attributes - gender - commute distance Household attributes - no. of household members - no. of drivers - no. of vehicles - income - no. of years at present address - single parents Residence attributes - accessibility (auto, transit) - residential density	Vehicle attributes - operating cost - vehicle age - 13 vehicle classes: mini, subcompact, compact, mid-sized, full-size, sports, compact pickup, full-size pickup, minivan, full-size van, compact SUV, luxury, and full-size SUV Household attributes - no. of household members - no. of children - no. of workers - income - average age of head - no. of vehicles	Vehicle attributes - operating cost - average occupancy of vehicle - registration type (HH-business/ other-business/private) - no. of months held - replacement (whether or not the vehicle was replaced in last 12 months) - weight - vehicle age - no. of cylinders - vehicle type: panel van/utility, light commercial/ camper van - vehicle kilometers of other vehicles (for multi-vehicle households) Primary driver attributes - age - education Household attributes - no. of household members - income - no. of commuters - no. of decision units - residential location
Significant Results	- van/wagon (+) - age (–) - commute distance (+) - no. of vehicles (–) - income (+) - no. of drivers (+)	- female principal driver (–) - employed principal driver (+) - mini car (–) - sports car (–) - no. of children (+) - income (+)	- operating cost (–) - vehicle age (–) - HH-business registration type (+) - panel van/utility (+) - weight (+)

Note: Sign in parentheses means positive or negative effect on the vehicle use such as VMT.

2.3 Attitudes toward Mobility

This section briefly reviews one paper and two master's theses based on the same 1998 data set analyzed in this study. These studies use the same travel attitude, personality, lifestyle, and mobility characteristics that will be considered as explanatory variables in our vehicle type choice model. Thus, they provide additional information on the context of the present study, including what has been learned so far about the measurement of these variables and their relationships to each other.

2.3.1 How Derived is the Demand for Travel? Some Conceptual and Measurement Considerations- Patricia L. Mokhtarian and Ilan Salomon (forthcoming)

By considering undirected travel and travel affinity, this paper contends that travel can have a positive utility. The authors disagree with an absolute application of the axiom that "travel is a derived demand" and point out that, in some cases, "travel is not a byproduct of the activity but itself constitutes the activity". Thus, they suggest, the utility of travel derives not just from the utility of reaching a desired destination (the traditional view of the utility of travel), but also from positive aspects of traveling itself (enjoyment of movement, exposure to the environment, skill in handling a vehicle, exploration and variety-seeking impulses, and so on) as well as from activities that can be conducted while traveling (relaxing, listening to music, using technology to work productively, etc.). Data on attitudes toward travel and other indicators were obtained from 1,904 San Francisco Bay Area respondents to a 1998 mail-out/mail-back questionnaire. Initial results support the existence of a positive utility of travel. For example, more than three-quarters of the sample indicated sometimes or often traveling "just for fun of it" and "out of your way to see beautiful scenery". Further, more than two-thirds disagreed that "the only good thing about traveling is arriving at your destination".

2.3.2 Attitudes toward Travel: The Relationships among Perceived Mobility, Travel Liking, and Relative Desired Mobility- Richard W. Curry (2000)

This master's thesis explores how travel liking and the qualitative perception of the amount one travels (perceived mobility) affect the desired amount of travel (relative desired mobility) by mode and purpose for short-and long-distance trips. Curry uses six different methodologies to study these relationships: correlation, cross tabulation, graphical, regression, vector sorting, and cluster analysis. The results show that travel liking is positively correlated to relative desired mobility, especially for short-distance trips. That is, the more people like to travel, the more they want to increase their travel. The result for perceived mobility is more complex. Respondents' desire to increase their travel (relative desired mobility) is negatively related to their perceived mobility in some cases (e.g. commuting to work, travel by rapid transit), while it is positively related to their perceived mobility in other cases (e.g. entertainment for long-distance trips, walking). In these latter cases, the more people already travel, the more they want to increase their travel in these categories.

As part of his thesis, Curry classified the vehicle most often driven by the respondent into ten categories based mainly on *Consumer Reports* magazine (these categories are discussed in greater detail in Chapter 3). Then, he compared the category of the most-often-driven vehicle across six groups obtained by cluster analyzing selected travel liking responses. Even though the vehicle type distribution was not significantly different across groups, he concluded that several trends exist. Those who dislike travel try to alleviate their discomfort by driving more comfortable vehicles such as large and luxury cars, and those who hate short-distance work travel but enjoy recreation travel tend to drive more SUVs and sports cars.

2.3.3 Attitude, Personality and Lifestyle Characteristics as Related to Travel: A Survey of Three San Francisco Bay Area Neighborhoods- Lothlorien S. Redmond (2000)

This master's thesis focuses on comparing clusters of respondents with similar profiles based on their scores on travel attitude, personality, and lifestyle factors. Redmond first used factor analysis to develop six factors (travel dislike, pro-environmental solution, commute benefit, travel freedom, travel stress, and pro-high density) from 32 attitude variables, four factors (adventure seeker, organizer, loner, and calm) from 17 personality variables, and four factors (frustrated, family and community oriented, status seeking, and workaholic) from 18 lifestyle variables of the survey. Scores on these factors will be used as explanatory variables in our vehicle type choice model, so each factor is discussed in more detail in Chapter 3. Then, she used cluster analysis to develop two independent partitions of the respondents into groups. In the first case, she identified six clusters based on five travel attitude factors (omitting the commute benefit factor, which was defined only for commuters), and in the second case she identified 11 clusters based on the eight personality and lifestyle factors taken together. Demographic, mobility, and travel liking variables were tested for significant differences across clusters, and many such differences were found. For example, "excess travelers", one of the six attitude clusters, are young, highly urban, highly educated, and adventure-seeking. They like to travel and are strongly pro-environment and pro-high density. On the other hand, the "new family model", one of the 11 personality and lifestyle clusters, mainly consists of young families. People in this cluster are family and community oriented, and have strongly positive attitudes toward travel. That is, they enjoy traveling.

CHAPTER 3. DATA CHARACTERISTICS

3.1 Survey

3.1.1 Survey Area

The data for this study were collected from mail-out/mail-back surveys completed by residents of the San Francisco Bay Area in May and June of 1998. Assuming that attitudes toward travel and mobility may vary by type of residential location, three neighborhoods were selected based in part on a previous study by Kitamura, *et al*. (1994): Concord and Pleasant Hill represent suburban neighborhoods, and an area defined as North San Francisco represents an urban neighborhood.

North San Francisco has more mixed land uses, higher residential density, and a more grid-like street system compared to the suburban examples. On the other hand, Concord has more segregated land uses and lower residential density. Pleasant Hill was selected to represent another part of the spectrum of suburban neighborhoods. Compared to Concord, Pleasant Hill has greater residential density and lower household income, indicating fewer single-family homes.

3.1.2 Survey Contents

The survey consists of 14 pages of questions, grouped into six sections. The sections are "Your Opinions about Travel" (Section A), "Your Lifestyle as it Relates to Travel" (Section B), "The Amount You Travel" (Section C), "How You View Your Travel" (Section D), "Your Travel-Related Choices" (Section E), and "General Information" (Section F). These sections contained questions about objective and perceived mobility, attitudes toward travel, lifestyle, personality, relative desired mobility, travel liking, and demographic characteristics.

3.1.3 Sample Size and Characteristics

The surveys were sent to 8,000 randomly-selected households in the three neighborhoods: 4,000 surveys were sent to North San Francisco, and Concord and Pleasant Hill received 2,000 surveys each. After discarding surveys with too much missing data from about 2,000 returned surveys, 1,904 surveys were retained for an overall response rate of 23.8%: 888 surveys from North San Francisco, 473 surveys from Concord, and 543 surveys from Pleasant Hill. Respondents are relatively evenly divided between the urban and suburban neighborhoods.

Based on Curry (2000) and Redmond (2000), we briefly describe key demographic characteristics of the sample. As shown in Table 3.1, almost 98% of respondents have driver's licenses and almost half of them (47.0%) are between the ages of 41 and 64. Most respondents (92.6%) have at least some college or technical school education, and 66% of them have a 4-year college degree or more. Approximately 80% of respondents are employed in full-time or part-time jobs. A high percentage (44.5%) of respondents are engaged in professional or technical jobs. The average household size in our sample is 2.4 people and 1.6 workers, and the average number of vehicles is 1.9 vehicles per household. For workers in our sample, actual commute time is almost 30 minutes, while ideal commute time is about 16 minutes.

Table 3.1: Sample Demographics

Characteristics		Count (Percent)			
		Total	**North San Francisco**	**Pleasant Hill**	**Concord**
% of sample		1904 (100)	888 (46.6)	543 (28.5)	473 (24.8)
Have a driver's license [T1, N1, C1*]		1857 (97.7)	854 (96.4)	541 (99.6)	462 (97.9)
Age category [T1, N1, C1]					
	23 or younger	61 (3.2)	35 (4.0)	15 (2.8)	11 (2.3)
	24 – 40	691 (36.3)	439 (49.5)	130 (23.9)	122 (25.8)
	41 – 64	894 (47.0)	332 (37.5)	294 (54.1)	268 (56.8)
	65 – 74	155 (8.2)	48 (5.4)	59 (10.9)	48 (10.2)
	75 or older	100 (5.3)	32 (3.6)	45 (8.3)	23 (4.9)
Educational background [T2, N2, C1]					
	Some grade school or high school	15 (0.8)	8 (0.9)	4 (0.7)	3 (0.6)
	High school diploma	126 (6.6)	25 (2.8)	34 (6.3)	67 (14.2)
	Some college or technical school	506 (26.6)	152 (17.1)	188 (34.6)	166 (35.2)
	4-year college/technical school degree	603 (31.7)	328 (37.0)	158 (29.1)	117 (24.8)
	Some graduate school	211 (11.1)	110 (12.4)	49 (9.0)	52 (11.0)
	Completed graduate degree(s)	441 (23.2)	264 (29.8)	110 (20.3)	67 (14.2)
Current employment status [T3, P1]					
	Full-time	1249 (65.6)	640 (72.1)	325 (60.0)	284 (60.0)
	Part-time	267 (14.0)	128 (14.4)	79 (14.6)	60 (12.7)
	Homemaker	60 (3.2)	16 (1.8)	24 (4.4)	20 (4.2)
	Non-employed student	25 (1.3)	13 (1.5)	5 (0.9)	7 (1.5)
	Unemployed	37 (1.9)	19 (2.1)	7 (1.3)	11 (2.3)
	Retired	265 (13.9)	72 (8.1)	102 (18.8)	91 (19.2)
Occupation category [T4, N3, P1, C2]					
	Homemaker	88 (4.6)	23 (2.6)	42 (7.7)	23 (4.9)
	Service/repair	97 (5.1)	38 (4.3)	33 (6.1)	26 (5.5)
	Sales	165 (8.7)	72 (8.2)	45 (8.3)	48 (10.2)
	Production/construction/crafts	79 (4.2)	30 (3.4)	16 (2.0)	33 (7.0)
	Manager/administrator	388 (20.5)	179 (20.3)	120 (22.1)	89 (18.9)
	Clerical/administrative support	195 (10.3)	80 (9.1)	67 (12.4)	48 (10.2)
	Professional/technical	844 (44.5)	445 (50.4)	212 (39.1)	187 (39.7)
	Other	40 (2.1)	16 (1.8)	7 (1.3)	17 (3.6)
Characteristics		**Mean (Standard Deviation)**			
		Total	**North San Francisco**	**Pleasant Hill**	**Concord**
Ideal one-way commute time [T5, N4, P2, C3]		16.3 (8.8)	16.4 (8.4)	16.0 (8.9)	16.5 (9.2)
Actual one-way commute time					
	… time (minute) [T6, N5, P3, C4]	29.7 (21.1)	28.1 (18.3)	30.8 (21.8)	31.7 (35.2)
	… distance (miles) [T7, N6, P4, C5]	14.5 (20.2)	11.1 (17.7)	17.5 (14.6)	18.5 (27.8)
Number of personal vehicles per HH [T8, N7, C2]		1.9 (1.8)	1.5 (1.0)	2.2 (1.2)	2.4 (3.0)
Percent of time vehicle is available [T4, N7, P5, C6]		90.8 (25.6)	83.6 (33.4)	98.5 (8.4)	95.6 (16.8)
Number of persons in HH		2.4 (1.2)	2.1 (1.2)	2.4 (1.2)	2.7 (1.3)
Number of workers in HH [T9, N8, P6, C7]		1.6 (0.9)	1.6 (0.9)	1.5 (0.9)	1.6 (1.0)

Note: This table is reproduced from Redmond (2000).

The following numbers are sample sizes, where T stands for Total, N stands for North San Francisco, C stands for Concord, and P stands for Pleasant Hill.

T1 = 1901, T2 = 1902, T3 = 1903, T4 = 1896, T5 = 1531, T6 = 1420, T7 = 1394, T8 = 1899, T9 = 1872,
N1 = 886, N2 = 887, N3 = 883, N4 = 825, N5 = 700, N6 = 687, N7 = 885, N8 = 875,
C1 = 472, C2 = 471, C3 = 417, C4 = 337, C5 = 330, C6 = 470, C7 = 466,
P1 = 542, P2 = 489, P3 = 383, P4 = 377, P5 = 541, P6 = 531

3.2 The Dependent Variable, Vehicle Type

This section explains the vehicle type categories later used as the dependent variable in our model. We first describe the vehicle type question in the survey and then indicate how we defined the vehicle type categories.

One question in Section F of the survey asked for the make, model, and year of the vehicle the respondent drives most often, with a "not applicable" box for those who do not have access to a vehicle. First, all of the spelling errors from initial data entry were corrected through reference to the *Consumer Reports* magazine[2], vehicle manufacturers' web pages, and vehicle fan club web pages. Missing values were coded "unspecified" when the respondent answered either make or model but left the other blank, while they were coded "none" if both were left blank. If the respondent marked "not applicable" for the question, then make and model were coded "blank" and year was labeled "-8", representing an acceptable missing value. After cleaning the data on vehicle information, there are about 550 pairs of make and model, with each pair having at least a few responses.

Curry (2000) created a variable named "Car Type" (sometimes called "vehicle class") based on vehicle makes and models. In his thesis, the makes and models were classified into ten categories mostly based on the classification scheme presented in *Consumer Reports*: subcompact, small, compact[3], mid-sized (at one time referred to as "medium" by *Consumer Reports*), large, luxury, sports, minivan/van, pickup, and sport utility vehicle (SUV). He also assumed that the *Consumer Reports*' classification scheme accurately reflects consumer perception, even though the definition of categories has changed from year to year[4]. That is, a make/model combination is classified according to its *Consumer*

[2] *Consumer Reports* provides detailed information on new automobiles every year (usually in its April issue), classifies the vehicle type, and rates the automobiles on various aspects as a guide to consumers.
[3] The *Consumer Reports* distinguished compact and mid-sized cars by saying that compact cars are "models that offer practical transportation for a small family", while mid-sized cars are models that are "bigger and roomier than compacts but priced about the same" (*Consumer Reports*, April 1991, p. 246).
[4] Some vehicle categories used by *Consumer Reports* have entered and dropped out in particular time periods. For example, the "subcompact car" classification has not been used since 1980, while "sports car" and "SUV" were created in 1984 and 1990, respectively. In particular, the size of a "mid-sized car" has not been

Reports designation for that model year, even if the same make and model are classified differently today. Table 3.2 shows some other vehicle classification schemes found in the academic literature and in statistical reports. These schemes are focused on vehicle size, vehicle function, or both. Similar to the *Consumer Reports* classification system, most schemes of vehicle classification first group vehicles by size, and then special categories such as sports, pickup, and SUV are added.

Table 3.2: Vehicle Classification Schemes

Item	Source	Vehicle Classification	Basis
Academic Literature	Kitamura, *et al*. (2000)	4-door sedan, 2-door coupe, van/wagon, sports car, sports utility, pickup truck	Function
	Lave and Train (1979)	Subsubcompact, sports, subcompact-A, subcompact-B, compact-A, compact-B, intermediate, standard-A, standard-B, luxury	Size
	Berkovec and Rust (1985)	Subcompact, compact, intermediate, standard, luxury/sports	Size
	Murtaugh and Gladwin (1980)	Minicompact, sports-specialty, subcompact, sporty, compact, sports sedan, intermediate, large 1, large 2, luxury	Size
	Golob, *et al*. (1997)	Minicompact, subcompact, compact, mid-sized, full-sized, sports, compact pickup, full-sized pickup, minivan, full-sized van, compact SUV, luxury, full-sized SUV	Size
Statistical Reports	NPTS (1995)	Automobile (including wagon), van, SUV, pickup, other truck, RV, motorcycle, other	Function
	NTS (1997)	Minicompact, subcompact, compact, mid-sized, large, two-seater, small pickup, large pickup, small van, large van, small utility, large utility	Size & function
	EPA (1996)	Two-seater, minicompact, subcompact, compact, mid-sized, large, station wagon (small & mid-sized), pickup (small & standard by 2wd & 4wd), van (cargo & passenger type), special purpose vehicle (2wd & 4wd)	Size & function
	Consumer Reports (1995)	Small, sports, mid-sized, large, minivan, luxury, SUV, pickup	Size & function

Note: Vehicle function generally refers to engine size, wheel drive, and specialty.

In this study, the nine vehicle categories currently used in *Consumer Reports* define the values of the dependent variable for the vehicle type choice model. Of the ten categories defined by Curry, subcompact is combined with small and the others are unchanged. These

consistent across all time periods, especially in periods without a "compact car" category (1980-1983 and

categories are obviously less detailed than specific make/model combinations, but the sample size is not large enough to permit analysis at that level of detail.

The first five categories are classified in order of vehicle size and the other categories are added to represent specialized vehicles. Certain vehicles in other categories such as "minicompact" or "subcompact" were included in the "small" category, and "sedan" or "wagon" types were reclassified into categories based on each vehicle's size. As Curry (2000) did, we also assumed that the same category label consistently represents consumers' perception of a vehicle type across time, even though the definition of that category may have changed over time.

While classifying the sample vehicle makes and models into the nine categories, some cases with missing values of either makes or models could not be fit into an appropriate category, and these were classified as "unspecified". From an original sample of 1,904 cases, 217 (11.4%) could not be classified into one of the nine types, including 29 (1.5%) missing cases, 68 (3.6%) "unspecified" cases, 9 (0.5%) other means cases (such as motorcycle and bus), and 111 (5.8%) "not applicable" (do not drive or do not have a vehicle available) cases. As expected, most "not applicable" responses come from North San Francisco where public transit service is relatively good and auto ownership is relatively low. All unclassified cases were of necessity excluded from this portion of the study.

Table 3.3 presents the distribution of vehicle types in our sample. The "small" and "mid-sized" categories are the largest, while the "large" and "luxury" categories are the smallest. It is of interest to compare the distribution of vehicle types in our sample to national data. The Bureau of Transportation Statistics reports the distribution of new car sales nationwide in its annual *National Transportation Statistics* report[5] (BTS, 1999). As an approximation to the composition of the entire vehicle fleet in 1997, the composite distribution of new car

1995-1998).

[5] The NTS report contains sales of new automobiles and light trucks matched to EPA fuel economy values every year.

sales for the years 1990-1997 combined was: minicompact (0.5%), subcompact (13.2%), compact (21.1%), mid-sized (17.5%), large (8.9%), two-seater (0.7%), pickup (16.9%), van (10.7%), and utility (10.6%). Differences between our sample and the NTS distribution may be due to the different vehicle categories and the fact that we are only obtaining data on one vehicle rather than all vehicles in a household.

Table 3.3: Sample Distribution of Vehicle Types

Vehicle Type	Number of Cases (% of column)			
	Total	Concord	Pleasant Hill	North San Francisco
Classified	1,687 (88.6)	433 (91.5)	514 (94.7)	740 (83.3)
Small	372 (19.5)	68 (14.4)	83 (15.3)	221 (24.9)
Compact	237 (12.4)	63 (13.3)	68 (12.5)	106 (11.9)
Mid-sized	353 (18.5)	88 (18.6)	123 (22.7)	142 (16.0)
Large	53 (2.8)	24 (5.1)	18 (3.3)	11 (1.2)
Luxury	58 (3.0)	11 (2.3)	11 (2.0)	36 (4.1)
Sports	151 (7.9)	30 (6.3)	41 (7.6)	80 (9.0)
Minivan/van	111 (5.8)	50 (10.6)	34 (6.3)	27 (3.0)
Pickup	159 (8.4)	58 (12.3)	65 (12.0)	36 (4.1)
SUV	193 (10.1)	41 (8.7)	71 (13.1)	81 (9.1)
Unclassified	217 (11.4)	40 (8.5)	29 (5.3)	148 (16.7)
Other	9 (0.5)	2 (0.4)	1 (0.2)	6 (0.7)
Unspecified	68 (3.6)	23 (4.9)	22 (4.1)	23 (2.6)
Not applicable	111 (5.8)	11 (2.3)	3 (0.6)	97 (10.9)
Missing	29 (1.5)	4 (0.8)	3 (0.6)	22 (2.5)
Total	1,904 (100.0)	473 (100.0)	543 (100.0)	888 (100.0)

3.3 Key Explanatory Variables

This section describes the explanatory variables used in the vehicle type choice model: travel-related attitudes, personality, lifestyle, mobility, travel liking, and demographic variables. Some of these variables came directly from the survey, and others have been defined in the course of previous work (Curry, 2000; Redmond, 2000).

3.3.1 Travel-related Attitudes

Section A of the survey contained 32 statements expressing attitudes on various issues related to travel, residential location, and the environment. Respondents were asked to rate each statement using a five-point Likert-type scale from “strongly disagree” to “strongly

agree". Redmond (2000) factor-analyzed the responses to these 32 interrelated statements, and identified six distinct factors: travel dislike, pro-environmental solutions, commute benefit, travel freedom, travel stress, and pro-high density. The scores of each respondent on these factors are considered to be key explanatory variables in the vehicle type choice model. The factors are described as follows.

- *Travel dislike*. This factor indicates a disutility for travel, with strongly loading variables such as: "traveling is boring", "travel time is generally wasted time", and "the only good thing about traveling is arriving at your destination". The travel liking variables described in Section 3.3.4 are direct, mode- and purpose-specific measures of an affinity for travel, whereas this is a more indirect, generic measure.
- *Pro-environmental solutions*. This factor represents a tendency to support environmental solutions to improve air quality and reduce congestion, with strongly loading variables such as: "to improve air quality, I am willing to pay a little more to use an electric or other clean-fuel vehicle", "we need more public transportation, even if taxes have to pay for a lot of the costs", and "we should raise the price of gasoline to reduce congestion and air pollution".
- *Commute benefit*. This factor relates to a positive utility specifically for commuting, and was defined only for the commuters in the sample. It includes "my commute is a real hassle" (negative loading), "my commute trip is a useful transition between home and work", and "I use my commute time productively".
- *Travel freedom*. This factor mainly consists of the variables "I have the freedom to go anywhere I want to" for both short- and long-distance travel. While on the face of it the factor represents a perception of the simple ability to travel, it may also carry overtones of an affinity for travel, with high-scoring individuals potentially saying "traveling gives me a sense of freedom".
- *Pro-high density*. This factor indicates a preference for higher-density residential locations. The variables "I like living in a neighborhood where there is a lot going on", "having shops and services within walking distance of my home is important

to me", and "living in a multiple family unit would not give me enough privacy" (negative) load heavily on this factor.

- *Travel stress*. This factor indicates a disutility for traveling, similar to "travel dislike" but focusing on particular sources of anxiety. Strongly loading variables include "I worry about my safety when I travel", "traveling makes me nervous", and "I tend to get sick when traveling".

3.3.2 Personality

The personality section of the survey (Section B, Question 1) asked "how well each of [17] words and phrases describes you", on a five-point scale from "hardly at all" to "almost completely". Redmond (2000) developed a four-factor solution from these 17 variables, and the scores on each personality factor are also considered key explanatory variables in the vehicle type choice model. The four factors are labeled adventure seeker, organizer, loner, and calm:

- *Adventure seeker*. High scores on this factor indicate people who are "adventurous", "variety-seeking", "spontaneous", "risk-taking", and "ambitious".
- *Organizer*. This factor indicates people who like everything to have its place and run on schedule. Personality traits of "efficient", "on time", and "like a routine" heavily load on the factor.
- *Loner*. High scores on this factor represent people who "like being alone" and "being independent".
- *Calm*. This factor indicates people who are more "patient" and less "aggressive" and "restless", and they don't like "being in charge".

3.3.3 Lifestyle

Section B, Question 2 of the survey contained 18 statements indicating lifestyle choices potentially related to travel. The statements focused on work, family, community, money, and status, and respondents reacted to them on a Likert-type scale from "strongly disagree" to "strongly agree". Redmond (2000) developed a four-factor solution from these 18

variables, and the scores on each lifestyle factor are also expected to be key explanatory variables in the vehicle type choice model. The four factors are named frustrated, family and community oriented, workaholic, and status seeking:

- *Frustrated*. Variables loading heavily on this factor are "I often feel like I don't have much control over my life" and "I am generally satisfied with my life" (negative loading).
- *Family and community oriented*. High scores on this factor represent people who prioritize their family, friends, and community over work and money. Variables of "I'd like to spend more time with my family and friends" and "I'd like to spend more time on social, environmental, or religious causes" load heavily on the factor.
- *Workaholic*. This factor represents people who put a high priority on work. The factor is based on variables such as "I'm pretty much a workaholic" and "I'd like to spend more time on work".
- *Status seeking*. High scores on this factor indicate people who seek higher social status related to wealth and want to display their wealth. Heavily loading variables are "to me, the car is a status symbol", "a lot of the fun of having something nice is showing it off", and "to me, a car is nothing more than a convenient way to get around" (negative loading).

3.3.4 Mobility and Travel Liking

The survey contains three types of questions relating to mobility: objective mobility, perceived mobility, and relative desired mobility. Another set of questions with a similar format relates to travel liking. All these questions ask about travel by mode and purpose for both short- and long-distance trips[6].

- *Objective mobility*. These questions ask about the amount of travel by mode and purpose in terms of distance and frequency for short- and long-distance trips. For short-distance trips, the travel frequencies are requested on a six-point scale ranging

[6] The definition of long-distance is more than 100 miles one way.

from "never" to "5 or more times a week", while the travel distance questions directly ask for the amount of miles per week by each mode and purpose. These responses can only be considered estimates of the amount of travel rather than accurate measures. For long-distance trips, respondents were asked to record the number of trips they took in the calendar year 1997, in each mode-purpose category, by region of the world. Curry (2000) transformed these reported trip frequencies to approximate trip distances, using an estimated average distance between the San Francisco Bay and a given destination region. We will use these trip distances to compare objective mobility for short- and long-distance trips across vehicle types.

- *Perceived Mobility*. These questions ask respondents how they perceive the amount of travel they currently do, on a five-point semantic scale anchored by the labels "none" and "a lot". Separately for short- and long-distance trips, responses are obtained for “overall” and by mode and purpose.
- *Relative Desired Mobility.* These questions ask about respondents’ desired amount of travel compared to their current travel. All responses are based on a five-point scale ranging from “much less” to “much more” for “overall” and by mode and purpose, for short- and long-distance.
- *Travel Liking.* These questions ask how much respondents enjoy traveling itself (distinguished in the survey instructions from the activity at the destination), “overall” and by mode and purpose, for short- and long-distance trips. All responses are based on a five-point scale ranging from “strongly dislike” to “strongly like”.

3.3.5 Demographics

The survey contains a series of demographic questions. Information obtained includes gender, age, educational background, employment status, occupation, number of vehicles, number of household members by age group, household income, and personal income, plus questions related to commute time/distance and personal limitations on the use of specific modes. All relevant demographic variables will be compared across vehicle types in the following chapter and considered explanatory variables in the vehicle type choice model.

CHAPTER 4. DESCRIPTIVE ANALYSES OF VEHICLE TYPE

This chapter explores whether or not the variables discussed in Chapter 3, plus two (attitudinal and personality/lifestyle) cluster membership variables created in previous work (Redmond, 2000), are significantly related to the choice of vehicle type the respondent drives most often. We conducted ANOVA and chi-squared tests to identify statistical differences among groups classified by vehicle type. The ANOVA test was used for continuous or quasi-continuous variables such as the travel attitude, personality, lifestyle, mobility, and travel liking variables, while the chi-squared test was used for categorical variables such as demographic characteristics and cluster memberships. The Bonferroni multiple comparisons test was additionally conducted for the variables that had statistical differences among vehicle type groups based on the ANOVA test, to identify which categories are significantly different from other categories. In the tables that follow, means (of the variable under discussion for a particular vehicle type category) that are significantly different from the mean of another category at a level of $\alpha = 0.05$ are bolded (see Appendix 2 for more detailed results).

4.1 Travel Attitudes, Personality, and Lifestyle

4.1.1 Travel Attitudes

ANOVA was used to compare the means of the travel dislike, pro-environmental solution, commute benefit, travel freedom, travel stress, and pro-high density factor scores across vehicle type groups. The mean scores on the pro-environmental solution, travel freedom, and pro-high density factors turn out to be significantly different among the groups at a level of $\alpha = 0.01$, whereas the others are not significantly different at a level of $\alpha = 0.05$. Table 4.1 displays the mean factor scores for each vehicle type.

Table 4.1: Mean Travel Attitude Factor Scores by Vehicle Type

Vehicle Type (no. of cases)	Travel Dislike (std. error)	Pro-environmental Solution (std. error)	Commute Benefit* (std. error)	Travel Freedom (std. error)	Travel Stress (std. error)	Pro-high Density (std. error)
Small (372)	-0.042 (0.043) [None]	**0.140** (0.040) [M, L, V, P, U]	0.015 (0.051) [None]	**-0.068** (0.038) [U]	0.018 (0.044) [None]	**0.114** (0.041) [M, L, V, P, U]
Compact (237)	0.098 (0.058) [None]	**-0.041** (0.051) [L]	-0.054 (0.061) [None]	**-0.070** (0.045) [U]	0.024 (0.051) [None]	**-0.035** (0.051) [L, V, P]
Mid-sized (353)	0.065 (0.046) [None]	**-0.167** (0.041) [S]	-0.052 (0.055) [None]	0.025 (0.039) [None]	0.006 (0.047) [None]	**-0.129** (0.040) [S, L, V, P]
Large (53)	0.178 (0.136) [None]	**-0.519** (0.112) [S, C, X, R]	0.030 (0.163) [None]	-0.020 (0.079) [None]	-0.052 (0.129) [None]	**-0.607** (0.109) [S, C, M, X, R, U]
Luxury (58)	0.180 (0.138) [None]	**0.018** (0.108) [L]	0.030 (0.148) [None]	0.210 (0.095) [None]	-0.208 (0.093) [None]	**0.049** (0.118) [L, V, P]
Sports (151)	-0.122 (0.070) [None]	**-0.026** (0.069) [L]	-0.046 (0.085) [None]	0.115 (0.057) [None]	-0.154 (0.070) [None]	**0.084** (0.069) [L, V, P]
Minivan/Van (111)	-0.052 (0.083) [None]	**-0.141** (0.076) [S]	0.248 (0.090) [None]	0.048 (0.063) [None]	-0.091 (0.075) [None]	**-0.436** (0.068) [S, C, M, X, R]
Pickup (159)	-0.001 (0.063) [None]	**-0.266** (0.069) [S]	-0.045 (0.075) [None]	-0.067 (0.051) [None]	-0.006 (0.062) [None]	**-0.500** (0.063) [S, C, M, X, R, U]
SUV (193)	-0.065 (0.060) [None]	**-0.166** (0.063) [S]	-0.026 (0.067) [None]	**0.151** (0.049) [S, C]	-0.057 (0.055) [None]	**-0.185** (0.056) [S, L, P]
Total (1,687)	0.008 (0.021)	-0.081 (0.020)	-0.011 (0.024)	0.012 (0.017)	-0.027 (0.020)	-0.114 (0.020)
F-value (Sig.)	1.884 (0.058)	7.570 (0.000)	1.052 (0.395)	3.277 (0.001)	1.252 (0.265)	15.678 (0.000)

Notes:
A bold figure indicates that the mean of that category is significantly different from that of another category. The letters in brackets indicate categories whose means are significantly different from the mean of the row category, where S stands for small, C stands for compact, M stands for mid-sized, L stands for large, X stands for luxury, R stands for sports, V stands for minivan/van, P stands for pickup, and U stands for SUV.
* The commute benefit factor has a different sample size (N=1,278) as it was defined only for commuters: small (308), compact (180), mid-sized (244), large (27), luxury (33), sports (123), minivan/van (72), pickup (132), and SUV (159).

Taking each factor in turn, we first see some interesting trends for the travel dislike factor, which are worth pointing out even though the differences are not statistically significant at a level of $\alpha = 0.05$. We had expected that driving large or luxury vehicles would be associated with *liking* travel (i.e. a low travel *dislike* factor score), with the comfort of the vehicle being a causal influence on the affinity for travel. Instead we found the opposite result: large and luxury car drivers have the highest mean travel dislike scores. This

suggests that the converse direction of causality may be at work: because a person doesn't like travel, she acquires a comfortable car to help ameliorate its unpleasantness. The fact that both counteracting directions of influence may be at work for different people in the sample may explain why the observed result is not statistically significant. We do note the expected result for sports car and SUV drivers: they have the lowest travel dislike scores, i.e. like travel the most. Here too, however, both directions of causality may be at work, although this time with the same sign: loving travel may be both a cause and an effect of driving a "fun", fast, "tough", outdoorsy vehicle.

As expected, pro-environmentalists are more likely to use smaller vehicles. They tend to use small cars rather than large cars or pickup trucks, which have higher emissions. As commute benefit means are not significantly different among the groups, the assessment of the potential benefits of commuting is less related to a particular car type. Interestingly, however, minivan/van drivers tend to view the benefits of commuting more positively than average. We may expect that minivan/van drivers are more likely to be chauffeuring children, and possibly running errands such as grocery shopping, in connection with their commute trips. Thus, this group may see the value of chaining other activities to the work trip, and may also (as other components of this study are suggesting) value the commute time as time to spend with family members.

Those who feel that they have travel freedom are more likely to use sporty, versatile, or leisure cars such as luxury cars and SUVs. On the other hand, they are less likely to use small and compact cars that may not offer the space or the versatility to carry people or materials comfortably. The relationship here may be one of third party correlation – both the lack of feeling of travel freedom and the ownership of a smaller car may be consequences of lower income – or, the perceived lack of freedom may be more directly due to the perceived limitations of a smaller car, or both. Not surprisingly, those who drive luxury and sports cars are less likely to feel stressed when they travel, although the mean

scores do not differ significantly among the groups. Presumably, the amenities of the car they are driving contribute to mitigating any stress they might feel.

The pro-high density attitude varies considerably across vehicle type groups. Consistent with the stereotype of young, upwardly-mobile urban professionals preferring higher-density environments and older, more affluent, more settled families preferring lower-density suburbs, we find that drivers of small and sports cars feel more positive than average toward higher densities, while drivers of large cars, pickups, and minivans feel less positive than average. The scarcity of parking in higher-density environments (assuming a strong correlation between people's attitudes and their actual residential choices) may also motivate a preference for smaller cars and away from larger vehicles there.

4.1.2 Personality

In this section, we describe the differences between vehicle type groups in terms of the four personality factors: adventure seeker, organizer, loner, and calm. Mean scores for all of the factors except "organizer" differ statistically across groups, at a level of $\alpha = 0.0005$ or better. Table 4.2 shows the mean factor scores for each vehicle type.

As a general observation it can be noted that mean scores differ less extremely for this group of factors than for several of the attitudinal factors of Table 4.1. This suggests that personalities spread somewhat more evenly across different vehicle types than do attitudes, so it must be remembered that the significant differences observed here represent general tendencies, not dramatic distinctions. Adventure seekers are ambitious, spontaneous, and variety-seeking, and might be expected to enjoy traveling in general and driving in particular. Thus, it is not surprising that drivers of sports cars and SUVs have the highest mean scores on the "adventure seeker" factor, whereas drivers of large and compact cars have the lowest mean scores (the mean for large car drivers, although the lowest of the nine groups, is not significantly different from the other means because of its relatively high standard error due to the small sample size for that group). Similar to our result, research by

automakers found that "SUV buyers tend to be more restless, more sybaritic, less social people who are 'self-oriented', to use the automakers' words, and who have strong conscious or subconscious fears of crime" (Bradsher, 2000).

Table 4.2: Mean Personality Factor Scores by Vehicle Type

Vehicle Type (no. of cases)	Adventure Seeker (std. error)	Organizer (std. error)	Loner (std. error)	Calm (std. error)
Small (372)	**0.013** (0.045) [R]	-0.015 (0.040) [None]	**0.122** (0.047) [M, V]	**0.068** (0.041) [R]
Compact (237)	**-0.122** (0.061) [R]	-0.063 (0.052) [None]	-0.106 (0.057) [None]	**0.086** (0.050) [R]
Mid-sized (353)	**-0.059** (0.046) [R]	0.095 (0.042) [None]	**-0.102** (0.047) [S]	0.006 (0.044) [None]
Large (53)	**-0.186** (0.132) [R]	0.038 (0.116) [None]	-0.244 (0.125) [None]	-0.116 (0.110) [None]
Luxury (58)	0.059 (0.117) [None]	0.043 (0.106) [None]	-0.139 (0.109) [None]	-0.192 (0.127) [None]
Sports (151)	**0.337** (0.079) [S, C, M, L, V]	-0.089 (0.061) [None]	0.118 (0.080) [None]	**-0.214** (0.066) [S, C, V]
Minivan/Van (111)	**-0.114** (0.088) [R]	0.026 (0.088) [None]	**-0.238** (0.087) [S, U]	**0.211** (0.073) [R, U]
Pickup (159)	0.035 (0.069) [None]	0.007 (0.058) [None]	-0.005 (0.074) [None]	-0.048 (0.070) [None]
SUV (193)	0.134 (0.063) [None]	0.113 (0.057) [None]	**0.140** (0.066) [V]	**-0.120** (0.059) [V]
Total (1,687)	0.011 (0.022)	0.018 (0.019)	-0.011 (0.022)	-0.005 (0.020)
F-value (Sig.)	4.484 (0.000)	1.516 (0.147)	4.292 (0.000)	4.058 (0.000)

Notes:
A bold figure indicates that the mean of that category is significantly different from that of another category. The letters in brackets indicate categories whose means are significantly different from the mean of the row category, where S stands for small, C stands for compact, M stands for mid-sized, L stands for large, X stands for luxury, R stands for sports, V stands for minivan/van, P stands for pickup, and U stands for SUV.

Organizers are more routine-oriented and efficient, so they may be more likely to use cars rather than transit, but with no hypothesized tendency toward particular vehicle types. As expected, the ANOVA test shows that there is no significant difference in mean factor score among the groups. Turning to the loner factor, it is logical that minivan and large car drivers

have the lowest scores, since those car types imply the frequent presence of other passengers. The high mean scores for small and sports car drivers are similarly logical. SUV drivers also have a greater-than-average tendency to be loners (with the highest mean score on that factor). This intriguing orientation of loners toward cars (sports cars as well as SUVs) that are arguably symbols of flamboyance may reflect a desire for attention and social acceptance (whether conscious or unconscious).

People with a high "calm" factor score are in some ways the antithesis of the adventure seekers; the means on these two scores have opposite signs for seven of the nine vehicle groups. Interestingly, minivan drivers have the highest mean score on this factor, indicating perhaps a more settled status and maturity of parenthood (as a general tendency). Sports car drivers are the least calm on average, suggesting a certain restless attitude toward life in general and travel in particular. Luxury car drivers have a similarly low average (although with a higher standard error so that it is not significantly different from the other categories), suggesting a tendency of this group to be striving for ever-greater success.

4.1.3 Lifestyle

The ANOVA test was also carried out to compare mean scores of each vehicle type group on the four lifestyle factors: frustrated, family/community oriented, workaholic, and status seeking. All factors have statistically significantly different mean scores among the groups at a level of $\alpha = 0.05$ or better.

Table 4.3: Mean Lifestyle Factor Scores by Vehicle Type

Vehicle Type (no. of cases)	Frustrated (std. error)	Family/Community Oriented (std. error)	Workaholic (std. error)	Status Seeking (std. error)
Small (372)	0.000 (0.044) [None]	0.094 (0.040) [None]	**-0.115** (0.038) [P]	**-0.162** (0.041) [X, R, P, U]
Compact (237)	0.039 (0.051) [None]	-0.024 (0.048) [None]	0.042 (0.050) [None]	**-0.074** (0.047) [X]
Mid-sized (353)	-0.009 (0.041) [None]	-0.035 (0.041) [None]	0.003 (0.039) [None]	**-0.023** (0.043) [X]
Large (53)	-0.009 (0.108) [None]	-0.207 (0.123) [None]	0.112 (0.098) [None]	0.172 (0.103) [None]
Luxury (58)	-0.181 (0.087) [None]	-0.078 (0.104) [None]	0.214 (0.101) [None]	**0.481** (0.132) [S, C, M, V]
Sports (151)	-0.070 (0.070) [None]	0.069 (0.061) [None]	-0.099 (0.062) [None]	**0.186** (0.073) [S, V]
Minivan/Van (111)	-0.034 (0.084) [None]	-0.006 (0.077) [None]	0.004 (0.074) [None]	**-0.148** (0.075) [X, R]
Pickup (159)	**0.192** (0.065) [U]	-0.082 (0.052) [None]	**0.149** (0.062) [S]	**0.134** (0.059) [S]
SUV (193)	**-0.096** (0.054) [P]	0.073 (0.055) [None]	0.026 (0.049) [None]	**0.106** (0.057) [S]
Total (1,687)	-0.004 (0.020)	0.008 (0.019)	0.000 (0.018)	0.003 (0.020)
F-value (Sig.)	2.047 (0.038)	1.993 (0.044)	3.140 (0.002)	7.635 (0.000)

Notes:
A bold figure indicates that the mean of that category is significantly different from that of another category. The letters in brackets indicate categories whose means are significantly different from the mean of the row category, where S stands for small, C stands for compact, M stands for mid-sized, L stands for large, X stands for luxury, R stands for sports, V stands for minivan/van, P stands for pickup, and U stands for SUV.

Table 4.3 shows the mean factor scores for each vehicle type. While the differences across groups in mean frustration score are not as extreme as for some of other factors, they are still statistically significant. It is perhaps not surprising that luxury car drivers are least frustrated (although not significantly different from the other categories), and on the other hand it is intriguing that pickup truck drivers are the most frustrated.

We expected that those who are family/community oriented would be more likely to use a larger vehicle, especially a minivan/van or perhaps an SUV. However, it turns out that these

groups do not have very high mean scores on the family/community factor. In fact, the large car group has the most negative mean. Drivers of small cars have the highest (although not very high) mean score on this factor, perhaps because small cars are more economical and practical than large cars and represent family or community orientation, just not big families. Also, it is important to remember that we do not have data on the household's entire fleet, only on the single car driven most often by the respondent. The small car could be the economical second (or third) vehicle in a family that also has a minivan or large car.
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Workaholics are likely to be ambitious and career-oriented, with potentially higher incomes as a result, or the desire to project an affluent, successful image. So it is not surprising that small car drivers have the lowest mean score and luxury car drivers have the highest mean score on this factor. The second-highest mean score, for pickup truck drivers, was not predicted but is interesting. With respect to the final personality factor, clearly, status seekers are more likely to drive a large, luxury, or expensive car, as they are likely to think of their cars as a status symbol. As expected, drivers of luxury and sports cars have the highest mean scores on this factor, with large car drivers next and pickup truck drivers next. The mean score for SUV drivers is also positive. Not surprisingly, small car drivers are the least status-seeking.

4.2 Mobility and Travel Liking

We used ANOVA to compare the means across vehicle type groups of three different kinds of measures of mobility (objective mobility, perceived mobility, and relative desired mobility) and travel liking for short- and long-distance trips. The bold figures in the tables indicate the vehicle type categories whose means are significantly different from that of another category.

4.2.1 Objective Mobility

For this study, we focus on distance traveled as the key measure of objective mobility. For short-distance trips we analyze distance traveled by personal vehicle and overall, and for

long-distance trips we analyze distance traveled by personal vehicle and by airplane. Distance traveled for long-distance trips was estimated by multiplying the number of reported trips to each destination region by an average distance to that region (Curry, 2000). In the present study, we counted only long-distance trips within North, Central, and South America, because vehicle type might be more clearly related to travel to areas accessible by car to the survey respondents (whether a personal vehicle or airplane was chosen for the trip). The sum of the natural log of the miles for each long-distance trip was also analyzed, to reflect a potential non-linear relationship between distance and other variables of interest (see Curry, 2000 for a more complete discussion of these objective mobility measures). As shown in Table 4.4, all variables, except for long-distance travel by personal vehicle, have significant differences across groups at a level of $\alpha = 0.05$.

For short-distance trips, drivers of pickup trucks have the highest mean distance traveled both by personal vehicle and overall, as shown in Figure 4.1. Both driving the pickup truck and traveling more than average (for short-distance trips) may be consequences of a need to move goods or materials some distance on a frequent basis. Other people who travel a lot by a personal vehicle may prefer bigger cars for greater comfort, so they tend to use minivans/vans or SUVs. On the other hand, those who travel less by a personal vehicle tend to use small or luxury cars. Those people may drive smaller cars because they do not make many trips, or more comfortable cars if they don't like traveling. Driving a luxury car may also be an indicator of greater age, which in some cases would be associated with lower mobility (e.g. for retired workers). For overall short-distance trips, the results are similar to those made by personal vehicle.

Table 4.4: Mean Distance Traveled (Objective Mobility) by Vehicle Type

Vehicle Type	Short-Distance Trips (miles/week)			Long-Distance Trips (miles/year), Western Hemisphere				
	Sample Size	Personal Vehicle (std. error)	Overall (std. error)	Sample Size	Personal Vehicle* (std. error)	Airplane* (std. error)	Ln (Personal Vehicle)* (std. error)	Ln (Airplane)* (std. error)
Small	372	**149** (8) [P]	**184** (8) [P]	368	1,790 (196) [None]	**4,931** (514) [X]	31.0 (2.4) [None]	**26.5** (2.6) [X]
Compact	237	**156** (11) [P]	**188** (11) [P]	236	1,556 (358) [None]	**4,523** (577) [X]	34.3 (9.3) [None]	**27.2** (2.7) [X]
Mid-sized	353	**169** (9) [P]	**206** (11) [P]	351	2,001 (238) [None]	**4,809** (411) [X]	42.6 (5.6) [None]	**31.1** (2.7) [X]
Large	53	165 (24) [None]	196 (24) [None]	52	2,621 (1,011) [None]	**4,450** (1,184) [X]	59.8 (24.8) [None]	**27.2** (6.5) [X]
Luxury	58	149 (19) [None]	**165** (19) [P]	57	1,746 (357) [None]	**14,547** (3,942) [S, C, M, L, R, V, P, U]	36.6 (6.6) [None]	**69.7** (16.9) [S, C, M, L, R, V, P, U]
Sports	151	175 (14) [None]	212 (15) [None]	149	2,068 (486) [None]	**7,794** (1,275) [X, P]	48.1 (12.6) [None]	**40.2** (6.3) [X, P]
Minivan/Van	111	180 (16) [None]	229 (21) [None]	111	1,762 (398) [None]	**3,302** (530) [X]	39.7 (10.3) [None]	**20.4** (3.7) [X]
Pickup	159	**223** (17) [S, C, M]	**266** (19) [S, C, M, X]	157	2,154 (486) [None]	**3,048** (590) [X, R, U]	46.4 (12.3) [None]	**17.2** (2.7) [X, R, U]
SUV	192	182 (12) [None]	214 (12) [None]	193	1,912 (217) [None]	**7,581** (1,042) [X, P]	42.2 (5.5) [None]	**41.6** (5.1) [X, P]
Total	1,686	170 (4)	205 (5)	1,674	1,897 (115)	5,436 (283)	39.8 (2.7)	30.7 (1.4)
F-value (sig.)		3.182 (0.001)	3.650 (0.000)		0.454 (0.889)	8.016 (0.000)	0.782 (0.618)	6.726 (0.000)

Notes:

* Mode-specific data on long-distance travel were only collected for the trip purposes of "work/school-related" and "entertainment/recreation/social", which are expected to comprise the bulk of long-distance travel.

"Ln (Personal Vehicle)" means the sum across trips of the natural log of the miles traveled for each trip by personal vehicle, and similarly for airplane.

A bold figure indicates that the mean of that category is significantly different from that of another category.

The letters in brackets indicate categories whose means are significantly different from the mean of the row category, where S stands for small, C stands for compact, M stands for mid-sized, L stands for large, X stands for luxury, R stands for sports, V stands for minivan/van, P stands for pickup, and U stands for SUV.

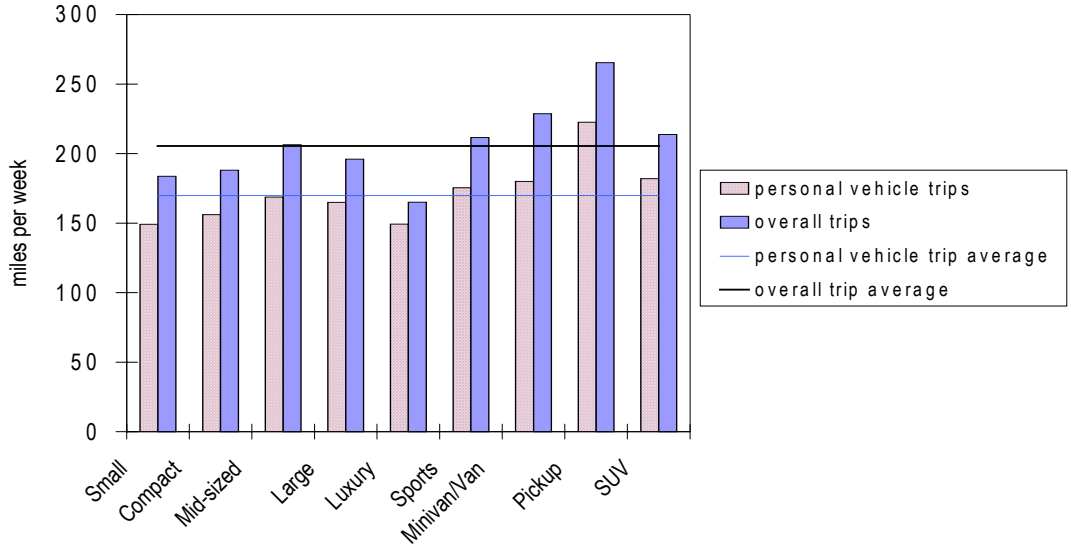


Figure 4.1: Objective Mobility for Short-Distance Trips

For long-distance trips, mean distances traveled by personal vehicle are not significantly different among the groups, indicating that the amount of long-distance travel by personal vehicle is not strongly related to a particular vehicle type. Interestingly, as shown in Figure 4.2, drivers of the more comfortable cars such as luxury cars tend to travel more by airplane than other drivers. Those people are more likely to have higher incomes supporting their extensive air travel for business or pleasure. They probably place higher value on their travel time, and also prefer more expensive cars (luxury and sports cars, and SUVs).

Examining the sum of the natural logs of the miles traveled for each trip is useful because this measure has the effect of giving some weight to the number of trips, not just the total distance traveled (Curry, 2000). Similar to the result for the mean raw distance traveled, only the mean sum of the natural logs of the miles traveled by airplane is significantly different among the groups, and the luxury car group has also the highest mean value. Unlike the result for raw distance, however, drivers of SUVs have the second-highest mean value of the sum of the natural logs of the miles traveled. That is, when number of trips as

well as distance traveled is taken into consideration, SUV drivers tend to engage in more long-distance travel than drivers of sports cars.

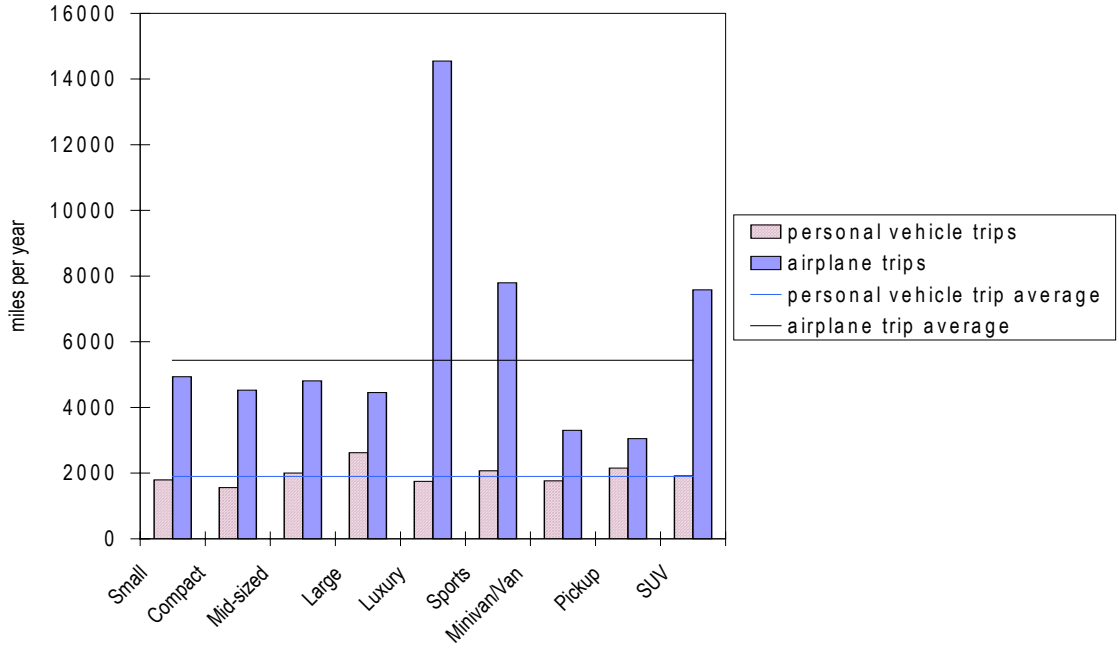


Figure 4.2: Objective Mobility for Long-Distance Trips

4.2.2 Perceived Mobility

As described in the previous chapter, perceived mobility refers to the respondent's perception of the amount currently traveled. It is measured on a five-point scale from "none" to "a lot". For short-distance trips, we analyze perceived mobility for personal vehicle and overall, and for long-distance trips, we analyze perceived mobility for personal vehicle, airplane travel, and overall. As shown in Table 4.5, the means of all variables are significantly different across vehicle type groups at a level of $\alpha = 0.01$.

Table 4.5: Mean Perceived Mobility by Vehicle Type

Vehicle Type	Sample Size	Short-Distance Trips		Long-Distance Trips		
		Personal Vehicle (std. error)	Overall (std. error)	Personal Vehicle (std. error)	Airplane (std. error)	Overall (std. error)
Small	372	**3.87** (0.06) [V]	3.47 (0.06) [None]	**2.95** (0.06) [V]	**2.74** (0.06) [P]	2.71 (0.05) [None]
Compact	237	**3.84** (0.07) [V]	**3.33** (0.06) [V]	**2.82** (0.08) [V, P, U]	**2.65** (0.07) [P]	2.65 (0.06) [None]
Mid-sized	353	4.07 (0.06) [None]	3.42 (0.05) [None]	**3.14** (0.07) [V]	**2.64** (0.06) [P]	2.76 (0.05) [None]
Large	53	4.04 (0.15) [None]	3.62 (0.15) [None]	3.19 (0.17) [None]	2.57 (0.15) [None]	3.00 (0.14) [None]
Luxury	58	3.88 (0.17) [None]	3.36 (0.14) [None]	**2.81** (0.17) [V]	**3.05** (0.18) [P]	3.05 (0.15) [None]
Sports	151	3.89 (0.10) [None]	3.60 (0.09) [None]	**2.83** (0.10) [V]	**2.88** (0.10) [P]	2.85 (0.08) [None]
Minivan/Van	111	**4.27** (0.09) [S, C]	**3.77** (0.09) [C]	**3.61** (0.12) [S, C, M,X, R]	2.50 (0.11) [None]	2.99 (0.09) [None]
Pickup	159	4.06 (0.09) [None]	3.50 (0.08) [None]	**3.27** (0.11) [C]	**2.23** (0.08) [S, C, M, X, R, U]	2.74 (0.08) [None]
SUV	193	4.11 (0.07) [None]	3.58 (0.07) [None]	**3.23** (0.09) [C]	**2.77** (0.08) [P]	2.88 (0.07) [None]
Total	1,687	3.99 (0.03)	3.49 (0.02)	3.07 (0.03)	2.66 (0.03)	2.78 (0.02)
F-value (sig.)		2.672 (0.006)	2.592 (0.008)	6.313 (0.000)	5.078 (0.000)	2.665 (0.007)

Notes:
A bold figure indicates that the mean of that category is significantly different from that of another category. The letters in brackets indicate categories whose means are significantly different from the mean of the row category, where S stands for small, C stands for compact, M stands for mid-sized, L stands for large, X stands for luxury, R stands for sports, V stands for minivan/van, P stands for pickup, and U stands for SUV.

For short-distance trips, Table 4.5 and Figure 4.3 show that drivers of minivans have a significantly higher perception of their mobility than do drivers of other vehicle types. This may be because minivan drivers are likely to be parents with multiple demands for traveling to satisfy work, personal, and family needs. The results for overall short-distance trips are similar to those for personal vehicle trips only, with compact car drivers also showing a lower perception of their overall short-distance mobility. Individuals with a

perceived lower demand for local travel may not wish to spend more money on a larger or more luxurious car.

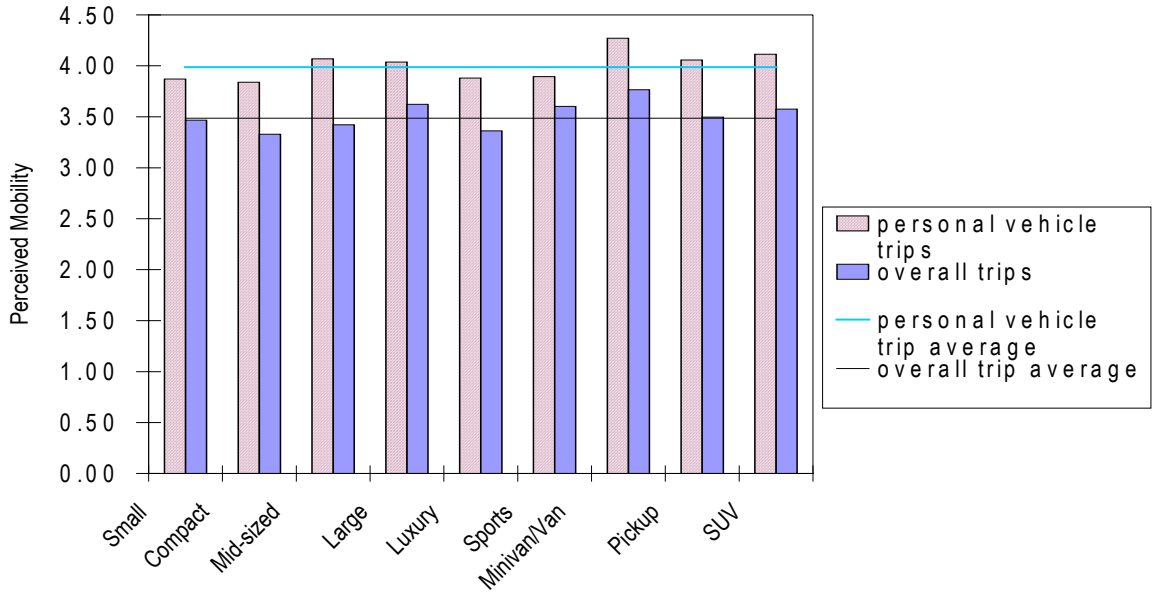


Figure 4.3: Perceived Mobility for Short-Distance Trips

For long-distance trips, Figure 4.4 shows that people who use larger cars (especially minivans, but also mid-sized and large cars, pickups, and SUVs) tend to have higher perceptions of their personal vehicle mobility than those who use smaller cars. These results are similar to those for short-distance trips. On the other hand, people with an above average perception of their airplane travel tend to drive expensive cars (luxury and sports cars, and SUVs). Both characteristics are associated with higher incomes. Interestingly, however, small car drivers also have a slightly above-average perception of their airplane mobility. Differing both from the short-distance trips and from the long-distance trips by personal vehicle, those who drive minivans/vans and pickup trucks rate their airplane mobility lower than average. Minivan drivers are probably parents who are more likely to take the family on a driving vacation than a flying one, while pickup truck drivers may have a greater tendency to be blue collar workers of more moderate incomes, who have

little demand for work-related airplane travel, and a greater inclination to take vacations involving driving rather than flying. The results for long-distance overall perceived mobility are a mixture of those for personal vehicle and airplane separately. Above-average ratings for overall long-distance perceived mobility are observed for drivers of larger or specialty cars (large and luxury cars, minivans, and SUVs).

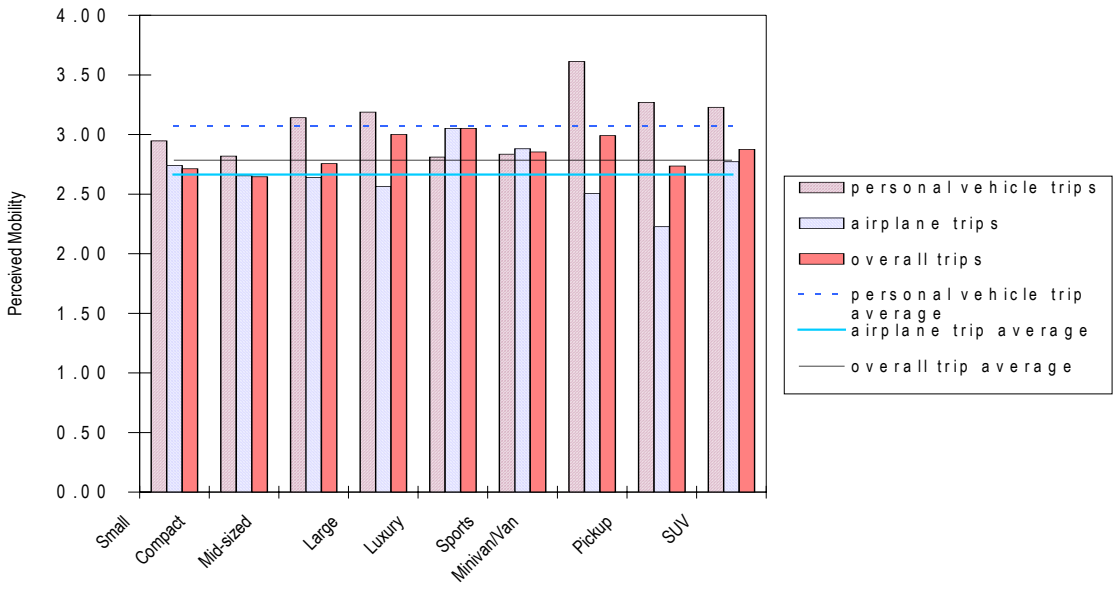


Figure 4.4: Perceived Mobility for Long-Distance Trips

4.2.3 Relative Desired Mobility

Relative desired mobility is a measure of an individual's ideal amount of travel compared to the current amount traveled, using a five-point scale ("much less" to "much more"). We compare the means of relative desired mobility across vehicle type groups for personal vehicle and overall trips for both short- and long-distance travel, and long-distance airplane trips. However, none of the means are significantly different across the groups at a level of $\alpha = 0.1$. Table 4.6 shows that, on average, respondents would like to travel a little less or about the same (ranging from 2.6 to 3.0) for short-distance travel compared to their current travel, but about the same or a little more (ranging from 3.0 to 3.6) for long-distance travel. Overall, there are no distinct differences on these variables among the groups. This

interesting result indicates that desires to increase or decrease one's travel tend to be independent of vehicle type.

Table 4.6: Mean Relative Desired Mobility by Vehicle Type

Vehicle Type	Sample Size	Short-Distance Trips		Long-Distance Trips		
		Personal Vehicle (std. error)	Overall (std. error)	Personal Vehicle (std. error)	Airplane (std. error)	Overall (std. error)
Small	372	2.73 (0.04)	2.64 (0.04)	3.04 (0.04)	3.58 (0.05)	3.58 (0.05)
Compact	237	2.78 (0.05)	2.67 (0.04)	3.09 (0.05)	3.58 (0.07)	3.51 (0.06)
Mid-sized	353	2.85 (0.04)	2.69 (0.04)	3.08 (0.04)	3.47 (0.05)	3.53 (0.05)
Large	53	2.92 (0.10)	2.72 (0.08)	3.21 (0.11)	3.30 (0.15)	3.40 (0.13)
Luxury	58	2.91 (0.10)	2.69 (0.12)	3.16 (0.11)	3.34 (0.15)	3.52 (0.13)
Sports	151	2.75 (0.06)	2.61 (0.06)	3.12 (0.07)	3.58 (0.08)	3.52 (0.07)
Minivan/Van	111	2.91 (0.08)	2.63 (0.07)	3.20 (0.07)	3.53 (0.10)	3.59 (0.07)
Pickup	159	2.86 (0.06)	2.62 (0.05)	3.11 (0.07)	3.45 (0.08)	3.53 (0.07)
SUV	193	2.75 (0.05)	2.67 (0.05)	3.10 (0.06)	3.54 (0.07)	3.57 (0.06)
Total	1687	2.80 (0.02)	2.66 (0.02)	3.09 (0.02)	3.52 (0.02)	3.54 (0.02)
F-value (Sig.)		1.624 (0.113)	0.332 (0.954)	0.679 (0.710)	1.118 (0.348)	0.399 (0.921)

Note: Mean relative desired mobility does not differ significantly by vehicle type, for any of the five categories of travel shown in the table.

4.2.4 Travel Liking

Travel liking focuses on an individual's feeling about traveling. Individuals responded on a five-point scale from "strongly dislike" to "strongly like". We separately compared travel liking by personal vehicle and overall for both short- and long-distance trips, and by airplane for long-distance trips.

Table 4.7: Mean Travel Liking by Vehicle Type

Vehicle Type	Sample Size	Short-Distance Trips		Long-Distance Trips		
		Personal Vehicle (std. error)	Overall (std. error)	Personal vehicle (std. error)	Airplane (std. error)	Overall (std. error)
Small	372	**3.44** (0.05) [V, U]	3.19 (0.04) [None]	**3.32** (0.05) [V]	3.66 (0.05) [None]	3.62 (0.05) [None]
Compact	237	3.51 (0.06) [None]	3.20 (0.04) [None]	3.37 (0.06) [None]	3.72 (0.06) [None]	3.54 (0.06) [None]
Mid-sized	353	3.59 (0.04) [None]	3.20 (0.04) [None]	3.41 (0.05) [None]	3.65 (0.05) [None]	3.60 (0.04) [None]
Large	53	3.74 (0.12) [None]	3.19 (0.09) [None]	3.57 (0.14) [None]	3.57 (0.16) [None]	3.60 (0.13) [None]
Luxury	58	3.66 (0.12) [None]	3.16 (0.10) [None]	3.31 (0.14) [None]	3.66 (0.16) [None]	3.52 (0.12) [None]
Sports	151	3.60 (0.08) [None]	3.21 (0.07) [None]	3.40 (0.08) [None]	3.72 (0.08) [None]	3.61 (0.07) [None]
Minivan/Van	111	**3.79** (0.07) [S]	3.32 (0.07) [None]	**3.68** (0.07) [S]	3.61 (0.10) [None]	3.82 (0.07) [None]
Pickup	159	3.69 (0.07) [None]	3.16 (0.05) [None]	3.48 (0.08) [None]	3.56 (0.09) [None]	3.67 (0.07) [None]
SUV	193	**3.72** (0.05) [S]	3.22 (0.05) [None]	3.55 (0.07) [None]	3.69 (0.07) [None]	3.74 (0.06) [None]
Total	1687	3.59 (0.02)	3.20 (0.02)	3.43 (0.02)	3.66 (0.03)	3.63 (0.02)
F-value (Sig.)		3.527 (0.000)	0.521 (0.841)	2.490 (0.011)	0.439 (0.898)	1.527 (0.143)

Notes:
A bold figure indicates that the mean of that category is significantly different from that of another category. The letters in brackets indicate categories whose means are significantly different from the mean of the row category, where S stands for small, C stands for compact, M stands for mid-sized, L stands for large, X stands for luxury, R stands for sports, V stands for minivan/van, P stands for pickup, and U stands for SUV.

As shown in Table 4.7, travel liking for both short- and long-distance trips by personal vehicle differs significantly across groups of vehicle types at a level of $\alpha = 0.05$. Drivers of larger cars tend to like personal vehicle travel more, for short- and long-distance trips. In general, both directions of causality are likely to be in effect, with driving a larger car both reflecting, and partly responsible for, a love of travel. The mean for minivans/vans is particularly high. Again, the high travel liking for this group may be partly a consequence of having a roomy, comfortable vehicle for transporting family or friends, and conversely,

those who already enjoy traveling with others are more likely to invest in a vehicle that will facilitate doing so comfortably. For the overall and airplane categories, mean travel liking is not significantly different among the groups.

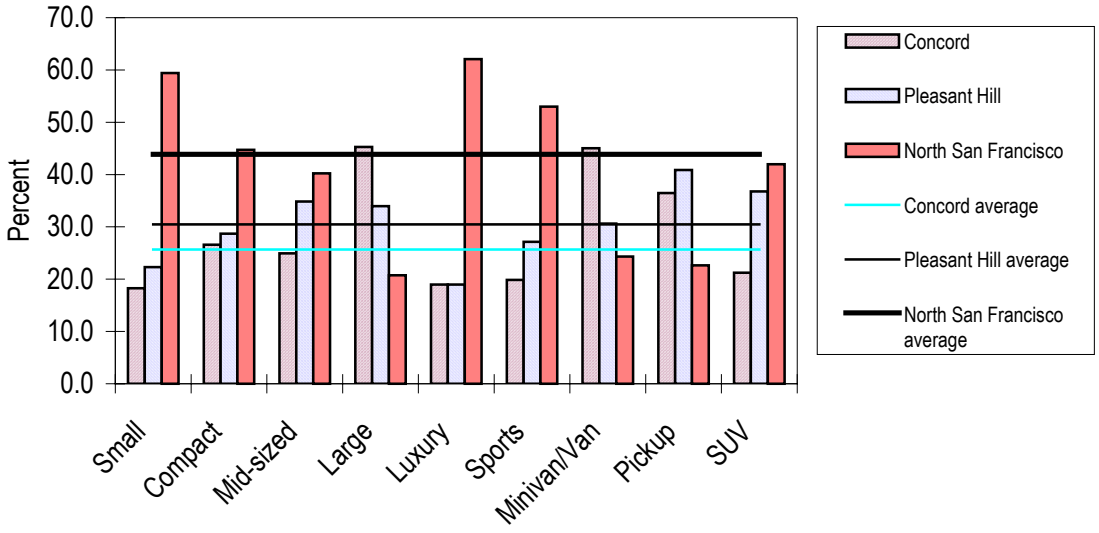
4.3 Demographics

In this section, demographic variables are analyzed to explore whether they are significantly different among vehicle type groups. We conducted chi-squared tests on cross-tabulation tables for general categorical variables and some continuous variables after categorization (such as number of vehicles and workers), and ANOVA tests on continuous variables (such as commute time and distance). For some of the variables, more than 10% of the cells in the cross-tabulation table have an expected count less than five. Thus, where necessary, cells are combined to increase cell counts, so as to make the chi-squared test more reliable. Then, we created bar charts to present the distribution of demographic characteristics within each vehicle type group (the percentages within each vehicle type sum to 100). The average lines represent the sample average. The bar charts help to illustrate which categories are over- or under-represented in each vehicle type. For a more detailed analysis, all cross-tabulation tables are presented in Appendix B.

4.3.1 Neighborhood

As discussed earlier, we selected Concord and Pleasant Hill as examples of suburban neighborhoods, and North San Francisco as our urban example. The Pearson chi-squared test shows that there are significant differences in neighborhood distribution within vehicle types (p-value = 0.000). As shown in Figure 4.5, Concord is overrepresented among drivers of large cars and minivans/vans, and Pleasant Hill tends to be overrepresented with respect to pickup trucks and SUVs. Both neighborhoods have lower residential density (than North San Francisco) and relatively little public transit, so those residents may depend more on their personal vehicles for movement of people and goods and may desire larger cars. These suburban neighborhood residents are also more likely to have families. Conversely, North San Francisco residents are overrepresented among small and sports car drivers. As

expected, these respondents are more likely to use smaller cars due to their greater maneuverability in the tight traffic and parking situations characteristic of the urban environment. Further, San Francisco residents have many opportunities to use public transit. Interestingly, luxury cars are overrepresented in North San Francisco. This is related to income as the residents of North San Francisco have the highest average income.



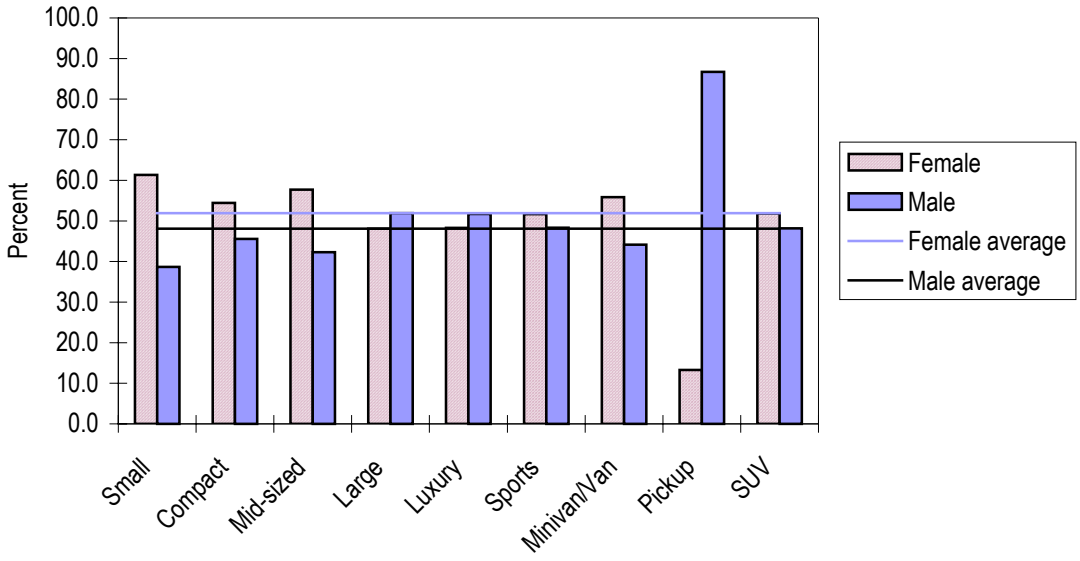
Note: Number of cases = 1687, Pearson chi-squared value (p-value) = 127.4 (0.000).

Figure 4.5: Neighborhood by Vehicle Type

4.3.2 Gender

The Pearson chi-squared test shows that there are significant differences in the gender distribution within vehicle types (p-value = 0.000). As shown in Figure 4.6, females are overrepresented among drivers of smaller cars (such as small, compact, and mid-sized cars), while males are overrepresented for larger cars (such as large and luxury cars, but especially pickup trucks). Males are more likely to drive more powerful or bigger cars than females (although SUV drivers, interestingly, exactly represent the overall sample distribution of gender). In particular, females make up a larger proportion of minivan/van drivers than males, as expected. Females continue to bear most of the household

responsibilities and are likely to use minivans/vans for the purposes of transporting children, their sports gear, groceries, and so on.



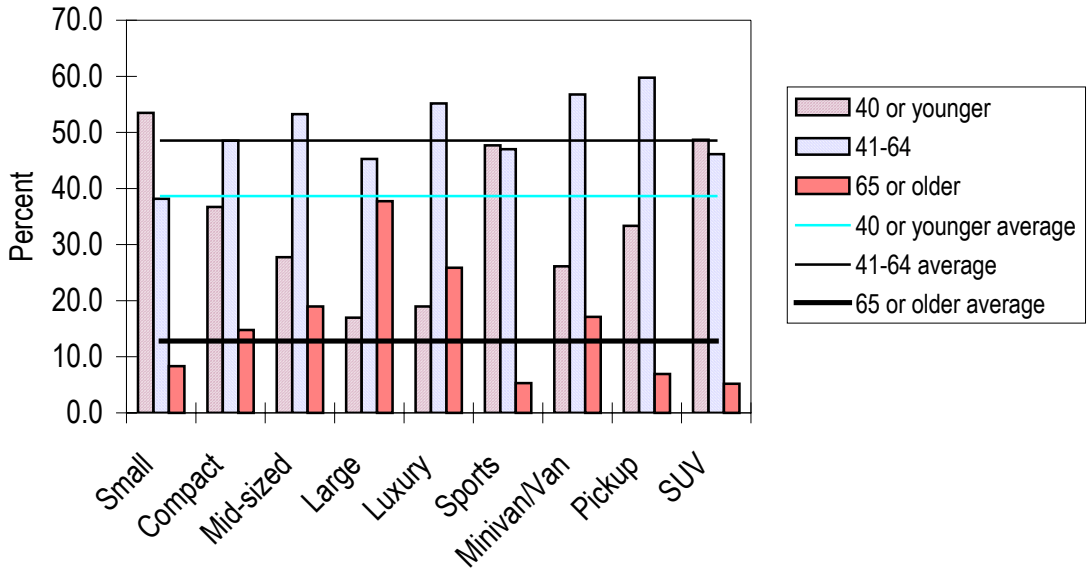
Note: Number of cases = 1680, Pearson chi-squared value (p-value) = 114.2 (0.000).

Figure 4.6: Gender by Vehicle Type

4.3.3 Age

We first compared vehicle types using five age categories (namely 23 or younger, 24-40, 41-64, 65-74, and 75 or older) for respondents based on the original survey, but 20% of the total cells had an expected count of less than 5. After combining cells with small counts, three categories (40 or younger, 41-64, and 65 or older) remained. The Pearson chi-squared test shows that there are significant differences in age distribution within vehicle types (p-value = 0.000). As shown in Figure 4.7, people age 40 or younger tend to be overrepresented among drivers of small or sports cars and SUVs. Younger drivers are likely to be more adventurous in some cases, or to have lower incomes in other cases, than the other age groups. On the other hand, people age 41-64 are overrepresented among drivers of luxury cars, minivans/vans, and pickup trucks. They are more likely to be family-oriented and economically stable than the other age groups, and hence have a tendency

toward practical or expensive cars. The oldest drivers (65 or older) tend to be overrepresented among drivers of large and luxury cars because they desire to use more comfortable and safer cars, and can afford the more expensive cars.



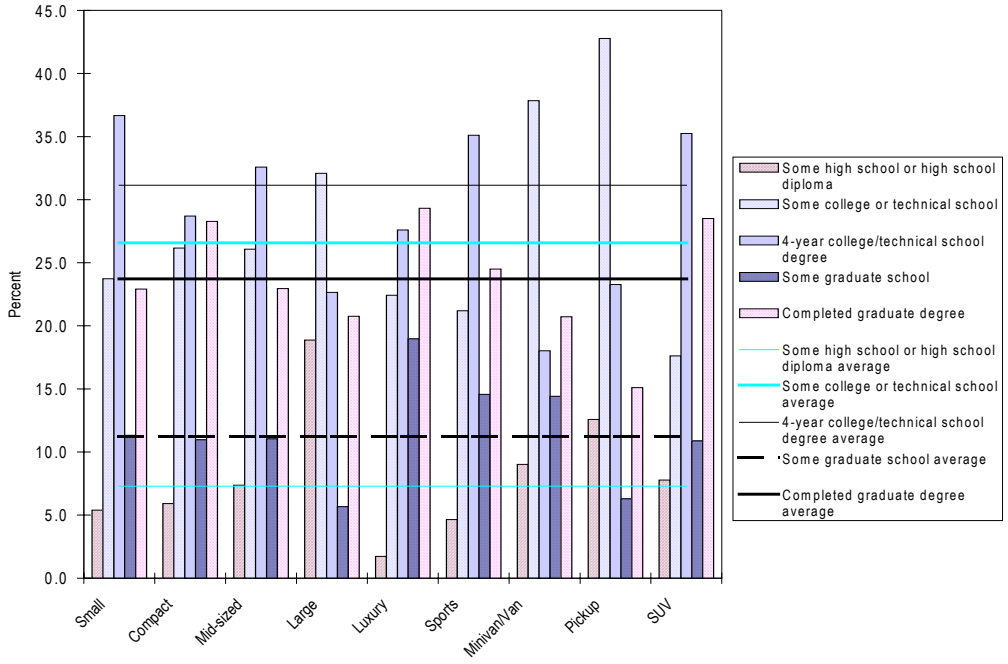
Note: Number of cases = 1687, Pearson chi-squared value (p-value) = 146.7 (0.000).

Figure 4.7: Age by Vehicle Type

4.3.4 Education

Similar to age, we combined "some grade school or high school" with "high school diploma" to reduce the number of cells with an expected count of less than 5. The Pearson chi-squared test shows that there are significant differences in education levels across vehicle types (p-value = 0.000). As shown in Figure 4.8, drivers of pickup trucks and, interestingly, large cars, are disproportionately likely to have only a high school education or less, while drivers of compact or luxury cars and SUVs are more likely to have completed graduate degrees. Individuals' education levels are certainly correlated to their occupations and income. Thus, high school graduates may be more likely to hold blue-collar jobs for which a pickup truck would be useful, and the large cars driven by this group may tend to be second-hand. On the other hand, college graduates are overrepresented

among drivers of small, sports, or mid-sized cars and SUVs. This education level may represent the middle class (income), and therefore reflect various patterns rather than a distinct tendency.



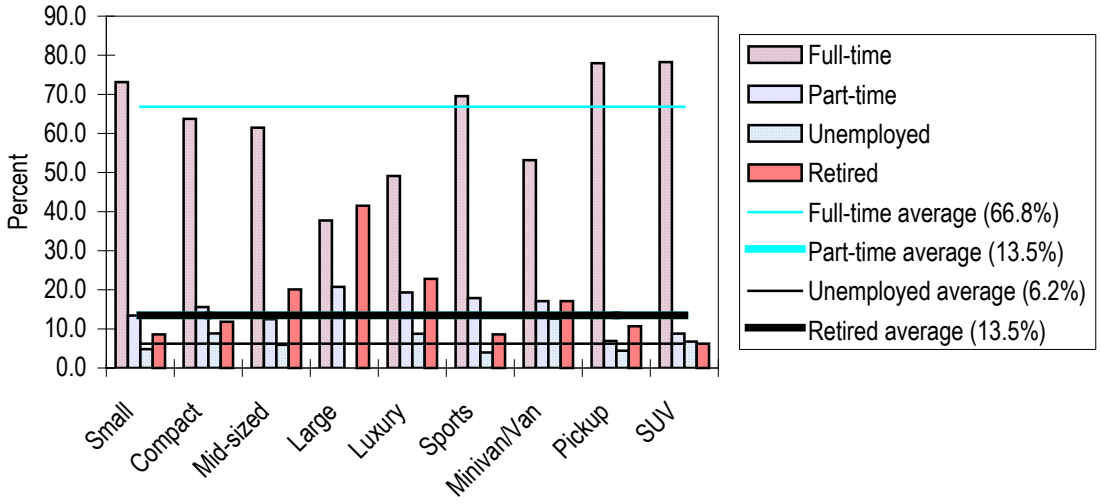
Note: Number of cases = 1686, Pearson chi-squared value (p-value) = 91.3 (0.000).

Figure 4.8: Education by Vehicle Type

4.3.5 Employment Status

The category of "unemployed" is combined with those of "homemaker" and "non-employed student" to reduce the number of cells with an expected count of less than 5. The Pearson chi-squared test shows that there are significant differences in the distribution of employment status within vehicle types (p-value = 0.000). Figure 4.9 shows that full-time workers are overrepresented among drivers of small cars, pickup trucks, and SUVs; they are likely using these vehicles for commuting or work-related activities. Interestingly, part-time workers tend to be overrepresented among drivers of large and luxury cars. These may tend to be wives in affluent households who work more to keep busy than out of economic necessity, or again, some of the large cars may be second-hand vehicles owned by lower-income households. Conversely, unemployed people are overrepresented among drivers of

minivans/vans because this group includes homemakers and non-employed students. As expected, retired people may prioritize more comfortable and bigger cars, so they tend to be overrepresented among drivers of large and luxury cars.



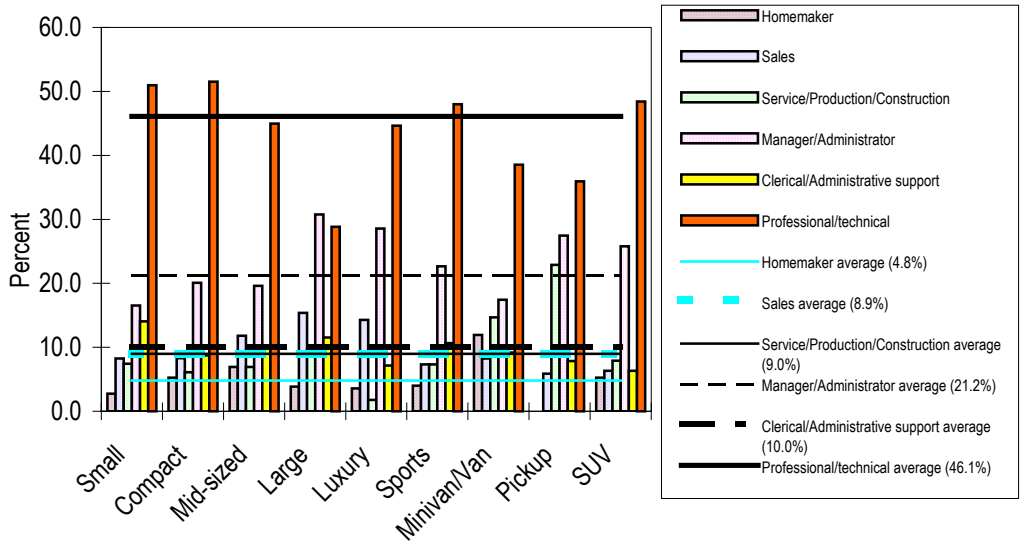
Note: Number of cases = 1686, Pearson chi-squared value (p-value) = 122.1 (0.000).

Figure 4.9: Employment Status by Vehicle Type

4.3.6 Occupation

We combined "production/construction/crafts" with "service/repair" and discarded "other" to decrease the number of cells with an expected count of less than 5. The Pearson chi-squared test shows that there are significant differences in occupational distributions within vehicle types (p-value = 0.000). As shown in Figure 4.10, homemakers are overrepresented among drivers of minivans/vans; they are likely to use this vehicle for non-commuting trips such as shopping and taking kids where they need to go. Those who are employed in service/repair or production/construction/crafts tend to be overrepresented in the minivan/van and pickup truck groups, presumably because they need bigger vehicles for carrying job-related equipment. Those who are employed as sales or managers/administrators are overrepresented among large and luxury car drivers; those occupations may be more likely to view a car as a symbol of status or success. Conversely, those employed in

clerical and administrative support jobs are overrepresented in the small car group, likely a consequence of lower incomes. Interestingly, those who are employed in professional/technical jobs are also overrepresented among small and compact car drivers. It may be that the smaller car is a commuting vehicle for this group, and that the household has other vehicles as well.



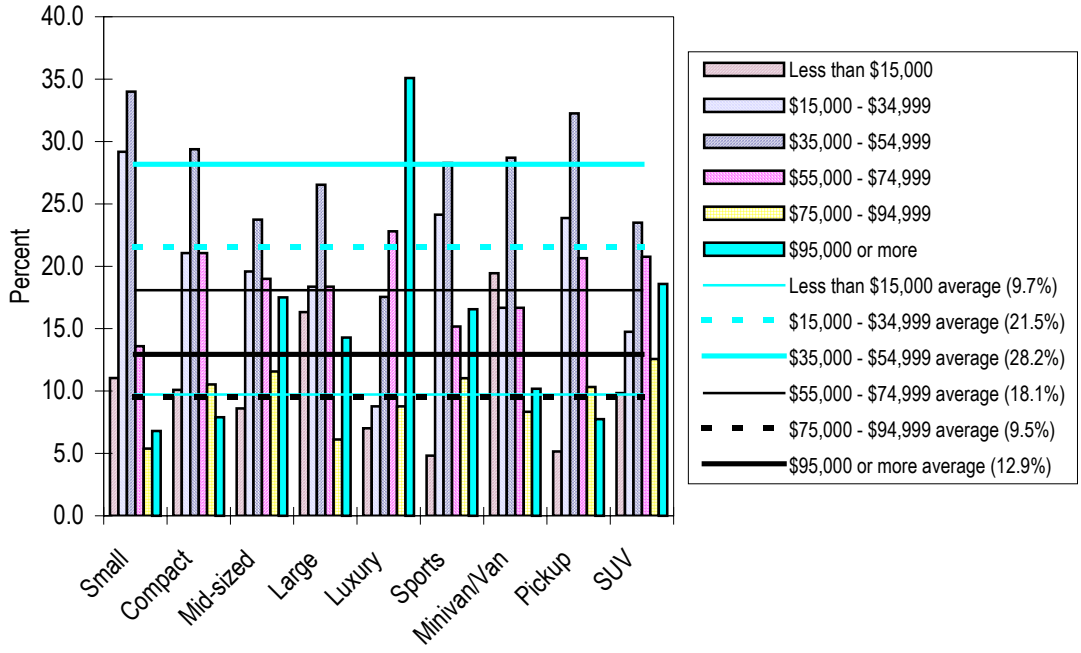
Note: Number of cases = 1680, Pearson chi-squared value (p-value) = 118.6 (0.000).

Figure 4.10: Occupation by Vehicle Type

4.3.7 Personal Income

The Pearson chi-squared test shows that there are significant differences in the distribution of personal income within vehicle types (p-value = 0.000). As shown in Figure 4.11, people with low incomes (less than $15,000) are overrepresented in the small car group, while those with high incomes ($95,000 or more) are overrepresented in the luxury car and SUV groups. These results are certainly to be expected. Interestingly, lower income (less than $15,000) drivers are also overrepresented in the large car and minivan/van groups. Since we are just looking at personal income here, this can reflect the tendency of drivers of these family vehicle types to be women who are homemakers and/or employed part-time. The result for large cars can also partly reflect the second-hand ownership phenomenon

suggested earlier. On the other hand, people of middle incomes ($35,000 to $54,999) tend to be overrepresented among small car and pickup truck drivers.

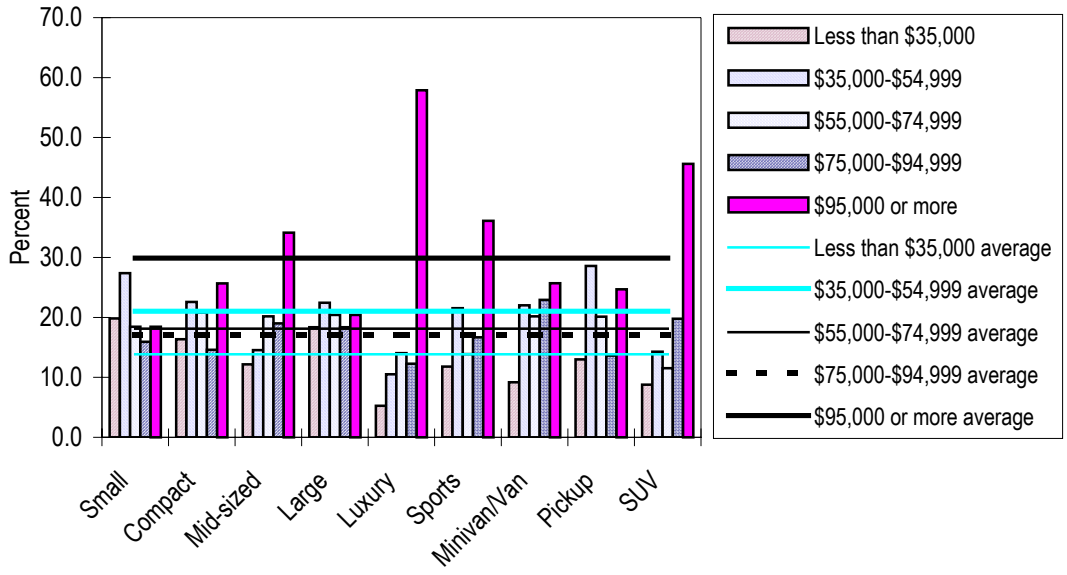


Note: Number of cases = 1615, Pearson chi-squared value (p-value) = 124.0 (0.000).

Figure 4.11: Personal Income by Vehicle Type

4.3.8 Household Income

We combined "less than $15,000" with "$15,000-$34,999" to reduce the number of cells with an expected count of less than 5. The Pearson chi-squared test indicates that there are significant differences in distribution of household income within vehicle types (p-value = 0.000). Figure 4.12 shows that households with low incomes (less than $35,000) are overrepresented in the small and large car groups, while households of high incomes ($95,000 or more) are overrepresented among luxury cars and SUVs. The results are similar to those for personal income, except that now, minivan drivers are disproportionately less likely to be either lowest-income or highest-income. This is an expected result (minivans are likely to be owned by young families, who are likely to have moderate household incomes).

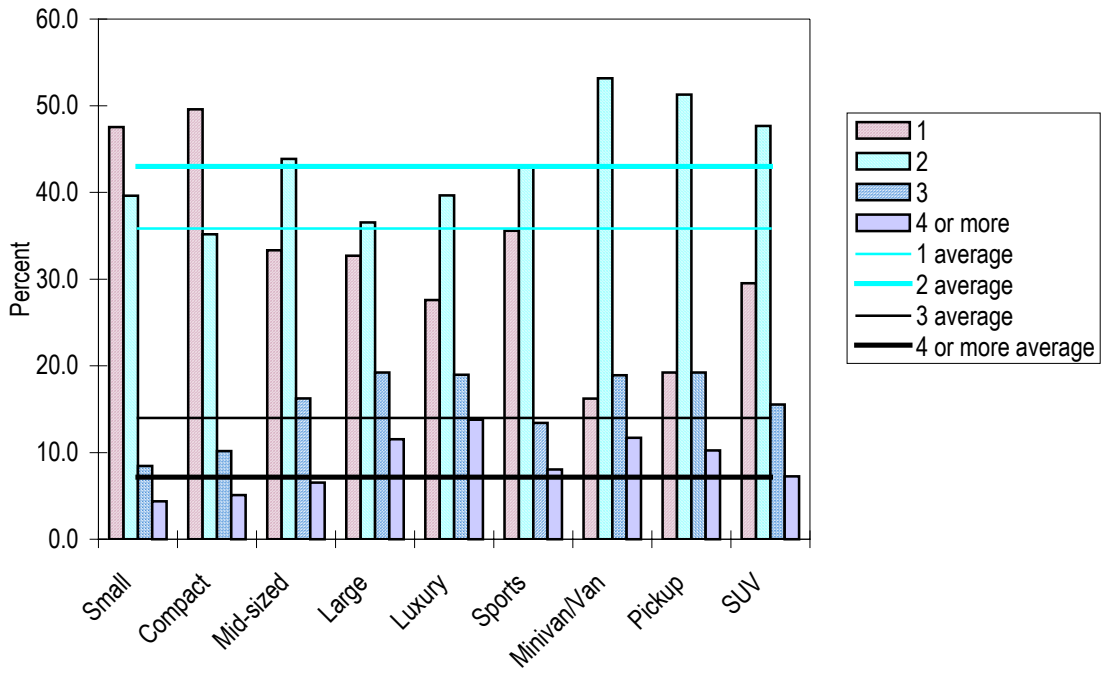


Note: Number of cases = 1616, Pearson chi-squared value (p-value) = 115.2 (0.000).

Figure 4.12: Household Income by Vehicle Type

4.3.9 Number of Vehicles in the Household

We discarded two cases of zero vehicles (who could have legitimately answered the vehicle type question with respect to a loaned vehicle that they often drive) and combined cases having four vehicles with those having more than four vehicles to reduce the number of cells with an expected count of less than 5. The Pearson chi-squared test shows that there are significant differences in distribution of the number of vehicles within vehicle types (p-value = 0.000). As shown in Figure 4.13, people who have one car are overrepresented among the smaller car types such as small and compact cars, while households with two cars are overrepresented among specialty cars such as minivans/vans, pickup trucks, and SUVs. It is likely that one-vehicle households are lower income and hence the single vehicle tends to be small, whereas two-vehicle households have a greater opportunity to diversify vehicle types for different uses. Additionally, households with three or more cars are overrepresented among drivers of large cars, luxury cars, minivans/vans, and pickup trucks. These households are more likely to be families or higher-income, so the results are logical.

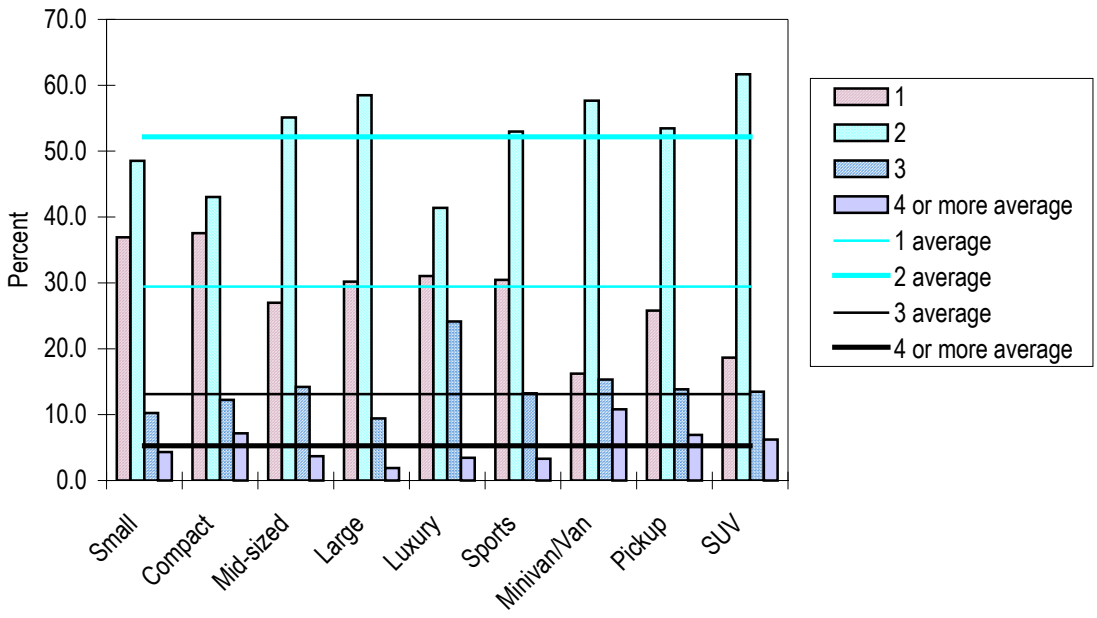


Note: Number of cases = 1672, Pearson chi-squared value (p-value) = 100.6 (0.000).

Figure 4.13: Number of Vehicles by Vehicle Type

4.3.10 Number of Licensed Drivers

We combined households having four driver's licenses with those having more than four driver's licenses to reduce the number of cells with an expected count of less than 5. The Pearson chi-squared test shows that there are significant differences in the distribution of the number of licensed drivers within vehicle types (p-value = 0.000). The number of licensed drivers is strongly correlated with the number of vehicles (r = 0.587), and both sets of results are similar. As shown in Figure 4.14, households who have one driver's license (probably a single adult or single-parent family) tend to be overrepresented among drivers of smaller cars such as small and compact cars, whereas households who have two driver's licenses tend to be overrepresented among large car, minivan/van, and SUV groups. Since households with multiple driver's licenses tend to have multiple vehicles, this again reflects the ability of such households to specialize their vehicle fleet.

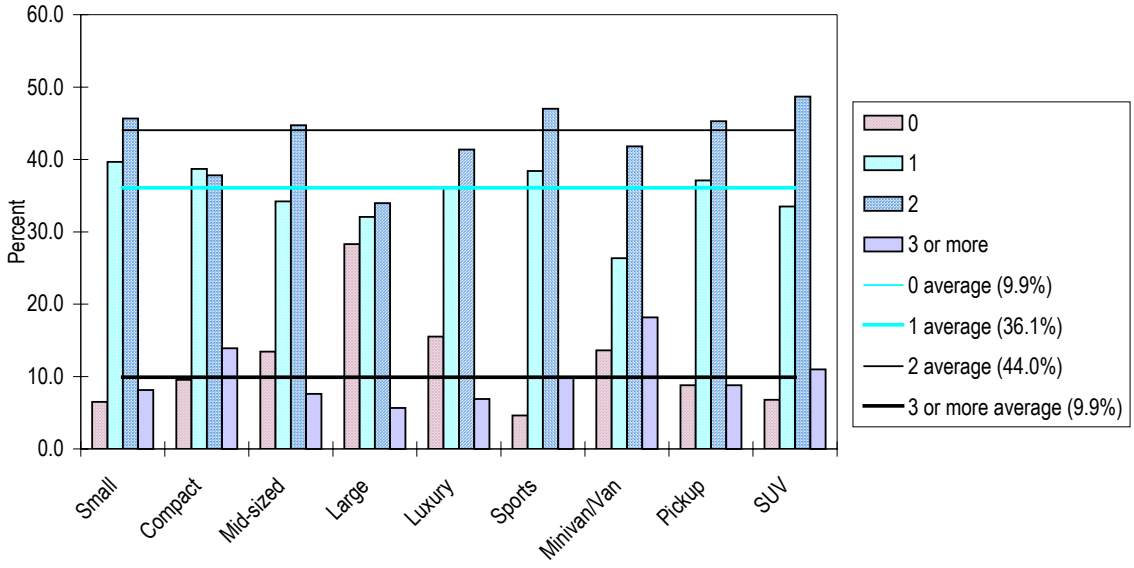


Note: Number of cases = 1685, Pearson chi-squared value (p-value) = 62.5 (0.000).

Figure 4.14: Number of Licensed Drivers by Vehicle Type

4.3.11 Number of Workers

We combined three workers in a household with more than three workers to reduce the number of cells with an expected count of less than 5. Here, number of workers includes full-time or part-time workers. The Pearson chi-squared test shows that there are significant differences in the distribution of the number of workers within vehicle types (p-value = 0.000). Figure 4.15 shows that households with three or more workers are overrepresented among drivers of minivans/vans, whereas households with no workers are overrepresented in the large car group. It is likely that households with several workers include some teenagers or young adult children living at home, so the minivan may still fulfill a family need, or possibly it is primarily used for carpooling to work. Households with no workers comprise mainly retired people (65.4%), and they may prioritize more comfortable cars. On the other hand, households with one worker are overrepresented in the small car group; these may be lower-income households who want an economical car for commuting.



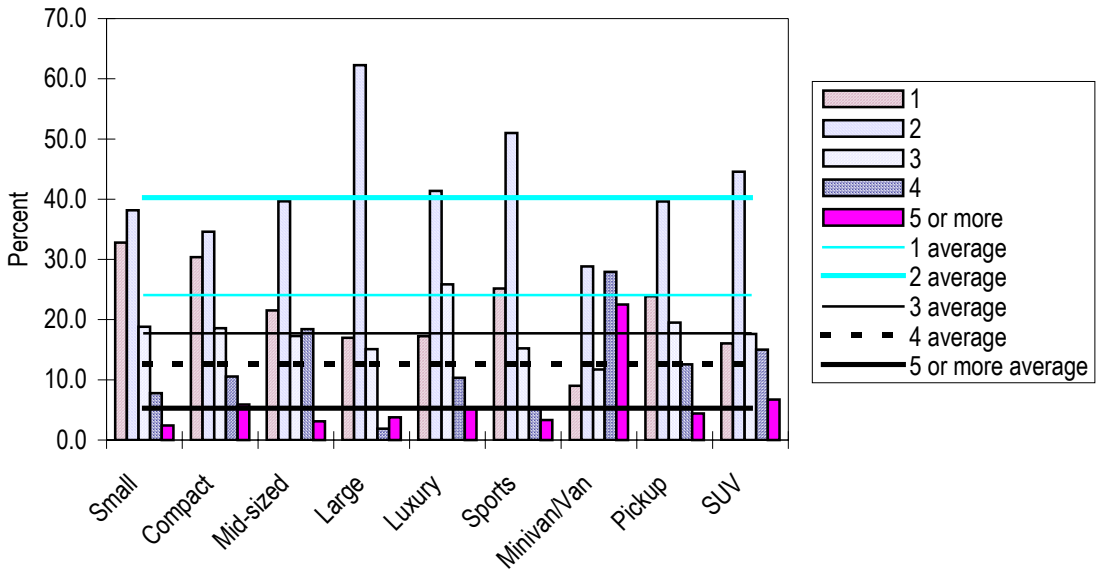
Note: Number of cases = 1662, Pearson chi-squared value (p-value) = 63.3 (0.000).

Figure 4.15: Number of Workers by Vehicle Type

4.3.12 Number of Household Members

We compared distributions of household size across vehicle types, in terms of both total household members and members in each age group. Although these are quasi-continuous variables, for greater insight we present the full distributions rather than just the means.

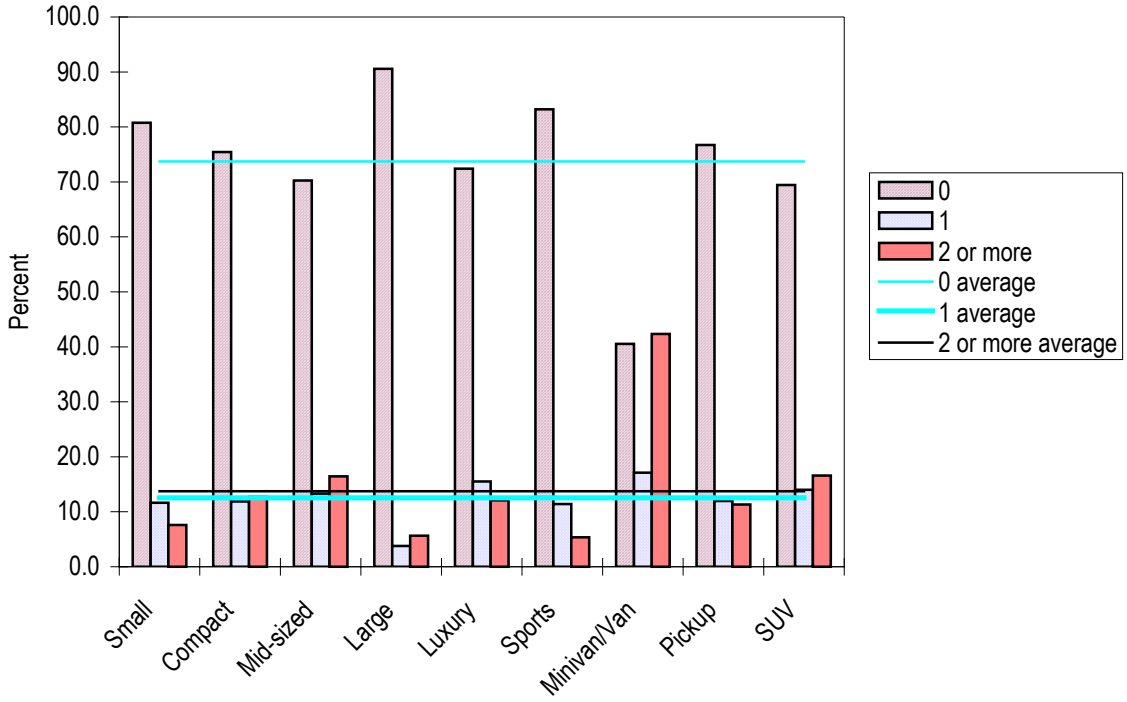
Total number of household members. We combined five people in a household with more than five people to reduce the number of cells that have an expected count of less than 5. The Pearson chi-squared test shows that there are significant differences in household size distributions within vehicle types (p-value = 0.000). As expected, the more people in the household, the bigger the car driven by the respondent tends to be. As shown in Figure 4.16, households with five or more people are overrepresented among drivers of minivans/vans, while households with one person are overrepresented in the small and compact car groups.



Note: Number of cases = 1687, Pearson chi-squared value (p-value) = 181.7 (0.000).

Figure 4.16: Total Number of Household Members by Vehicle Type

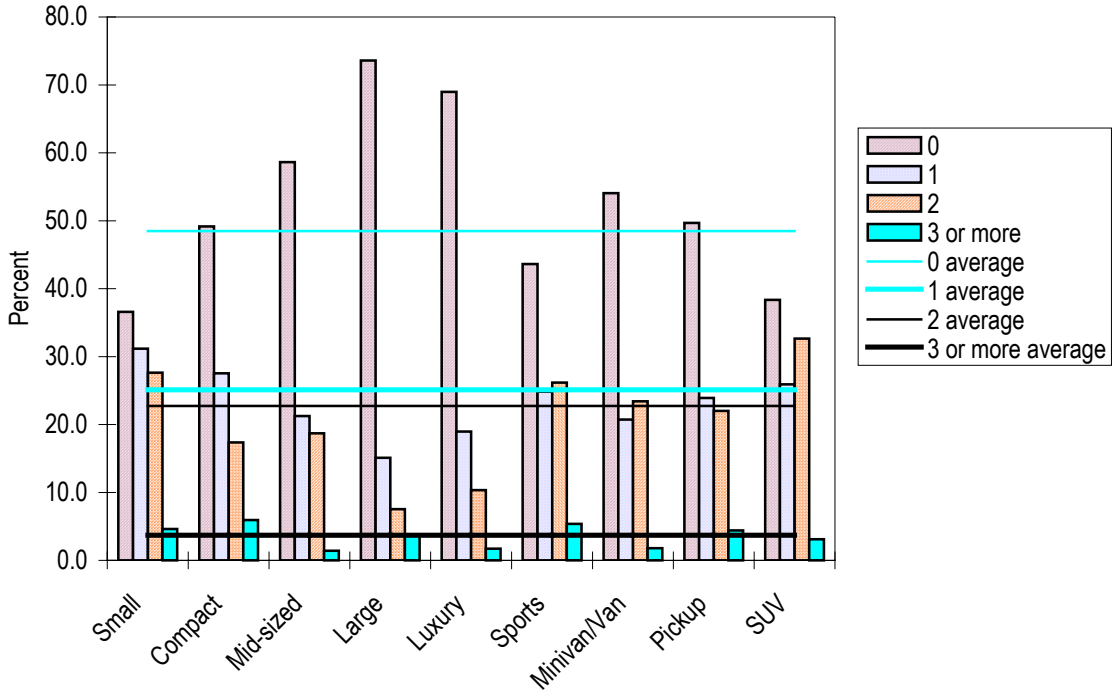
Number of household members under 19. The Pearson chi-squared test shows that there are significant differences in distribution of the number of household members under 19 years old within vehicle types (p-value = 0.000). As expected, Figure 4.17 shows that households with two or more people under 19 are overrepresented among drivers of minivans/vans, whereas households with no people under 19 are overrepresented in the small, large, and sports car types.



Note: Number of cases = 1681, Pearson chi-squared value (p-value) = 121.1 (0.000).

Figure 4.17: Number of Household Members Under Age 19 by Vehicle Type

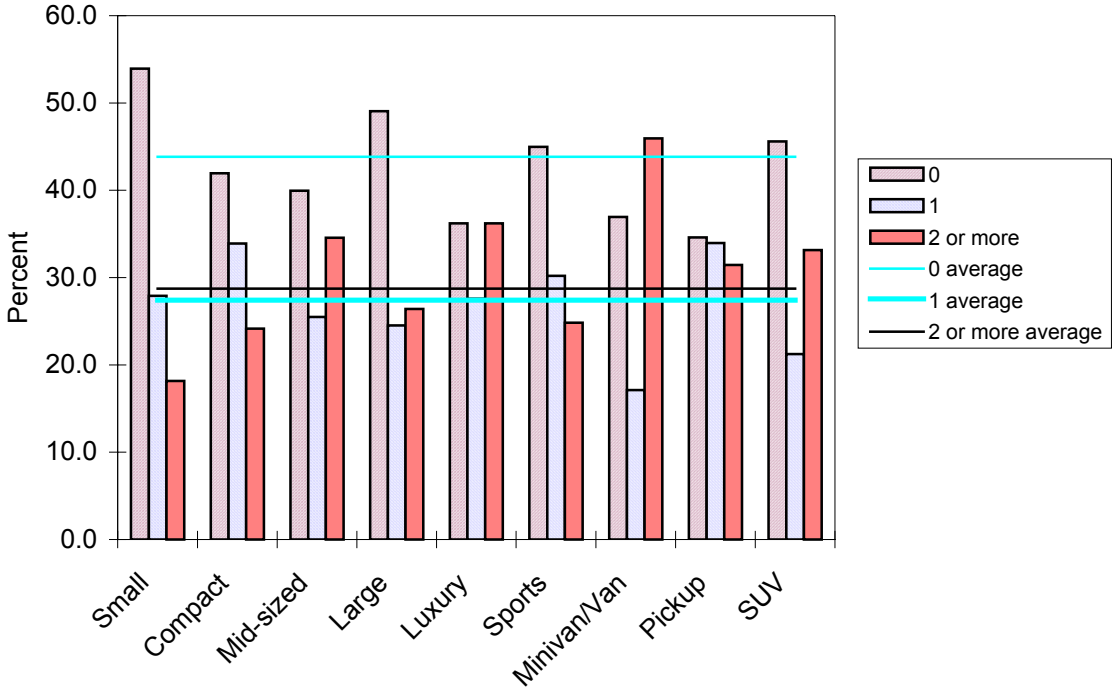
Number of household members age 19-40. The Pearson chi-squared test shows that there are significant differences in distribution of the number of household members age 19-40 within vehicle types (p-value = 0.000). As shown in Figure 4.18, households with two or more people age 19-40 are overrepresented in the small car, sports car, and SUV groups, while households with no people age 19-40 are overrepresented among large and luxury car drivers. These results are similar to those based on the respondent's age, discussed in Section 4.3.3.



Note: Number of cases = 1681, Pearson chi-squared value (p-value) = 87.9 (0.000).

Figure 4.18: Number of Household Members Age 19-40 by Vehicle Type

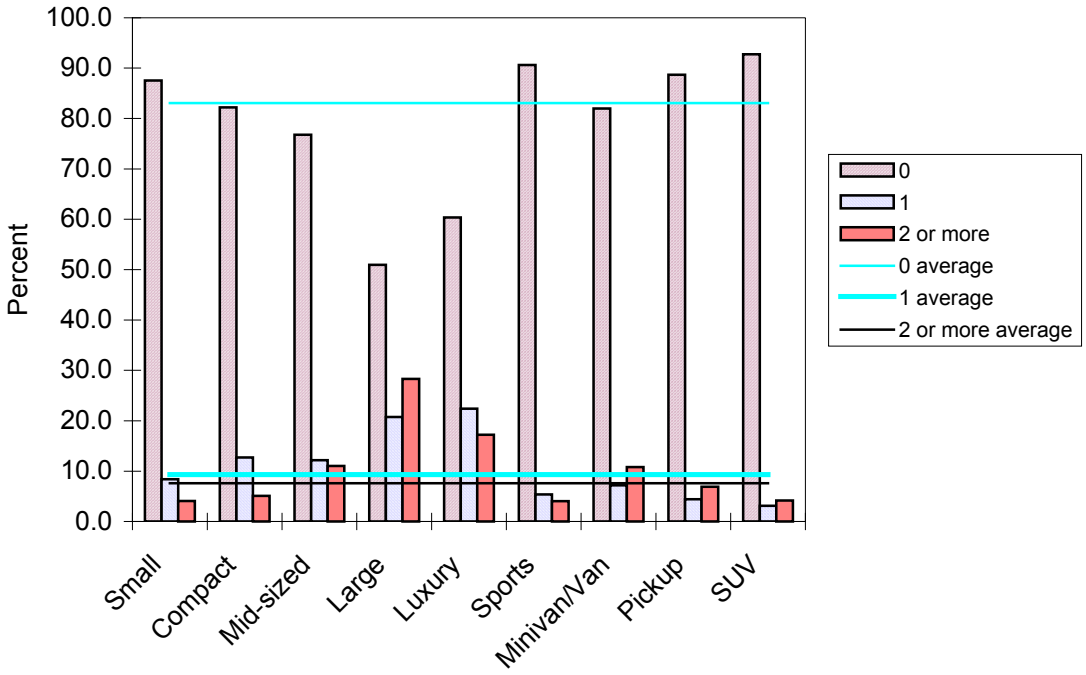
Number of household members age 41-64. The Pearson chi-squared test shows that there are significant differences in distribution of the number of household members age 41-64 within vehicle types (p-value = 0.000). This age group may have the greatest degree of economic stability. As shown in Figure 4.19, households with two or more people age 41-64 are overrepresented in the luxury car, minivan/van, and SUV groups, while households with no people age 41-64 are overrepresented in the small and large car groups. Thus, households with more people age 41-64 are more likely to use expensive or family-oriented cars. Households with no people age 41-64 consist of younger or older adults, so they tend to use small or large cars respectively. These results are also similar to those based on the respondent's age (Section 4.3.3).



Note: Number of cases = 1681, Pearson chi-squared value (p-value) = 65.2 (0.000).

Figure 4.19: Number of Household Members Age 41-64 by Vehicle Type

Number of household members age 65 or older. We combined households having two members age 65 or older with those having more than two such members to reduce the number of cells with an expected count of less than 5. Nevertheless, 11.1 % of cells still had an expected count of less than 5. This is a marginally acceptable proportion. The Pearson chi-squared test shows that there are significant differences in distribution of the number of household members age 65 or older within vehicle types (p-value of 0.000). Figure 4.20 indicates that households with two or more people age 65 or older are overrepresented among drivers of large and luxury cars. This result is similar to that for the respondents' age (Section 4.3.3).



Note: Number of cases = 1681, Pearson chi-squared value (p-value) = 113.7 (0.000).

Figure 4.20: Number of Household Members Age 65 or Older by Vehicle Type

4.3.13 Commute Time and Distance

We used ANOVA to compare the commute time by vehicle type (N= 1268). As illustrated in Figure 4.21, the test shows that there is no significant difference in the average commute time across vehicle type groups (p-value of 0.761). Thus, commute time is independent of vehicle type. We also conducted ANOVA to compare the commute distance by vehicle type (N=1250). Similar to the commute time, the test indicates that there is no significant difference in the average commute distance across vehicle type groups (p-value of 0.791). That is, vehicle type is not associated with commute distance (see Figure 4.22).

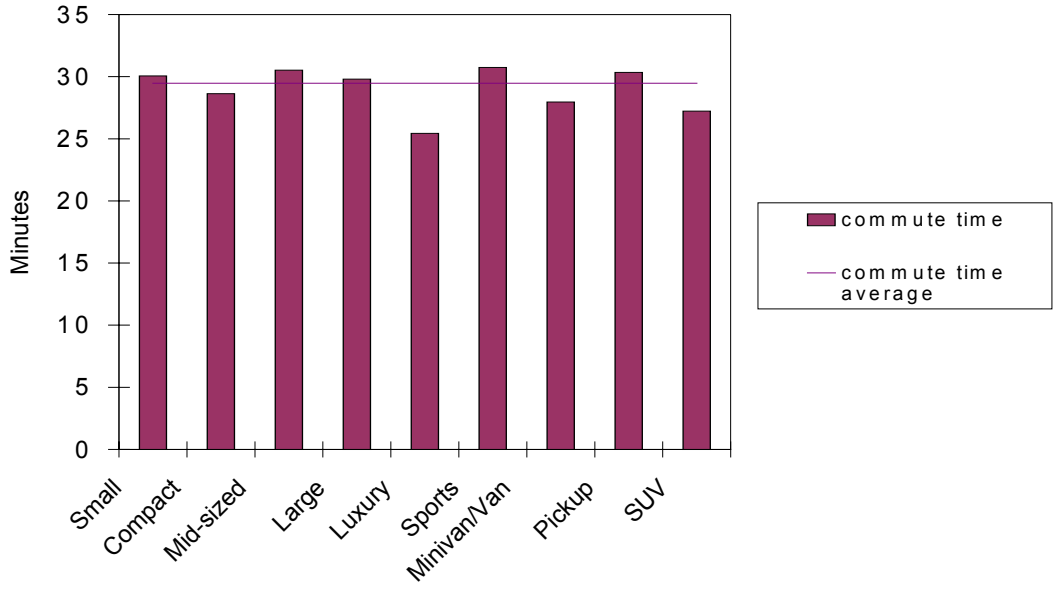


Figure 4.21: Commute Time by Vehicle Type

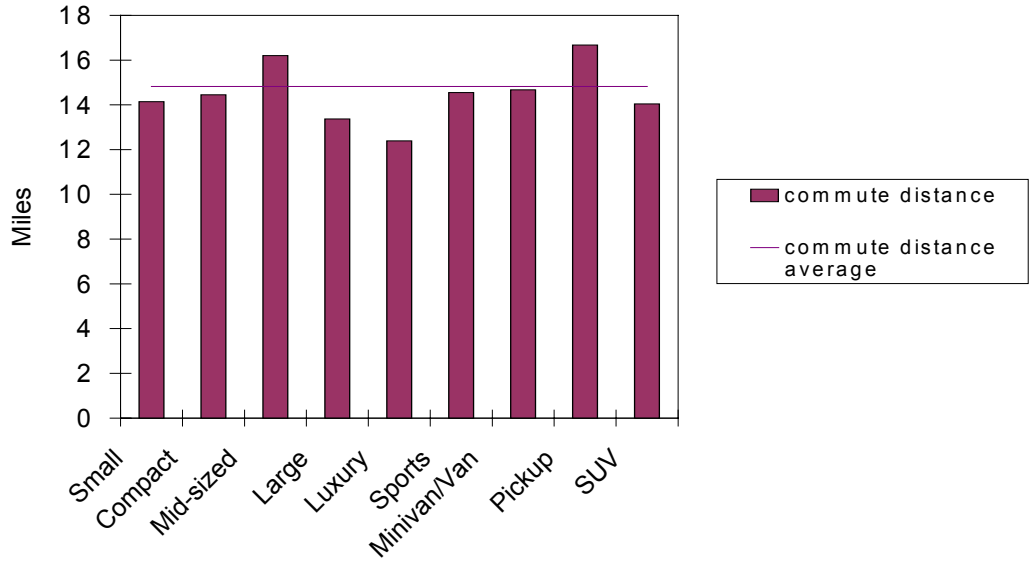


Figure 4.22: Commute Distance by Vehicle Type

4.4 Attitudinal and Personality/Lifestyle Clusters

In earlier work, Redmond (2000) performed two cluster analyses - one on the attitudinal factor scores and one on the personality and lifestyle factor scores together - to identify groups of people in the sample having similar attitudinal profiles, and similar personality and lifestyle profiles. The resulting clusters are summarized in Table 4.8. It is of interest to examine how the distribution of vehicle type varies by cluster - or equivalently, how the distribution of cluster membership varies within each vehicle type. The resulting relationships can be rather complex, since the clusters represent individuals with similar tendencies on several variables simultaneously, but for which there could be considerable variation within each cluster. Nevertheless, some intriguing patterns emerge, as discussed below.

4.4.1 Six Attitudinal Clusters

The Pearson chi-squared test shows that there are significant differences in the distribution of the six attitudinal clusters within vehicle types (p-value = 0.000). We first focus on the vehicle type composition of each cluster, and then focus on the cluster composition of each vehicle type. The complete cross-tabulation is shown in Appendix 4, and illustrated in Figure 4.23. Additionally, Table A1 of Appendix 4 summarizes the results qualitatively. Figure 4.23 shows that, interestingly, *Affluent Professionals* are overrepresented among drivers of compact and mid-sized cars, underrepresented among drivers of large cars, minivans, and pickups, and proportionally represented among drivers of small, luxury, and sports cars and SUVs. These results are consistent with their character as tending to have a weaker travel stress attitude, the highest incomes, and the smallest households without children. The compact and mid-sized cars are logical choices for smaller households, but are likely to be the upscale versions of vehicles in these classes, and may also be the second (or third) vehicle in a household that also has an expensive car such as a luxury car or SUV.

Table 4.8: Cluster Descriptions

Cluster Name (Sample Percent)	Description
Attitude Clusters	
Affluent Professionals (17.5%)	Affluent and mobile, this cluster eats out a lot, is not family and community oriented and usually doesn't have a (large) family. They seem to be more entertainment oriented than work oriented.
Transit-using Urbanites (15.0%)	Young, urban, highly educated and community oriented. This cluster is pro-environment and pro-high density (they live in urban areas and like it).
Homemakers and Older Workers (20.5%)	Older suburbanites who focus on family and home and don't particularly like travel.
Travel Haters (12.1%)	This work-oriented cluster doesn't like travel, does as little as possible and wants to do less of it.
Excess Travelers (19.7%)	Young, urban, highly educated and adventure seeking. This cluster is pro-environment and pro-high density, and pro-travel. Not one of the highest income groups, perhaps because they are prioritizing their adventure time over work time and status-seeking.
Adventurous, Car-Oriented Suburbanites (15.2%)	Car-bound, excess travelers, oldest, organized, status conscious, and suburban.
Personality and Lifestyle Clusters	
New Family Model (11.0%)	Young families, enjoy traveling for fun but not for work, family/community oriented but not settling down.
Homebodies (8.1%)	Not particularly social, don't really like travel, one of the more neutral clusters compared to the others.
Mobile Yuppies (6.8%)	Young, professional, highly educated, travel lovers.
Transit Advocates (10.0%)	Highly educated, environmentally sensitive, transit-oriented.
Assistant V.P.s (10.9%)	Suburban, auto-oriented (but not particularly travel loving), older, least educated, frustrated.
Status Seeking Workaholics (9.0%)	Travel most (miles and frequency) for work, auto-bound, enjoy work travel... one of the more extreme clusters – most status seeking, workaholic and not calm.
Suburban and Stationary (10.8%)	Mostly older, suburban women, calm, don't travel a lot.
Older and Independent (9.4%)	Older, independent, unencumbered (most strongly NOT family/community oriented), entertainment focused.
Middle-of-the-roaders (8.7%)	Most neutral cluster, most strongly family/community oriented.
Travel Lovin' Transit Users (7.1%)	Highly educated urban women, middle income, environmentally sensitive, like short distance travel by bus, strong excess travelers, highest walking share of total miles traveled.
Frustrated Loners (8.1%)	Most extremely frustrated, above average commutes, somewhat transit oriented.

Source: Redmond (2000).

Transit-using Urbanites tend to be overrepresented among drivers of small cars and underrepresented among drivers of mid-sized and large cars, and SUVs. People in this cluster are more likely to drive smaller cars because they have stronger pro-environmental and pro-high density attitudes. Interestingly, however, they are proportionally represented among drivers of luxury and sports cars, minivans and pickups. *Homemakers and Older Workers* are overrepresented among drivers of large cars, minivans, and pickups, and underrepresented among drivers of luxury and sports cars, and SUVs. This group consists of the least educated with the largest families, so the result is similar to the differences in education by vehicle type examined in Section 4.3.4.

Travel Haters tend to be underrepresented among drivers of small and sports cars, and slightly overrepresented with respect to large and luxury cars. We hypothesize the explanation to be that, since they have stronger travel dislike and travel stress attitudes, they tend to seek larger cars to be more comfortable. In contrast to *Travel Haters*, *Excess Travelers* are more likely to have weaker travel dislike and travel stress attitudes, plus a stronger pro-environmental attitude, and they tend to be young, highly educated, and living in an urban area as well. Thus, *Excess Travelers* tend to be overrepresented among drivers of small, luxury, and sports cars, and underrepresented among drivers of large cars, minivans, and pickups. *Adventurous, Car-oriented Suburbanites* tend to have weaker pro-environmental, pro-high density, travel dislike, and travel stress attitudes, and they tend to be older and suburban. It is natural that they are overrepresented among drivers of large cars, minivans, pickups, and SUVs, and underrepresented among drivers of small and compact cars. They are about proportionally represented with respect to luxury and sports cars.

Focusing on individual vehicle type, drivers of small cars are more likely to be *Transit-using Urbanites* and *Excess Travelers*, showing a stronger pro-environmental tendency, and less likely to be *Travel Haters* and *Adventurous, Car-oriented Suburbanites*. Conversely, drivers of large cars are more likely to be *Travel Haters* and *Adventurous, Car-oriented*

Suburbanites. This implies that both those who dislike travel and those who travel a lot are more likely to drive larger cars to minimize their travel fatigue. Interestingly, pickup drivers tend to be *Homemakers and Older Workers* and *Adventurous, Car-oriented Suburbanites*, but they are less likely to be *Excess Travelers*. The latter two groups both tend to be adventure-seeking excess travelers, but the *Adventurous, Car-oriented Suburbanites* tend to be suburban, older, and status conscious, whereas the *Excess Travelers* tend to be younger, urban, and not status-seeking. SUV drivers also tend to be *Adventurous, Car-oriented Suburbanites*, and are less likely to be *Transit-using Urbanites*. The summaries for the remaining vehicle types can be seen in Table A1, and fit prior expectations reasonably well.

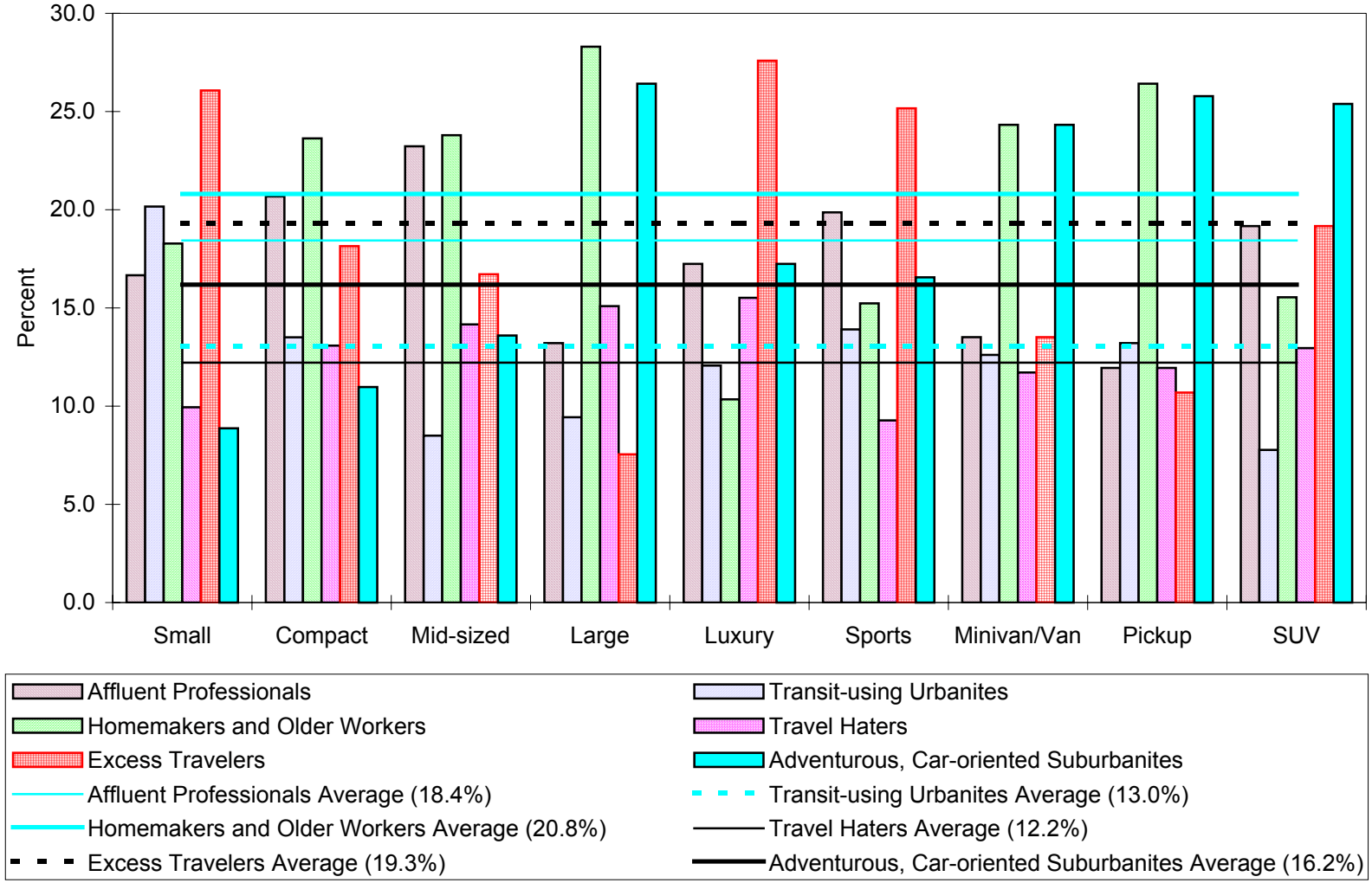


Figure 4.23: Six Attitudinal Clusters by Vehicle Type

4.4.2 Eleven Personality and Lifestyle Clusters

When all nine vehicle types were first cross-tabulated against the 11 personality and lifestyle clusters, 11% of the total cells had an expected count of less than 5. The large (7%) and luxury (4%) car categories accounted for all of these cells. Since the chi-squared test is of questionable validity when more than 10% of the cells have a small (less than 5) expected count, we removed the large car category (which, at 53 cases, was the smallest vehicle type category in the sample) and re-did the chi-squared test. After excluding the large car category, only 4.5% of the total cells remaining had an expected count less than 5. The Pearson chi-squared test shows that there are significant differences in the distribution of 11 personality and lifestyle clusters among the eight vehicle types (p-value = 0.000). For completeness, the large car category is included in the tables, figure, and discussion, but it should be understood that results involving this category are only tentative due to its small size. The discussion below is summarized by Table A2 of Appendix 4, and illustrated in Figure 4.24. The complete cross-tabulation is found in Appendix 4.

As shown in Figure 4.24, people in the *New Family Model* cluster are overrepresented among drivers of SUVs, luxury and sports cars, and pickups, because they tend to be adventure seekers, not loners, and young families enjoying traveling. On the contrary, *Homebodies* tend to be loners, not adventure seekers, and they have neutral demographic traits as well. Hence, *Homebodies* are overrepresented among drivers of minivans and large cars, and underrepresented among drivers of luxury cars.

Mobile Yuppies are overrepresented among drivers of SUVs and sports cars, because they tend to be young, highly educated, and travel lovers. As expected, *Transit Advocates* are overrepresented among drivers of smaller cars such as small and compact cars, and underrepresented among drivers of large cars and pickups. It is not surprising that *Assistant V.P.s* are overrepresented among drivers of mid-sized or large cars, and pickups. People in this cluster are more likely to be suburbanites and workaholics, and they are frustrated,

older, and least educated. Clearly, *Status Seeking Workaholics* are more likely to drive expensive cars such as luxury and sports cars, and less likely to drive small cars.

Turning to the *Suburban and Stationary* cluster, people in this cluster are overrepresented among drivers of compact cars and minivans, because they tend to be older, calm, and suburban women, and don't travel a lot. Interestingly, people in the *Older and Independent* cluster are more likely to be older and somewhat status seeking, and enjoy traveling, especially for entertainment. Thus, they tend to drive larger and more comfortable cars such as luxury cars or leisure cars such as SUVs. As the most neutral cluster, *Middle-of-the-roaders* are overrepresented among drivers of mid-sized or large cars, and minivans, consistent with their strong tendency toward the organized personality and the family/community-oriented lifestyle.

Similar to *Transit Advocates*, *Travel Lovin' Transit Users* are overrepresented among drivers of small cars, but they have a higher proportion than average in the minivan category. This is consistent with the observations that *Travel Lovin' Transit Users* are more likely (68%) to be female than are *Transit Advocates* (53%), and that minivan drivers are most often female (56%). *Frustrated Loners* are overrepresented among drivers of small and sports cars, because they tend to be young and like living in urban areas. Interestingly, they are overrepresented among drivers of large cars, differing from the individual tests for the frustrated or loner personality factor (although again, this result should be viewed with caution due to the small sample size in this category). On the other hand, people in this cluster are underrepresented among drivers of luxury cars and minivans, probably because those car types imply greater possibilities for the presence of other passengers.

Focusing on individual vehicle types, drivers of small cars are more likely to be *Transit Advocates, Travel Lovin' Transit Users,* and *Frustrated Loners*. The implication is that transit-oriented people are more likely to drive small cars, a logical result. On the other hand, drivers of luxury cars tend to be in the *New Family Model*, *Status Seeking*

Workaholics, and *Older and Independent* clusters. This result is consistent with the view of luxury cars as representing entertainment, comfort, style, affluence, and status, more than a simple means of transportation. Drivers of mid-sized and large cars are more likely to be *Assistant V.P.s* and *Middle-of-the-roaders*, indicating a neutral tendency. Drivers of minivans are more likely to be *Homebodies, Suburban and Stationary*, and *Middle-of-the-roaders*. This result strongly supports the idea that minivans are most likely to be popular among people who are family/community-oriented and like living in suburbs. In addition, SUV drivers are more likely to be *New Family Model, Mobile Yuppies*, and *Older and Independent*, probably showing a strong tendency toward a love of travel. Similarly, drivers of sports cars tend to be *New Family Model, Mobile Yuppies, Status Seeking Workaholics*, and *Frustrated Loners*. Clearly, adventure seekers with high incomes or loners are more likely to drive sports cars.

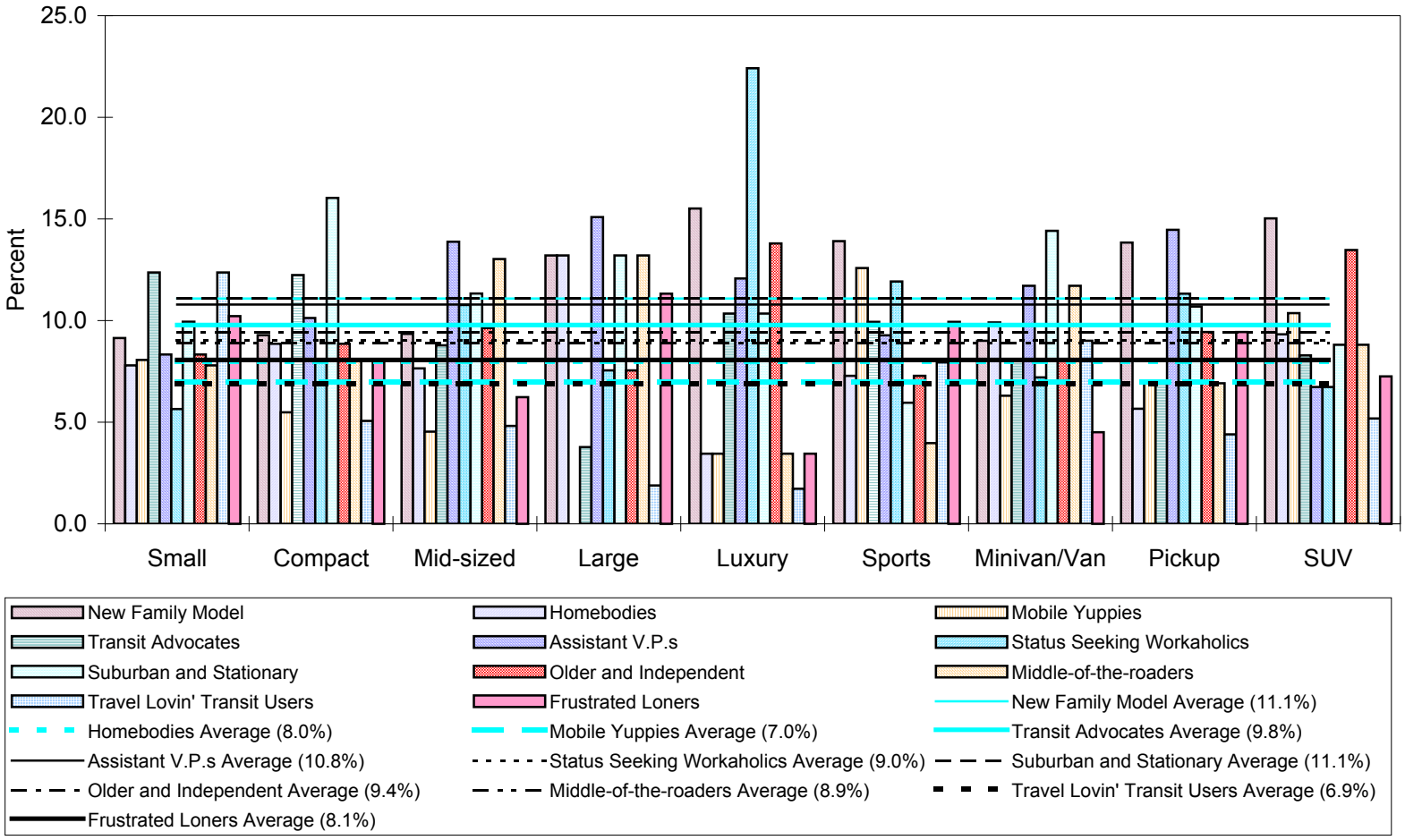


Figure 4.24: Eleven Personality and Lifestyle Clusters by Vehicle Type

4.5 Summary of Key Characteristics for Each Vehicle Type

Table 4.8 summarizes the key characteristics for each vehicle type discussed. We list the factor, mobility, and travel liking variables for which the mean of that vehicle type is significantly different from the mean of one or more other vehicle types at a level of $\alpha = 0.05$ (see bar charts in Part 2 of Appendix 2 for a more detailed illustration). For selected values of each demographic and cluster membership variable, the vehicle types having the two largest proportions are identified (three largest in the case of the two gender categories). Tables A1 and A2 in Appendix 4 provide additional summary information that is incorporated here. All vehicle type groups, except the mid-sized car group, have distinct characteristics with respect to the variables studied. Obviously, the characteristics of travel attitude, personality, and lifestyle for each vehicle type are consistent with those of cluster memberships, showing a higher proportion in the corresponding cluster. The mid-sized car group tends to be "middle-of-the-road" in its characteristics. Also, no significant differences across vehicle types were found with respect to the relative desired mobility, commute time, and commute distance variables. The distinct characteristics for each vehicle category are as follows:

- *Small Car*. Small car drivers tend to have stronger pro-environmental and pro-high density attitudes, and a weaker travel freedom attitude. They tend to be loners, and not workaholics or status seekers. Additionally, small car drivers tend to perceive themselves as traveling less for short-distance trips in a personal vehicle than others do, and are less likely to enjoy personal vehicle travel. In terms of demographic characteristics, the small car driver group has higher than average proportions of North San Francisco residents, females, people age 40 or younger, and people with 4-year college degrees. It also has higher proportions in clerical or professional jobs, and lower incomes. In particular, small car drivers are overrepresented in single-vehicle and single-adult households. As expected, small car drivers have the highest

proportions in the *Transit-using Urbanites*, *Excess Traveler*, *Transit Advocates*, *Travel Lovin' Transit Users*, and *Frustrated Loners* clusters.

- *Compact Car*. Compact car drivers tend to have a weaker travel freedom attitude, and travel less for long-distance trips by personal vehicle. They tend to perceive that they travel less by personal vehicle and overall short-distance. Similar to small car drivers, the compact car driver group has higher proportions in professional jobs and single-vehicle households. In addition, they are overrepresented in middle income categories, and especially in single-adult households. For the clusters, compact car drivers tend to be in the *Affluent Professionals*, *Transit Advocates*, and *Suburban and Stationary* clusters.
- *Mid-sized Car*. Mid-sized car drivers have no distinct travel attitude, personality, lifestyle, mobility, or travel liking characteristics. On demographic traits, we found that mid-sized car drivers are more likely than average to be females or homemakers, and to have higher incomes or larger households. Also, not surprisingly, mid-sized car drivers have higher than average proportions in the *Affluent Professionals*, *Assistant V.P.s*, and *Middle-of-the-roaders* clusters.
- *Large Car*. In contrast to small car drivers, large car drivers tend to have weaker pro-environmental and pro-high density attitudes. They are also more likely to be Concord residents, males, older or retired people, and part-time employees. Interestingly, large car drivers are overrepresented among less educated or lower income people. They are also overrepresented in multi-vehicle or older-adult households. Similar to the attitudinal characteristics, large car drivers tend to be in the *Homemakers and Older Workers*, *Travel Haters*, and *Adventurous, Car-oriented Suburbanites* clusters, and have higher than average proportions in the *Homebodies*, *Assistant V.P.s*, *Middle-of-the-roaders*, and *Frustrated Loners* clusters.
- *Luxury Car*. Luxury car drivers are more likely to be status seekers, and to travel long-distance by airplane a lot. They are more likely to be North San Francisco

residents, males, and older or retired people. In particular, luxury car drivers are overrepresented among highly educated or higher income people. Similar to large car drivers, the luxury car driver group has higher than average proportions in multi-vehicle or older-adult households. For the clusters, luxury car drivers have higher than average proportions in the *Travel Haters*, *Excess Travelers*, *New Family Model*, *Status Seeking Workaholics*, and *Older and Independent* clusters.

- *Sports Car*. Sports car drivers are more likely to be adventure seekers, and less likely to be calm. They are more likely than average to have 4-year college degrees or lower incomes. Additionally, sports car drivers are overrepresented in two-worker or younger-adult households. Clearly, sports car drivers have higher than average proportions in the *Excess Travelers*, *New Family Model*, *Mobile Yuppies*, *Status Seeking Workaholics*, and *Frustrated Loners* clusters.
- *Minivan/Van*. Minivan drivers tend to have a weaker pro-high density attitude. They tend to be calm, and not to be loners. Minivan drivers tend to perceive that they travel more by personal vehicle and overall short-distance than others do. Further, they tend to enjoy traveling by personal vehicle more than average. In terms of demographics, minivan drivers are more likely to be Concord residents, females, homemakers, or age 41-64. They also tend to have higher household incomes as well as lower personal incomes. Clearly, minivan drivers are overrepresented in multi-vehicle households or larger households with children. Minivan drivers are also overrepresented in the *Homemakers and Older Workers* and *Adventurous, Car-oriented Suburbanites* Attitudinal clusters, and have higher than average proportions in the *Homebodies, Suburban and Stationary*, *Middle-of-the-roaders,* and *Travel Lovin' Transit Users* Personality/Lifestyle clusters.
- *Pickup*. Pickup drivers tend to have a weaker pro-high density attitude, and are more likely to be frustrated and workaholic. Their short-distance travel is higher than average, while their long-distance travel by airplane is lower. Likewise, pickup

drivers tend to perceive their long-distance travel by airplane as lower than others do. Demographically, pickup drivers are more likely to be Pleasant Hill residents, males, and age 41-64. They are also overrepresented among lower education levels, full-time employees, service-related jobs, middle incomes, and two-vehicle households. Additionally, pickup drivers have higher than average proportions in the *Homemakers and Older Workers*, *Adventurous, Car-oriented Suburbanites*, *New Family Model*, and *Assistant V.P.s* clusters.

- *SUV*. SUV drivers tend to have a stronger travel freedom attitude, and are less likely to be frustrated. They tend to enjoy short-distance traveling by personal vehicle. Demographically, SUV drivers are more likely to be Pleasant Hill residents and age 40 or younger. They are also overrepresented among highly educated or higher income people. Similar to minivan drivers, the SUV driver group has a higher than average proportion in larger households with children. Further, SUV drivers have higher than average proportions in the *Adventurous, Car-oriented Suburbanites*, *New Family Model*, *Mobile Yuppies*, and *Older and Independent* clusters.

Table 4.9: Summary of Key Characteristics Associated with Each Vehicle Type

Vehicle Type	Travel Attitudes	Personality	Lifestyle	Objective Mobility		Perceived Mobility		Relative Desired Mobility		Travel Liking	
				SD	LD	SD	LD	SD	LD	SD	LD
Small	Pro-environmental (H), Pro-high density (H), Travel freedom (L)	Loner (H)	Workaholic (L), Status seeking (L)			PV (L)				PV (L)	PV (L)
Compact	Travel freedom (L)					PV (L), Overall (L)	PV (L)				
Mid-sized											
Large	Pro-environmental (L), Pro-high density (L)										
Luxury			Status seeking (H)		Airplane trips (H), Ln Air (H)						
Sports		Adventure seeker (H), Calm (L)									
Minivan/ Van	Pro-high density (L)	Loner (L), Calm (H)				PV (H), Overall (H)	PV (H)			PV (H)	PV (H)
Pickup	Pro-high density (L)		Frustrated (H), Workaholic (H)	PV (H), Total (H)	Airplane trips (L) Ln Air (L)		Airplane trips (L)				
SUV	Travel freedom (H)		Frustrated (L)							PV (H)	

Notes:
The 'L' and 'H' in parentheses refer to mean values that are substantially lower or higher, respectively, than the overall sample mean.
PV = personal vehicle trips, Ln PV (Air) = the sum across trips of the natural log of the personal vehicle (airplane) miles traveled of each trip.

(Table 4.9 continued)

Vehicle Type	Neighborhood	Gender	Age	Education	Employment Status	Occupation	Personal Income	Household Income
Small	NSF (2)	Female (1)	40 or younger (1)	4-year college (1)		Clerical* (1), Professional* (2)	$15,000-$34,999 (1), $35,000-$54,999 (1),	< $35,000 (1), $35,000-$54,999 (2)
Compact						Professional* (1)	$55,000-$74,999 (2)	$55,000-$74,999 (1)
Mid-sized		Female (2)				Homemaker (2)	$75,000-$94,999 (2)	
Large	Concord (1)	Male (2)	65 or older (1)	High school (1)	Part-time (1), Retired (1)	Sales (1), Manager* (1), Clerical* (2)	< $15,000 (2)	< $35,000 (2), $55,000-$74,999 (2)
Luxury	NSF (1)	Male (3)	65 or older (2)	Some graduate school (1), Graduate degree (1)	Part-time (2), Unemployed (2), Retired (2)	Sales (2), Manager* (2)	$55,000-$74,999 (1), $95,000 or more (1)	$95,000 or more (1)
Sports				4-year college (2), Some graduate school (2)			$15,000-$34,999 (2)	
Minivan/ Van	Concord (2)	Female (3)	41-64 (2)	Some college (2)	Unemployed (1)	Homemaker (1) Service* (2)	< $15,000 (1)	$75,000-$94,999 (1)
Pickup	Pleasant Hill (1)	Male (1)	41-64 (1)	High school (2), Some college (1)	Full-time (1)	Service* (1)	$35,000-$54,999 (2)	$35,000-$54,999 (1)
SUV	Pleasant Hill (2)		40 or younger (2)	Graduate degree (2)	Full-time (2)		$75,000-$94,999 (1), $95,000 or more (2)	$75,000-$94,999 (2), $95,000 or more (2)

Notes:
The number in parentheses indicates the rank of that vehicle type in terms of proportion of that group having the characteristic in question. For example, luxury car drivers had the highest proportion of NSF residents of any of the vehicle types, and small car drivers had the second highest proportion.
* Service = service/production/construction, Manager = manager/administrator, Clerical = clerical/administrative support, Professional = professional/technical.

(Table 4.9 continued)

Vehicle Type	No. of Vehicles	No. of Driver's Licenses	No. of Workers	No. of HH Members	No. of HH Members < age 19	No. of HH Members 19-40	No. of HH Members 41-64	No. of HH Members > age 64	Commute Time	Commute Distance
Small	One (2)	One (2)	One (1)	One (1)		One (1), Two (2)	None (1)			
Compact	One (1)	One (1), Four or more (2)	One (2), Three or more (2)	One (2)		One (2), Three or more (1)	One (1)			
Mid-sized				Four (2)						
Large	Three (1)	Two (2)	None (1)	Two (1)	None (1)	None (1)	None (2)	One (2), Two or more (1)		
Luxury	Three (2), Four or more (1)	Three (1)	None (2)	Three (1)	One (2)	None (2)	Two or more (2)	One (1), Two or more (2)		
Sports			Two (2)	Two (2)	None (2)	Three or more (2)		None (2)		
Minivan/ Van	Two (1), Four or more (2)	Three (2), Four or more (1)	Three or more (1)	Four (1), Five or more (1)	One (1), Two or more (1)		Two or more (1)			
Pickup	Two (2)			Three (2)			One (2)			
SUV		Two (2)	Two (1)	Five or more (2)	Two or more (2)	Two (1)		None (1)		

Note: The number in parentheses indicates the rank of that vehicle type in terms of proportion of that group having the characteristic in question. For example, compact car drivers had the highest proportion of single-vehicle households of any of the vehicle types, and small car drivers had the second highest proportion.

(Table 4.9 continued)

Vehicle Type	Attitudinal Clusters	Personality and Lifestyle Clusters
Small	Transit-using Urbanites (H), Excess Travelers (H)	Transit Advocates (H), Travel Lovin' Transit Users (H), Frustrated Loners (H)
Compact	Affluent Professionals (H)	Transit Advocates (H), Suburban and Stationary (H)
Mid-sized	Affluent Professionals (H)	Assistant V.P.s (H), Middle-of-the-roaders (H)
Large	Homemakers and Older Workers (H), Travel Haters (H), Adventurous, Car-oriented Suburbanites (H)	Homebodies (H), Assistant V.P.s (H), Middle-of-the-roaders (H), Frustrated Loners (H)
Luxury	Travel Haters (H), Excess Travelers (H)	New Family Model (H), Status Seeking Workaholics (H), Older and Independent (H)
Sports	Excess Travelers (H)	New Family Model (H), Mobile Yuppies (H), Status Seeking Workaholics (H), Frustrated Loners (H)
Minivan/ Van	Homemakers and Older Workers (H), Adventurous, Car-oriented Suburbanites (H)	Homebodies (H), Suburban and Stationary (H), Middle-of-the-roaders (H), Travel Lovin' Transit Users (H)
Pickup	Homemakers and Older Workers (H), Adventurous, Car-oriented Suburbanites (H)	New Family Model (H), Assistant V.P.s (H)
SUV	Adventurous, Car-oriented Suburbanites (H)	New Family Model (H), Mobile Yuppies (H), Older and Independent (H)

Note: The 'H' in parentheses refers to a proportion that is substantially higher than the overall sample proportion of that cluster membership.

CHAPTER 5. MODELING VEHICLE TYPE CHOICE

In Chapter 4, we explored whether the explanatory variables individually are statistically different among vehicle type groups. In reality, however, the relationship of one variable to vehicle type can be affected by other variables. The relationship of one variable to vehicle type may be significant in isolation, but disappear or diminish in importance when the impact of a related variable is accounted for. Conversely, an insignificant pairwise relationship may become significant in the presence of other variables. Thus, in this chapter, we examine the combined impact of multiple variables together. Specifically, we develop a disaggregate discrete choice model to estimate the probability of choosing each vehicle type based on the collective effect of factors such as travel attitude, personality, lifestyle, travel liking, and demographic variables. The first section describes the model specification including an initial specification and modeling procedure, and the second section presents the estimation and interpretation of the final model. In the last section, we discuss the independence from irrelevant alternatives (IIA) property of the final model.

5.1 Model Specification

The dependent variable, vehicle type driven most often by the respondent, consists of nine mutually exclusive categories, so a multinomial logit model is developed for vehicle type choice. In a general multinomial discrete choice model, the utility of each discrete alternative to the individual is expressed as a linear-in-parameters function of explanatory variables plus the combined effect of all unobserved variables, and the individual is assumed to select the alternative with the highest utility. Since a portion of utility is unobserved, to the analyst the choice of a particular alternative is probabilistic rather than deterministic. Expressions for the probability of choosing a given alternative can be developed, and estimates of the coefficients of the observed explanatory variables are

chosen so as to maximize the joint probability across the sample of observing the choices that are actually made.

All variables discussed in Chapter 3 are considered as explanatory variables in the initial model specification, even though some variables were not significantly different across vehicle type groups based on the individual analysis using ANOVA and chi-squared tests. Table 5.1 presents the initial model specification including 54 variables, plus alternative-specific constant (ASC) terms. These 54 variables comprise travel attitudes, personality, lifestyle, travel liking, and demographic traits. Since none of the explanatory variables change by alternative, if they were entered into the model directly (i.e. with a constant coefficient across all vehicle types), they could not distinguish the choice among the various vehicle types. Thus, each variable must be allowed to take on a different weight for at least one subset of the alternatives. It is customary (for simplicity of estimation and presentation) to take one alternative as the base, and set its coefficient for each variable equal to zero.

For the remaining alternatives, the coefficients for each variable may either be different for each alternative, or may be constrained to be equal across two or more alternatives. In this analysis, we initially allowed the coefficients for each variable to differ for each vehicle type. Thus, initially each explanatory variable (such as the travel freedom factor score) was entered into the model as eight alternative-specific variables (ASVs), one for each non-base vehicle type. Therefore, the initial model specification contained $55 \times 8 = 440$ variables, including the ASCs. When initial estimations suggested that some variables had a similar impact on more than one vehicle type, we then constrained those coefficients to be equal for the sake of parsimony and to increase the degrees of freedom available in the sample. We chose the pickup truck alternative as the base alternative in the model, in view of its relatively distinct characteristics against most other vehicle types.

Table 5.1: Initial Model Specification

Classification	Explanatory Variables
Travel Attitudes	Travel dislike, Pro-environmental solution, Commute benefit, Travel freedom, Travel stress, Pro-high density
Personality	Adventure seeker, Organizer, Loner, Calm
Lifestyle	Frustrated, Family/Community oriented, Workaholic, Status seeking
Objective Mobility	Overall trips (SD), Personal vehicle trips (SD), Personal vehicle trips (LD), Airplane trips (LD), Sum of log-miles by personal vehicle (LD), Sum of log-miles by airplane (LD)
Perceived Mobility	Overall travel (SD), Personal vehicle travel (SD), Overall travel (SD), Personal vehicle travel (LD), Airplane travel (LD)
Relative Desired Mobility	Overall travel (SD), Personal vehicle travel (SD), Overall travel (SD), Personal vehicle travel (LD), Airplane travel (LD)
Travel Liking	Overall travel (SD), Personal vehicle travel (SD), Overall travel (SD), Personal vehicle travel (LD), Airplane travel (LD)
Demographics	Urban neighborhood[d], Female[d], Age, Education, Manager[d], Sales[d], Employment[d], Household income, Personal income, No. of vehicles, No. of licensed drivers, No. of workers, Household size, No. of HH members < 19, No. of HH members 19-40, No. of HH members 41-64, No. of HH members > 64, Commute time, Commute distance

Notes:
"SD" and "LD" stand for short-distance and long-distance trips, respectively.
"Sum of log-miles by personal vehicle" means the sum across trips of the natural log of the miles traveled for each trip by personal vehicle, and similarly for airplane.
"d" indicates a dummy variable.
"Urban neighborhood" = 1 for North San Francisco residents, and 0 otherwise.
"Female" = 1 for female, and 0 for male.
"Manager" = 1 for manager, and 0 otherwise.
"Sales" = 1 for sales, and 0 otherwise.
"Employment" = 1 for full- or part-time job, and 0 otherwise.

Based on the initial model specification, we identify which variables have significant effects on vehicle type choice. However, we are unable to test including all 440 variables simultaneously, because the statistical package used to estimate the model, LIMDEP, allows at most 200 variables. Instead, we first test models with subsets of variables from the initial specification, overlapping some classes of variables across the models. Variables significant in any of these preliminary models were retained for further analysis. In this way, nearly 100 variables were selected for an intermediate model specification. Next, starting with the

intermediate model specification, statistically insignificant variables were eliminated, and then variations on the remaining specification were tested to obtain a final model having all significant explanatory variables (possibly excepting the ASCs, which should be included for technical reasons even if they are not significant, Manski and Lerman, 1977; Cosslett, 1981). Figure 5.1 shows the model estimation procedure.

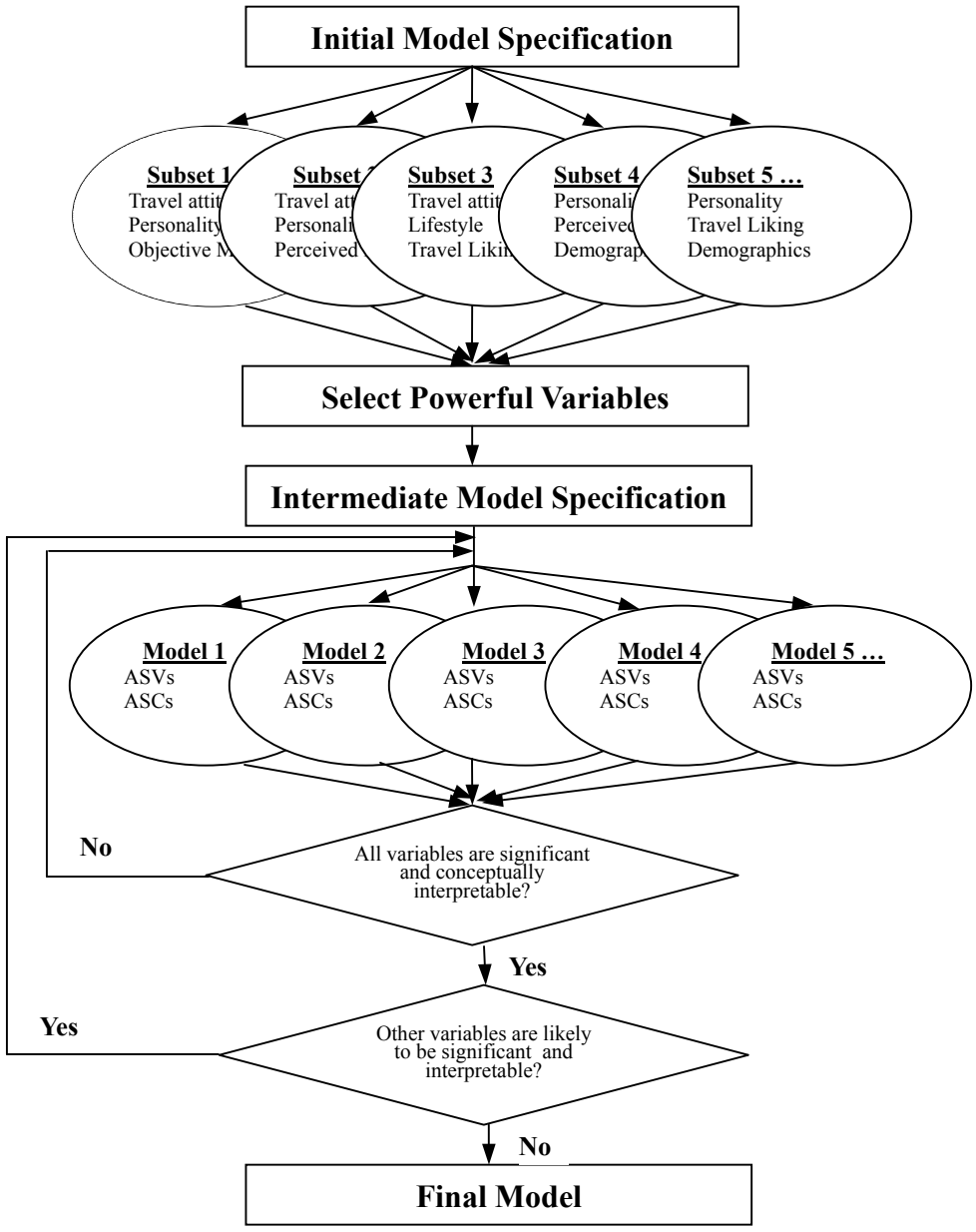


Figure 5.1: Model Estimation Procedure

5.2 Model Estimation

Through the model estimation procedure discussed in Section 5.1, the final model with eight ASCs and 40 ASVs, representing 22 different variables, was achieved. As shown in Table 5.2, all explanatory variables were statistically significant and conceptually interpretable. Additionally, as a goodness-of-fit test statistic, the χ^2 value of 1,225.2 shows that the final model significantly differs from the equally likely model (in which all coefficients are equal to zero) at $\alpha << 0.005$.

The ρ^2 value of the final model is 0.177, indicating that the model explains 17.7% of the information in the data. Compared to the ρ^2 value of 0.108 for the market share model (the model containing only constant terms), the final model explains substantially more information, and the χ^2 value of 688.5 indicates there is a significant difference between the two models at $\alpha << 0.005$. Further, the ρ^2 value of 0.177 of the final model falls within the range of other models found in the literature, such as a ρ^2 of 0.126 found in Lave and Train (1979) and 0.249 in Kitamura, *et al*. (2000)[7].

[7] As discussed in Chapter 2, both of these models have multinomial logit structures and their dependent variables are vehicle type categories (not makes/models), similar to our final model.

Table 5.2: Final Multinomial Logit Model for Vehicle Type Choice (Base Alternative = Pickup)

Explanatory Variables	Small	Compact	Mid-sized	Large	Luxury	Sports	Minivan/Van	SUV
Travel Attitudes								
Travel Dislike					0.461 (2.74)			
Pro-high Density	0.491 (6.11)	0.491 (6.11)	0.491 (6.11)		0.694 (5.62)			0.694 (5.62)
Personality								
Organizer			0.181 (2.22)					
Calm							0.333 (2.45)	
Lifestyle								
Frustrated					-0.507 (-2.25)			-0.238 (-2.26)
Workaholic	-0.222 (-2.43)					-0.425 (-3.22)		
Status Seeking					0.756 (4.12)	0.445 (3.81)		
Objective Mobility								
Sum of log-miles by airplane for LD					0.004 (2.85)			
Perceived Mobility								
Overall SD						0.208 (2.28)		
Overall LD		-0.182 (-2.35)						
Personal Vehicle for LD						-0.221 (-2.90)		
Travel Liking								
Personal Vehicle for SD	-0.151 (-2.00)							

Note: The number in parentheses indicates the t-value of that coefficient (at a level of α=0.05 a critical t-value = 1.96).

(Table 5.2 continued)

Explanatory Variables	Small	Compact	Mid-sized	Large	Luxury	Sports	Minivan/Van	SUV
Demographics								
Age	-0.324 (-3.31)					-0.367 (-2.64)		-0.582 (-4.51)
Education	0.258 (3.65)	0.364 (5.09)	0.258 (3.65)		0.364 (5.09)	0.364 (5.09)	0.258 (3.65)	0.364 (5.09)
Household Income			0.203 (4.09)		0.449 (3.49)			0.292 (4.59)
Personal Income	-0.169 (-3.37)							
No. of People < 19			0.240 (2.98)				0.904 (9.44)	
No. of People > 64			0.350 (2.74)	0.901 (5.07)	0.830 (3.54)			
Female (dummy)	2.419 (9.03)	2.176 (8.20)	2.419 (9.03)	2.176 (8.20)	2.703 (6.70)	2.176 (8.20)	2.176 (8.20)	2.176 (8.20)
Urban (dummy)	0.667 (4.81)				0.826 (2.48)			
Employed (dummy)			-0.579 (-3.03)		-0.989 (-2.42)		-0.799 (-3.16)	
Sales (dummy)			0.621 (3.01)		0.978 (2.27)			
Constants	0.697 (1.40)	-1.127 (-3.06)	-1.582 (-4.19)	-2.278 (-10.46)	-5.931 (-7.42)	-1.273 (-2.03)	-2.113 (-5.82)	-1.674 (-3.10)
No. of Observations					1571			
Log-likelihood at 0					-3451.8			
Log-likelihood at Market Share					-3183.5			
Log-likelihood at Convergence					-2839.2			
ρ_o^2 **(Adjusted** ρ_o^2 **)**					0.177 (0.174)			
ρ_c^2 **(Adjusted** ρ_c^2 **)**					0.108 (0.105)			
χ_o^2					1225.2			
χ_c^2					688.5			

Note: The number in parentheses indicates the t-value of that coefficient (at a level of α=0.05 a critical t-value = 1.96).

Turning to the explanatory variables in the final model, the model has results similar to those of the individual tests discussed in the previous chapter. One difference from the previous results is that two travel attitude and personality variables are significant for mid-sized cars. Some demographic variables are significant for many vehicle type alternatives, which is natural considering that the base alternative is the distinctive pickup vehicle type. We first describe the results for each explanatory variable (discussion by row), focusing on its sign and magnitude for a specific vehicle type alternative. Then, we analyze some key significant variables by vehicle type (discussion by column), to develop a profile of typical drivers of each kind of vehicle.

Two travel attitude factors, travel dislike and pro-high density, are significant in the model. As we hypothesized that those who dislike travel are more likely to seek more comfortable cars to minimize travel fatigue, the travel dislike attitude factor has a positive sign for luxury cars. That is, those who have a stronger dislike for travel are more likely to drive luxury cars, perhaps to ameliorate the unpleasantness of travel. Interestingly, the pro-high density attitude factor has a positive sign both for smaller cars (small, compact, and mid-sized cars) and for expensive cars (luxury cars and SUVs), with the larger magnitude occurring for the second category. Those who have a stronger pro-high density attitude (who tend to live in the urban neighborhood of North San Francisco) are more likely to drive smaller cars due to their greater maneuverability in tight traffic and parking situations. On the other hand, in our sample those who have a stronger pro-high density attitude are also likely to have higher incomes, so they tend to drive expensive cars.

Two of the personality factors, organizer and calm, turn out to be significant in the model. Interestingly, the organizer personality factor is significant (and positive) only for mid-sized cars. Organizers (who like to be in charge) may be more likely to be mid-level manager types, and hence to drive moderate cars rather than smaller, larger or specialty cars. The calm personality factor is significant (and positive) only for minivans. That is, calmer

people are more likely to drive minivans, suggesting the settled status and maturity of parenthood.

All lifestyle factors except family/community oriented are significant in the model. Not surprisingly, the frustrated lifestyle factor has a negative sign for luxury cars and SUVs, although not driving an expensive car is more likely an indicator of being frustrated for other reasons (or a contributory cause of being frustrated), than a direct consequence of being frustrated. The workaholic lifestyle factor has a negative sign for small and sports cars, perhaps because workaholics are likely to be career-oriented with potentially higher incomes. Additionally, the status seeking lifestyle factor has a positive sign for luxury and sports cars, as status seekers are likely to think of their cars as a status symbol.

The model also contains four mobility variables and one travel liking variable. For objective mobility, the sum of the natural log of the miles traveled by airplane for long-distance trips has a positive sign for luxury cars, with both variables being likely consequences of high incomes rather than representing direct causality. For perceived mobility, an interesting contrast between short and long distance appears. Those who think they travel a lot for short distance overall are more likely to drive sports cars, whereas those who think they travel a lot by personal vehicle for long distance are less likely to drive sports cars. Similarly, those who think they travel long distance a lot overall are less likely to drive compact cars. The implication is that compact and sports cars are desirable for traveling around town, but less comfortable or practical for long trips. The result for compact cars may also represent an income effect. Those who like traveling by personal vehicle for short distance are less likely to drive a small car. Again, the direction of causality is ambiguous: those who like traveling by car may be more motivated to invest more money in a vehicle, but the degree of liking for travel by car may be somewhat influenced by the degree of comfort and amenities offered by one's current vehicle.

Ten demographic characteristics turn out to be significant in the model, in logical ways. The sign and magnitude of each variable are similar to the results of the individual tests. The respondent's age is negatively associated with driving small or sports cars, and SUVs, as expected. Education has a positive sign for all vehicle type categories except large cars, indicating that drivers of pickups (the base category) and large cars tend to be less-educated than drivers of the other vehicle types. The household income variable has a positive sign for expensive cars such as luxury cars and SUVs, while the personal income variable has a negative sign for small cars. The number of people in the household under age 19 has a positive sign and highest magnitude for minivans, with a smaller positive coefficient for mid-sized cars. On the other hand, the number of people age 65 or older has a positive sign for larger cars such as large and luxury cars. Similar to education, the female variable has a positive sign for all vehicle type categories. That is, all else equal, females are less likely to drive pickups (the base alternative) than any other vehicle type. As expected, the urban neighborhood variable has a positive sign for small and luxury cars. The employed variable has a negative sign for mid-sized or luxury cars, and minivans. This indicates that unemployed people such as homemakers and retired people may tend to drive family vehicles or bigger and more comfortable cars. The sales variable has a positive sign for mid-sized and luxury cars, indicating the need for a comfortable vehicle in an occupation often involving a lot of travel. The coefficient for luxury cars has the higher magnitude of the two, suggestive of the need to appear successful in a sales occupation.

Additionally, the negative signs on all the alternative-specific constants except the one for small cars (which is not significant) show that the average impact of all *unmeasured* variables is to reduce the probability of choosing that vehicle type alternative. Especially, the alternative-specific constant for luxury cars has a much higher magnitude than those for other vehicle type alternatives, suggesting that the choice of luxury cars is least well-explained by the available variables.

Focusing now on each vehicle type (discussion by column), those who have a stronger pro-high density attitude are more likely to drive small cars, while those who are workaholics or do not enjoy personal vehicle travel for short distance are less likely to choose small cars. Additionally, those who have a stronger pro-high density attitude are more likely to drive compact cars, while those who perceive that they have a lot of overall long-distance travel are less likely to do so. Interestingly, those who have a stronger pro-high density attitude or tend to be organizers are more likely to drive mid-sized cars. Those who have higher household incomes are also more likely to choose mid-sized cars, but are even more likely to drive luxury cars and SUVs.

In contrast to the individual tests, no travel attitude, personality, lifestyle, mobility, or travel liking characteristics are significant to choosing large cars. On the other hand, those who have stronger travel dislike and pro-high density attitudes, tend to be status seeking, or not frustrated, are more likely to drive luxury cars. With respect to the mobility variables, those who travel long-distance by airplane a lot also tend to drive luxury cars.

Looking at sports cars and SUVs, those who tend to be status seekers, not workaholics, or younger are more likely to drive sports cars. Particularly, those who perceive their overall short-distance travel to be a lot but their long-distance personal vehicle travel to be lower are more likely to drive sports cars. Those who have a stronger pro-high density attitude are more likely to drive SUVs, whereas those who are frustrated are less likely to drive SUVs. Conversely, those who tend to be calm are more likely to drive minivans.

5.3 Independence from Irrelevant Alternatives (IIA) Tests

A central condition for the multinomial logit (MNL) model form to be valid is the Independence from Irrelevant Alternatives (IIA) assumption, which states that the relative odds of choosing one alternative over another should not differ with the presence or absence of other alternatives in the choice set. If this assumption is violated, MNL is not the appropriate model structure and an alternative structure or specification must be sought.

IIA will be violated when observed explanatory variables are correlated with unobserved ones, or when the unobserved variables for one alternative are correlated with those of another alternative. Since several of our vehicle types could be considered similar, it is quite possible that IIA is violated in this context. On the other hand, IIA holding or not is a property of the model specification, not of the choice context per se, and it is possible within the same choice context to remedy a violation of IIA by improving the model specification (thereby moving variables from "unobserved" to "observed", and reducing the opportunity for correlations involving the fewer remaining unobserved variables). In particular, one common way to try to remedy an IIA violation is to make a generic variable (i.e. one having the same coefficient across all alternatives) alternative-specific (allowing the coefficient to differ across alternatives). This transfers the alternative-specific contribution of that variable to utility from being unobserved to being observed. In our case, since all of our explanatory variables are of necessity alternative-specific from the outset, it is possible that our specification will not violate IIA. We still must test for that condition, however. In this section, we test whether or not the final model violates the independence from irrelevant alternatives (IIA) property for a multinomial logit model.

We first attempted to conduct the Hausman-McFadden test[8] (Hausman and McFadden, 1984) of IIA for various subsets of the model within the LIMDEP software estimation package. However, none of the tests could be completed since the V(r) – V(f) matrix was not positive definite[9]. Thus, we conduct another set of tests for IIA, by comparing the MNL

[8] The test statistic is $[\beta(r)-\beta(f)]' [V(r)-V(f)]^{-1} [\beta(r)-\beta(f)]$, where β is an estimated coefficient vector, V is the estimated variance-covariance matrix of β, r stands for a restricted model, and f stands for a full model. This statistic has the chi-squared distribution, with degrees of freedom equal to the number of linearly independent restrictions needed to obtain the restricted model from the full one. The restrictions involve estimating the model on only a subset of the alternatives; if IIA holds the restricted model should be similar to the full one, and the test statistic should be small. A large test statistic requires rejection of the null hypothesis that IIA holds.

[9] The literature (Small and Hsaio, 1985) points out that if IIA holds, V(r) and V(f) will of necessity be similar to each other, and so their difference will be "close to zero" in a matrix sense, rendering the V(r) – V(f) matrix impossible to invert as required to calculate the test statistic. Thus, the numerical difficulties encountered in executing the test are common. They in fact suggest that IIA *does* hold, but cannot be taken as definitive in this regard, since there may be other reasons for the observed result. For example, after excluding one or more alternatives from the choice set, some explanatory variables may be collinear or nearly so.

model structure to the more general nested logit (NL) model that does not require IIA to hold. Conceptually, the NL model groups alternatives hypothesized to be similar into the same nest, and then the discrete choice consists of the joint choice of nest and alternative within nest (this is purely a mathematical structure and does not necessarily imply a temporal sequence or conceptual clustering on the part of the respondent). If the so-called "inclusive value (IV) parameters" of the NL model are not significantly different from one, then the NL model is equivalent to the MNL model and IIA can be assumed to hold (Hausman and McFadden, 1984). On the other hand, if any of the IV parameters are significantly less than one (they must lie between 0 and 1 for the model to be theoretically consistent), then the NL model is significantly better than the MNL model and can be used to remedy the IIA violation of MNL.

To test the IIA property using NL models, we first established 17 conceptual nested structure models with two or three levels based on vehicle size (e.g., grouping small and compact or compact and mid-sized into one nest) and vehicle specialty (e.g., grouping sports, minivan/van, pickup, and SUV or sports and SUV into one nest). Figure 5.2 illustrates the nested structures that we tested.

Then, we ran the 17 NL models with the same model specification as the final MNL model, using the LIMDEP software estimation package. For each of these 17 NL structures, we also estimated another model specification (with eight ASCs and 53 ASVs), where all explanatory variables were the same as for the final model but all previously combined ASVs were separated again, constructing a complete ASV specification. Koppelman and Wen (1998) have established that, in general, the NL model used in commercial software packages such as LIMDEP, called the nonnormalized nested logit model (NNNL), needs to be corrected to be consistent with utility maximization[10]. In our case, however, the NL models do not need to be corrected for estimation because the NNNL model is equivalent to

[10] The latest version, LIMDEP 8.0/NLOGIT 3.0, permits straightforward estimation of either the nonnormalized nested logit model (NNNL) or utility maximizing nested logit (UMNL) models.

the utility maximizing nested logit (UMNL) model when it has a fully alternative-specific specification, i.e. all ASVs (Daly, 2001; Koppelman, *et al*., 2001).

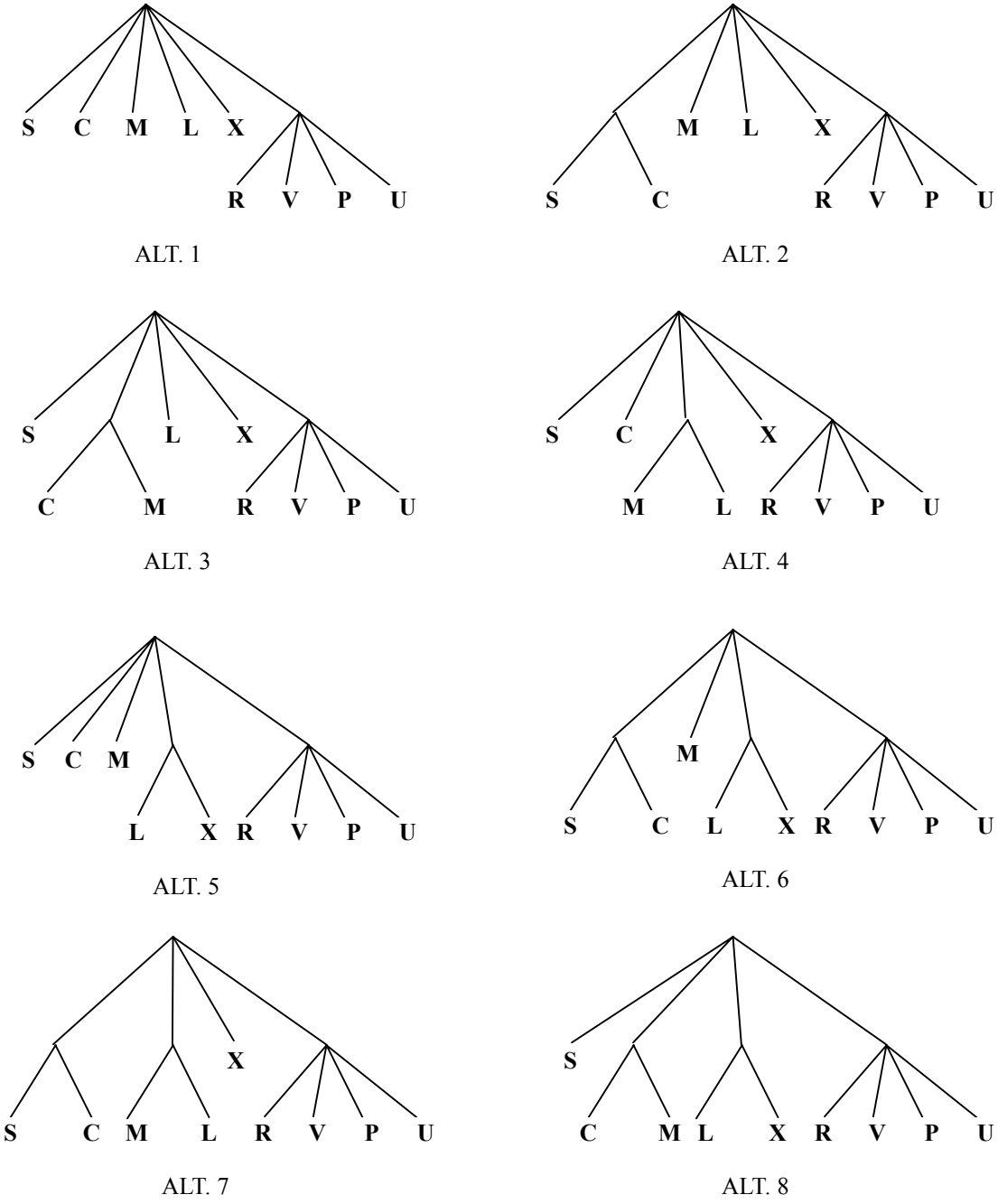
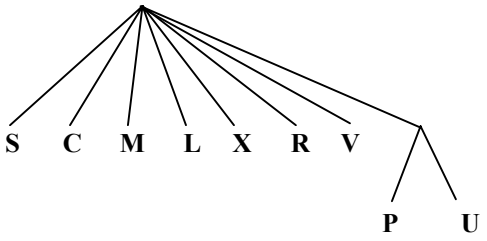


Figure 5.2: Nested Logit Model Alternatives Tested

Note: S stands for small, C stands for compact, M stands for mid-sized, L stands for large, X stands for luxury, R stands for sports, V stands for minivan/van, P stands for pickup, and U stands for SUV.

(Figure 5.2 continued)



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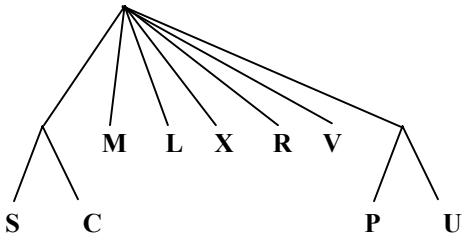

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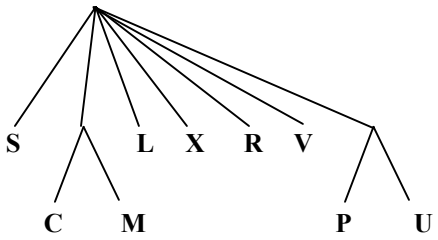

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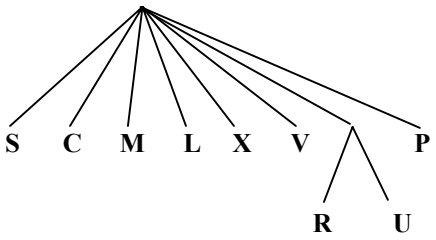

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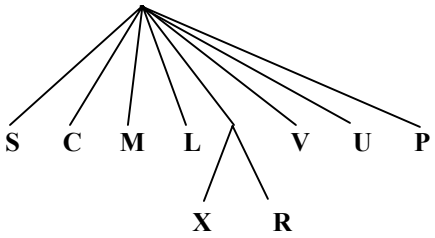

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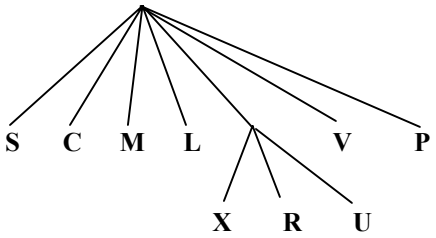

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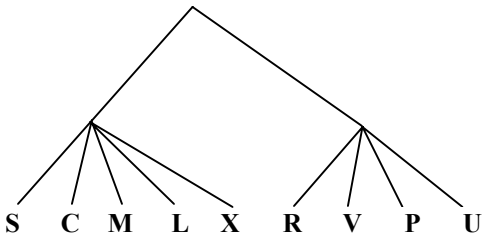

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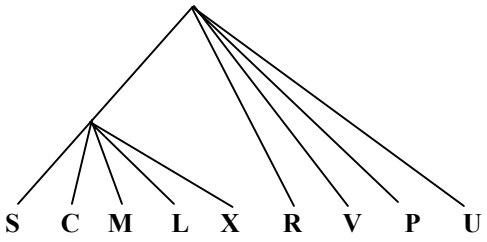

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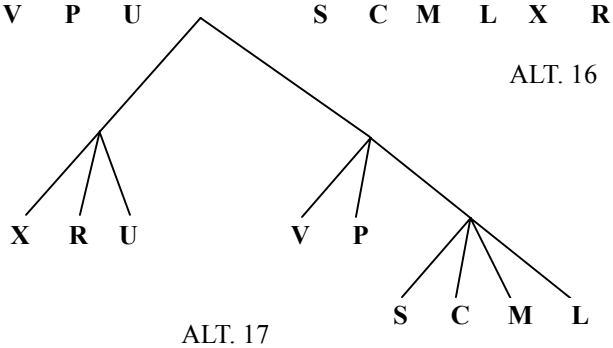

ALT. 17

Table 5.3 presents the test results for the nested structures. For the former (final MNL) model specification, all NL models except two have IV parameters statistically equal to one, indicating that IIA holds. The remaining two NL models have IV parameters significantly greater than one, violating the conditions of utility maximization and requiring that the models be discarded. For the latter (complete ASV) specification, eight NL models have IV parameters equal to one, and the others have IV parameters greater than one. On the other hand, looking at the ρ^2 values, some nested logit models have a higher ρ^2 value than the 0.177 of the final model, but they have IV parameters equal to one or greater than one. Thus, the IIA test results for the NL models strongly suggest that no NL models are superior to the final MNL model. That is, the IIA property of the final model holds. Despite conceptual similarities among the nine vehicle types modeled, this is not necessarily surprising considering the fact that all of our explanatory variables are ASVs, and allowing a variable to be alternative-specific is recommended as one potential solution to IIA violations of a multinomial logit model (McFadden, *et al*., 1977; Ben-Akiva and Lerman, 1985).

Table 5.3: Summary of Nested Logit Models (N = 1571)

NL model	Log-likelihood at Convergence	ρ^2	Inclusive Value (IV) Test (Ho : all IV parameters are equal to one)
ALT. 1	-2839 (-2836)	0.215 (0.215)	Accept Ho (Accept Ho)
ALT. 2	-2838 (-2833)	0.237 (0.238)	Accept Ho (Reject Ho, but greater than one)
ALT. 3	-2839 (-2836)	0.235 (0.236)	Accept Ho (Reject Ho, but greater than one)
ALT. 4	-2839 (-2833)	0.209 (0.211)	Accept Ho (Reject Ho, but greater than one)
ALT. 5	-2839 (-2834)	0.165 (0.166)	Accept Ho (Reject Ho, but greater than one)
ALT. 6	-2838 (-2831)	0.175 (0.177)	Accept Ho (Reject Ho, but greater than one)
ALT. 7	-2833 (-2830)	0.220 (0.220)	Reject Ho, but greater than one (Reject Ho, but greater than one)
ALT. 8	-2839 (-2833)	0.172 (0.174)	Accept Ho (Reject Ho, but greater than one)
ALT. 9	-2839 (-2838)	0.188 (0.189)	Accept Ho (Accept Ho)
ALT. 10	-2839 (-2835)	0.228 (0.229)	Accept Ho (Accept Ho)
ALT. 11	-2839 (-2838)	0.226 (0.227)	Accept Ho (Accept Ho)
ALT. 12	-2839 (-2835)	0.186 (0.187)	Accept Ho (Accept Ho)
ALT. 13	-2839 (-2838)	0.165 (0.165)	Accept Ho (Accept Ho)
ALT. 14	-2838 (-2835)	0.181 (0.182)	Accept Ho (Reject Ho, but greater than one)
ALT. 15	-2836 (-2833)	0.187 (0.188)	Reject Ho, but greater than one (Reject Ho, but greater than one)
ALT. 16	-2839 (-2838)	0.312 (0.313)	Accept Ho (Accept Ho)
ALT. 17	-2839 (-2838)	0.311 (0.311)	Accept Ho (Accept Ho)

Notes:
Numbers in parentheses come from the model having all individual alternative-specific variables.
When the NL models were estimated, IV parameters of any branches having only one choice were fixed at 1.0 for identification purposes. In fact, most NL models could not be estimated when IV parameters of those branches were not restricted.

CHAPTER 6. CONCLUSIONS

Differing from the traditional vehicle type choice models previously developed by economists and market researchers, this study identified travel attitude, personality, lifestyle, and mobility factors that affect individuals' vehicle type choices (the type the respondent drives most often), using data from a 1998 mail-out/mail-back survey of 1,904 residents in three neighborhoods in the San Francisco Bay Area. Here, similar to the *Consumer Reports* classification scheme, vehicle type was classified into nine categories based on make, model, and vintage of a vehicle: small, compact, mid-sized, large, luxury, sports, minivan/van, pickup, and sport utility vehicle (SUV).

We first conducted ANOVA and chi-squared tests to identify whether the explanatory variables, plus two (attitudinal and personality/lifestyle) cluster membership variables created in previous work, individually are statistically different among groups classified by vehicle type. The Bonferroni multiple comparisons test was additionally conducted for the variables that had statistical differences among vehicle type groups based on the ANOVA test, to identify which categories are significantly different from other categories. All vehicle type groups, except the mid-sized car group, have distinct characteristics with respect to travel attitude, personality, lifestyle, mobility, and demographic variables. The characteristics of travel attitude, personality, and lifestyle for each vehicle type are consistent with those of cluster memberships, showing a higher proportion of a given vehicle type in the corresponding cluster. The mid-sized car group tends to be "middle-of-the-road" in its characteristics. Also, no significant differences across vehicle types were found with respect to the relative desired mobility, commute time, and commute distance variables.

Furthermore, we developed a disaggregate discrete choice model (specifically, a multinomial logit model) for vehicle type choice to estimate the joint effect of the key variables on the probability of choosing each vehicle type. The final model (with the pickup

vehicle type as base) includes 40 significant alternative-specific variables representing travel attitude, personality, lifestyle, mobility factors, and demographic variables together with the eight alternative-specific constants. We also examined whether the independence from irrelevant alternatives (IIA) assumption of the final model specification is violated or not by using two tests for IIA: the Hausman-McFadden and nested logit structure tests. The former test could not be completed due to the singularity of the V(r) – V(f) matrix (a common occurrence), while the latter test strongly indicates that the IIA property of the final model holds. Despite conceptual similarities among the nine vehicle types modeled, this is not necessarily surprising considering the fact that alternative-specific variables are generally recommended as one solution to IIA violations of a multinomial logit model.

The key results of the model are as follows:

- Those who have a stronger pro-high density attitude are more likely to drive *small* cars, while those who are workaholics or do not enjoy personal vehicle travel for short distance are less likely to choose *small* cars. Additionally, those who have a stronger pro-high density attitude are more likely to drive *compact* cars, while those who perceive that they have a lot of overall long-distance travel are less likely to do so. Interestingly, those who have a stronger pro-high density attitude or tend to be organizers are more likely to drive *mid-sized* cars. Those who have higher household incomes are also more likely to choose *mid-sized* cars, but are even more likely to drive *luxury* cars and *SUVs*.

- No travel attitude, personality, lifestyle, mobility, or travel liking characteristics are significant to choosing *large* cars. On the other hand, those who have stronger travel dislike and pro-high density attitudes, tend to be status seeking, or not frustrated, are more likely to drive *luxury* cars. With respect to the mobility variables, those who travel long-distance by airplane a lot also tend to drive *luxury* cars.

- For sports cars and SUVs, those who tend to be status seekers, not workaholics, or younger are more likely to drive *sports* cars. Particularly, those who perceive their overall short-distance travel to be a lot but their long-distance personal vehicle travel to be lower are more likely to drive *sports* cars. Interestingly, those who have a stronger pro-high density attitude are more likely to drive *SUVs*, whereas those who are frustrated are less likely to drive *SUVs*. On the other hand, those who tend to be calm are more likely to drive *minivans*.

- Similar to the previous studies on vehicle type choice, demographic characteristics are also related to vehicle type choice. The respondent's age is negatively associated with driving *small* or *sports* cars and *SUVs*, and drivers of *pickups* and *large* cars tend to be less-educated than drivers of the other vehicle types. Household income is positively related to expensive cars such as *luxury* cars and *SUVs*, while personal income is negatively related to small cars. Clearly, the number of people under age 19 in a household is strongly positively associated with *minivans*, and the number of people age 65 or older in a household is positively related to larger cars such as *large* and *luxury* cars.

- Interestingly, females are less likely to drive *pickups* than any other vehicle type. As expected, the urban neighborhood variable has a positive sign for *small* and *luxury* cars. Unemployed individuals such as homemakers and retired people may tend to drive family vehicles or bigger and more comfortable cars such as *minivans* and *luxury* cars. Being a salesperson is strongly positively related to driving a *luxury* car, suggesting the need to appear successful in such an occupation.

These results strongly support our hypotheses that travel attitudes, personality, lifestyle, and mobility factors affect individuals' vehicle type choices. There are some limitations in analyzing the relationships of those variables to vehicle type choice because (i) the data used in this study did not have detailed information on all the vehicles in a household,

including their acquisition history as well as vehicle characteristics (e.g. price, capacity, horsepower, etc.), and (ii) vehicle type in our model is focused on only the make, model, and year of the single vehicle driven *most often* by the respondent. Nonetheless, the specific relationships identified in this study provide useful insight for vehicle manufacturers, as well as for decision makers and transportation planners developing transportation policies related to vehicle ownership, traffic congestion, and energy consumption. The general conclusion is also important: in addition to traditional demographic variables, travel attitude, personality, lifestyle, and mobility factors significantly affect an individual's vehicle type choice. Future models of vehicle type choice can be substantially more powerful with the inclusion of such variables.

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APPENDIX 1. REPRESENTATIVE MAKES AND MODELS FOUND IN OUR DATA, FOR EACH VEHICLE CLASSIFICATION

1. **Small (89):** Honda Civic (50), Toyota Corolla (48), Acura Integra (29) Toyota Tercel (27), Volkswagen Jetta (18), Ford Escort (18), Mazda Protege (11), Saturn SL2 (10)
2. **Compact (69):** Honda Accord (before 1994, 59), Toyota Camry (before 1992, 25), Ford Tempo (14)
3. **Mid-size (130):** Toyota Camry (since 1992, 41), Ford Taurus (32), Honda Accord (since 1994, 26), Acura Legend (13)
4. **Large (26):** Buick LeSabre (7), Cadillac DeVille (4), Lincoln Towncar (4), Pontiac Bonneville (4)
5. **Luxury (36):** Cadillac Seville (5), Lexus LS400 (4), Mercedes 300E (4), Mercedes 300SD (4), Mercedes 320E (4)
6. **Sports (65):** Ford Mustang (16), Honda Civic CRX (11), Honda Prelude (9), Toyota Celica (18)
7. **Minivan/Van (35):** Dodge Caravan (24), Chevrolet Astro (9), Plymouth Voyager (9), Ford Windstar (7), Nissan Quest (5), Ford Aerostar (5)
8. **Pickup (62):** Ford Ranger (20), Toyota Pickup (17), Nissan Pickup (8), Ford Pickup (7), Ford F150 (7)
9. **SUV (48):** Ford Explorer (36), Jeep Cherokee (19), Jeep Grand Cherokee (15), Toyota 4Runner (14)

Note: The number in parentheses is the number of cases. The makes and models listed are representative rather than exhaustive.

APPENDIX 2. BONFERRONI MULTIPLE COMPARISONS

1. Bonferroni Multiple Comparison Tables

- Travel Dislike (Travel Attitude Factor)

Multiple Comparisons

Dependent Variable: 6 factor solution for A3, Travel dislike factor
Bonferroni

(I) Vehicle Type	(J) Vehicle Type	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval Lower Bound	95% Confidence Interval Upper Bound
small	compact	-.1405492	.072	1.000	-.3708332	8.973E-02
	mid-sized	-.1072582	.064	1.000	-.3131367	9.862E-02
	large	-.2206443	.127	1.000	-.6274488	.1861603
	luxury	-.2224541	.122	1.000	-.6136097	.1687015
	sports	8.001E-02	.083	1.000	-.1873507	.3473634
	minivan/van	9.437E-03	.094	1.000	-.2902318	.3091056
	pickup	-4.11E-02	.082	1.000	-.3036377	.2214212
	SUV	2.306E-02	.077	1.000	-.2227408	.2688513
compact	small	.1405492	.072	1.000	-8.97E-02	.3708332
	mid-sized	3.329E-02	.073	1.000	-.1993923	.2659743
	large	-8.01E-02	.131	1.000	-.5011004	.3409103
	luxury	-8.19E-02	.127	1.000	-.4878091	.3239994
	sports	.2205555	.090	.521	-6.79E-02	.5090610
	minivan/van	.1499861	.100	1.000	-.1686939	.4686660
	pickup	9.944E-02	.089	1.000	-.1845965	.3834784
	SUV	.1636044	.084	1.000	-.1050427	.4322515
mid-sized	small	.1072582	.064	1.000	-9.86E-02	.3131367
	compact	-3.33E-02	.073	1.000	-.2659743	.1993923
	large	-.1133861	.127	1.000	-.5215537	.2947815
	luxury	-.1151959	.123	1.000	-.5077688	.2773770
	sports	.1872645	.084	.942	-8.22E-02	.4566909
	minivan/van	.1166950	.094	1.000	-.1848213	.4182114
	pickup	6.615E-02	.083	1.000	-.1984866	.3307865
	SUV	.1303134	.077	1.000	-.1177319	.3783588
large	small	.2206443	.127	1.000	-.1861603	.6274488
	compact	8.010E-02	.131	1.000	-.3409103	.5011004
	mid-sized	.1133861	.127	1.000	-.2947815	.5215537
	luxury	-1.81E-03	.164	1.000	-.5283243	.5247047
	sports	.3006506	.138	1.000	-.1417232	.7430244
	minivan/van	.2300811	.144	1.000	-.2325376	.6926999
	pickup	.1795360	.137	1.000	-.2599370	.6190090
	SUV	.2436995	.134	1.000	-.1859870	.6733860
luxury	small	.2224541	.122	1.000	-.1687015	.6136097
	compact	8.190E-02	.127	1.000	-.3239994	.4878091
	mid-sized	.1151959	.123	1.000	-.2773770	.5077688
	large	1.810E-03	.164	1.000	-.5247047	.5283243
	sports	.3024604	.134	.856	-.1255668	.7304877
	minivan/van	.2318910	.140	1.000	-.2170287	.6808106
	pickup	.1813458	.133	1.000	-.2436827	.6063743
	SUV	.2455093	.130	1.000	-.1693922	.6604108
sports	small	-8.00E-02	.083	1.000	-.3473634	.1873507
	compact	-.2205555	.090	.521	-.5090610	6.795E-02
	mid-sized	-.1872645	.084	.942	-.4566909	8.216E-02
	large	-.3006506	.138	1.000	-.7430244	.1417232
	luxury	-.3024604	.134	.856	-.7304877	.1255668
	minivan/van	-7.06E-02	.108	1.000	-.4169883	.2758493
	pickup	-.1211146	.098	1.000	-.4359580	.1937288
	SUV	-5.70E-02	.094	1.000	-.3579832	.2440810
minivan/van	small	-9.44E-03	.094	1.000	-.3091056	.2902318
	compact	-.1499861	.100	1.000	-.4686660	.1686939
	mid-sized	-.1166950	.094	1.000	-.4182114	.1848213
	large	-.2300811	.144	1.000	-.6926999	.2325376
	luxury	-.2318910	.140	1.000	-.6808106	.2170287
	sports	7.057E-02	.108	1.000	-.2758493	.4169883
	pickup	-5.05E-02	.107	1.000	-.3932518	.2921616
	SUV	1.362E-02	.103	1.000	-.3164451	.3436818
pickup	small	4.111E-02	.082	1.000	-.2214212	.3036377
	compact	-9.94E-02	.089	1.000	-.3834784	.1845965
	mid-sized	-6.61E-02	.083	1.000	-.3307865	.1984866
	large	-.1795360	.137	1.000	-.6190090	.2599370
	luxury	-.1813458	.133	1.000	-.6063743	.2436827
	sports	.1211146	.098	1.000	-.1937288	.4359580
	minivan/van	5.055E-02	.107	1.000	-.2921616	.3932518
	SUV	6.416E-02	.093	1.000	-.2325893	.3609163
SUV	small	-2.31E-02	.077	1.000	-.2688513	.2227408
	compact	-.1636044	.084	1.000	-.4322515	.1050427
	mid-sized	-.1303134	.077	1.000	-.3783588	.1177319
	large	-.2436995	.134	1.000	-.6733860	.1859870
	luxury	-.2455093	.130	1.000	-.6604108	.1693922
	sports	5.695E-02	.094	1.000	-.2440810	.3579832
	minivan/van	-1.36E-02	.103	1.000	-.3436818	.3164451
	pickup	-6.42E-02	.093	1.000	-.3609163	.2325893

- Pro-environmental Solutions (Travel Attitude Factor)

Multiple Comparisons

Dependent Variable: 6 factor solution for A3, Pro-environmental solutions
Bonferroni

(I) Vehicle Type	(J) Vehicle Type	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval Lower Bound	95% Confidence Interval Upper Bound
small	compact	.1803542	.067	.263	-3.47E-02	.3954306
	mid-sized	.3065150*	.060	.000	.1142324	.4987975
	large	.6591290*	.119	.000	.2791892	1.0390688
	luxury	.1213979	.114	1.000	-.2439263	.4867222
	sports	.1657355	.078	1.000	-8.40E-02	.4154367
	minivan/van	.2804459*	.087	.049	5.668E-04	.5603249
	pickup	.4057431*	.077	.000	.1605507	.6509355
	SUV	.3054953*	.072	.001	7.593E-02	.5350594
compact	small	-.1803542	.067	.263	-.3954306	3.472E-02
	mid-sized	.1261608	.068	1.000	-9.12E-02	.3434781
	large	.4787748*	.123	.004	8.557E-02	.8719777
	luxury	-5.90E-02	.118	1.000	-.4380552	.3201427
	sports	-1.46E-02	.084	1.000	-.2840717	.2548343
	minivan/van	.1000917	.093	1.000	-.1975431	.3977265
	pickup	.2253889	.083	.237	-3.99E-02	.4906690
	SUV	.1251412	.078	1.000	-.1257649	.3760472
mid-sized	small	-.3065150*	.060	.000	-.4987975	-.1142324
	compact	-.1261608	.068	1.000	-.3434781	9.116E-02
	large	.3526140	.119	.112	-2.86E-02	.7338268
	luxury	-.1851170	.114	1.000	-.5517650	.1815310
	sports	-.1407795	.079	1.000	-.3924134	.1108544
	minivan/van	-2.61E-02	.088	1.000	-.3076738	.2555356
	pickup	9.923E-02	.077	1.000	-.1479323	.3463885
	SUV	-1.02E-03	.072	1.000	-.2326844	.2306452
large	small	-.6591290*	.119	.000	-1.0390688	-.2791892
	compact	-.4787748*	.123	.004	-.8719777	-8.56E-02
	mid-sized	-.3526140	.119	.112	-.7338268	2.860E-02
	luxury	-.5377311*	.154	.017	-1.0294753	-4.60E-02
	sports	-.4933935*	.129	.005	-.9065537	-8.02E-02
	minivan/van	-.3786831	.135	.182	-.8107513	5.339E-02
	pickup	-.2533859	.128	1.000	-.6638368	.1570649
	SUV	-.3536337	.125	.174	-.7549443	4.768E-02
luxury	small	-.1213979	.114	1.000	-.4867222	.2439263
	compact	5.896E-02	.118	1.000	-.3201427	.4380552
	mid-sized	.1851170	.114	1.000	-.1815310	.5517650
	large	.5377311*	.154	.017	4.599E-02	1.0294753
	sports	4.434E-02	.125	1.000	-.3554235	.4440985
	minivan/van	.1590479	.131	1.000	-.2602258	.5783216
	pickup	.2843451	.124	.789	-.1126152	.6813054
	SUV	.1840974	.121	1.000	-.2034046	.5715994
sports	small	-.1657355	.078	1.000	-.4154367	8.397E-02
	compact	1.462E-02	.084	1.000	-.2548343	.2840717
	mid-sized	.1407795	.079	1.000	-.1108544	.3924134
	large	.4933935*	.129	.005	8.023E-02	.9065537
	luxury	-4.43E-02	.125	1.000	-.4440985	.3554235
	minivan/van	.1147104	.101	1.000	-.2088314	.4382522
	pickup	.2400076	.092	.325	-5.40E-02	.5340592
	SUV	.1397599	.088	1.000	-.1413926	.4209123
minivan/van	small	-.2804459*	.087	.049	-.5603249	-5.67E-04
	compact	-.1000917	.093	1.000	-.3977265	.1975431
	mid-sized	2.607E-02	.088	1.000	-.2555356	.3076738
	large	.3786831	.135	.182	-5.34E-02	.8107513
	luxury	-.1590479	.131	1.000	-.5783216	.2602258
	sports	-.1147104	.101	1.000	-.4382522	.2088314
	pickup	.1252972	.100	1.000	-.1947777	.4453721
	SUV	2.505E-02	.096	1.000	-.2832171	.3333160
pickup	small	-.4057431*	.077	.000	-.6509355	-.1605507
	compact	-.2253889	.083	.237	-.4906690	3.989E-02
	mid-sized	-9.92E-02	.077	1.000	-.3463885	.1479323
	large	.2533859	.128	1.000	-.1570649	.6638368
	luxury	-.2843451	.124	.789	-.6813054	.1126152
	sports	-.2400076	.092	.325	-.5340592	5.404E-02
	minivan/van	-.1252972	.100	1.000	-.4453721	.1947777
	SUV	-.1002477	.087	1.000	-.3774035	.1769080
SUV	small	-.3054953*	.072	.001	-.5350594	-7.59E-02
	compact	-.1251412	.078	1.000	-.3760472	.1257649
	mid-sized	1.020E-03	.072	1.000	-.2306452	.2326844
	large	.3536337	.125	.174	-4.77E-02	.7549443
	luxury	-.1840974	.121	1.000	-.5715994	.2034046
	sports	-.1397599	.088	1.000	-.4209123	.1413926
	minivan/van	-2.50E-02	.096	1.000	-.3333160	.2832171
	pickup	.1002477	.087	1.000	-.1769080	.3774035

*. The mean difference is significant at the .05 level.

- Travel Freedom (Travel Attitude Factor)

Multiple Comparisons

Dependent Variable: 6 factor solution for A3, Travel Freedom Factor
Bonferroni

(I) Vehicle Type	(J) Vehicle Type	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval Lower Bound	95% Confidence Interval Upper Bound
small	compact	1.507E-03	.058	1.000	-.1849145	.1879294
	mid-sized	-9.31E-02	.052	1.000	-.2597150	7.361E-02
	large	-4.81E-02	.103	1.000	-.3774172	.2812244
	luxury	-.2781741	.099	.179	-.5948265	3.848E-02
	sports	-.1833178	.068	.243	-.3997516	3.312E-02
	minivan/van	-.1161655	.076	1.000	-.3587565	.1264255
	pickup	-5.53E-04	.066	1.000	-.2130788	.2119724
	SUV	-.2194455*	.062	.015	-.4184250	-2.05E-02
compact	small	-1.51E-03	.058	1.000	-.1879294	.1849145
	mid-sized	-9.46E-02	.059	1.000	-.2829218	9.381E-02
	large	-4.96E-02	.106	1.000	-.3904206	.2912129
	luxury	-.2796815	.103	.233	-.6082735	4.891E-02
	sports	-.1848253	.073	.409	-.4183793	4.873E-02
	minivan/van	-.1176730	.081	1.000	-.3756542	.1403082
	pickup	-2.06E-03	.072	1.000	-.2319977	.2278764
	SUV	-.2209530*	.068	.042	-.4384310	-3.47E-03
mid-sized	small	9.305E-02	.052	1.000	-7.36E-02	.2597150
	compact	9.456E-02	.059	1.000	-9.38E-02	.2829218
	large	4.495E-02	.103	1.000	-.2854705	.3753778
	luxury	-.1851240	.099	1.000	-.5029239	.1326758
	sports	-9.03E-02	.068	1.000	-.3083767	.1278412
	minivan/van	-2.31E-02	.076	1.000	-.2672022	.2209713
	pickup	9.250E-02	.067	1.000	-.1217346	.3067282
	SUV	-.1263955	.063	1.000	-.3271958	7.440E-02
large	small	4.810E-02	.103	1.000	-.2812244	.3774172
	compact	4.960E-02	.106	1.000	-.2912129	.3904206
	mid-sized	-4.50E-02	.103	1.000	-.3753778	.2854705
	luxury	-.2300777	.133	1.000	-.6563073	.1961519
	sports	-.1352215	.112	1.000	-.4933366	.2228937
	minivan/van	-6.81E-02	.117	1.000	-.4425732	.3064349
	pickup	4.754E-02	.111	1.000	-.3082237	.4033100
	SUV	-.1713491	.109	1.000	-.5191936	.1764953
luxury	small	.2781741	.099	.179	-3.85E-02	.5948265
	compact	.2796815	.103	.233	-4.89E-02	.6082735
	mid-sized	.1851240	.099	1.000	-.1326758	.5029239
	large	.2300777	.133	1.000	-.1961519	.6563073
	sports	9.486E-02	.108	1.000	-.2516449	.4413575
	minivan/van	.1620086	.113	1.000	-.2014057	.5254228
	pickup	.2776209	.107	.355	-6.65E-02	.6216945
	SUV	5.873E-02	.105	1.000	-.2771469	.3946040
sports	small	.1833178	.068	.243	-3.31E-02	.3997516
	compact	.1848253	.073	.409	-4.87E-02	.4183793
	mid-sized	9.027E-02	.068	1.000	-.1278412	.3083767
	large	.1352215	.112	1.000	-.2228937	.4933366
	luxury	-9.49E-02	.108	1.000	-.4413575	.2516449
	minivan/van	6.715E-02	.088	1.000	-.2132843	.3475889
	pickup	.1827646	.080	.784	-7.21E-02	.4376400
	SUV	-3.61E-02	.076	1.000	-.2798224	.2075671
minivan/van	small	.1161655	.076	1.000	-.1264255	.3587565
	compact	.1176730	.081	1.000	-.1403082	.3756542
	mid-sized	2.312E-02	.076	1.000	-.2209713	.2672022
	large	6.807E-02	.117	1.000	-.3064349	.4425732
	luxury	-.1620086	.113	1.000	-.5254228	.2014057
	sports	-6.72E-02	.088	1.000	-.3475889	.2132843
	pickup	.1156123	.087	1.000	-.1618193	.3930439
	SUV	-.1032800	.083	1.000	-.3704765	.1639165
pickup	small	5.532E-04	.066	1.000	-.2119724	.2130788
	compact	2.061E-03	.072	1.000	-.2278764	.2319977
	mid-sized	-9.25E-02	.067	1.000	-.3067282	.1217346
	large	-4.75E-02	.111	1.000	-.4033100	.3082237
	luxury	-.2776209	.107	.355	-.6216945	6.645E-02
	sports	-.1827646	.080	.784	-.4376400	7.211E-02
	minivan/van	-.1156123	.087	1.000	-.3930439	.1618193
	SUV	-.2188923	.075	.129	-.4591228	2.134E-02
SUV	small	.2194455*	.062	.015	2.047E-02	.4184250
	compact	.2209530*	.068	.042	3.475E-03	.4384310
	mid-sized	.1263955	.063	1.000	-7.44E-02	.3271958
	large	.1713491	.109	1.000	-.1764953	.5191936
	luxury	-5.87E-02	.105	1.000	-.3946040	.2771469
	sports	3.613E-02	.076	1.000	-.2075671	.2798224
	minivan/van	.1032800	.083	1.000	-.1639165	.3704765
	pickup	.2188923	.075	.129	-2.13E-02	.4591228

*. The mean difference is significant at the .05 level.

- Pro-high Density (Travel Attitude Factor)

Multiple Comparisons

Dependent Variable: 6 factor solution for A3, Pro-hi density factor
Bonferroni

(I) Vehicle Type	(J) Vehicle Type	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval Lower Bound	95% Confidence Interval Upper Bound
small	compact	.1493418	.065	.809	-6.00E-02	.3586826
	mid-sized	.2439196*	.058	.001	5.676E-02	.4310744
	large	.7211923*	.115	.000	.3513847	1.0909999
	luxury	6.590E-02	.111	1.000	-.2896810	.4214827
	sports	3.001E-02	.076	1.000	-.2130291	.2730553
	minivan/van	.5509764*	.085	.000	.2785611	.8233916
	pickup	.6149828*	.075	.000	.3763292	.8536364
	SUV	.2991198*	.070	.001	7.568E-02	.5225618
compact	small	-.1493418	.065	.809	-.3586826	6.000E-02
	mid-sized	9.458E-02	.066	1.000	-.1169441	.3060996
	large	.5718505*	.120	.000	.1891335	.9545674
	luxury	-8.34E-02	.115	1.000	-.4524301	.2855482
	sports	-.1193288	.082	1.000	-.3815960	.1429385
	minivan/van	.4016345*	.090	.000	.1119370	.6913320
	pickup	.4656410*	.081	.000	.2074354	.7238466
	SUV	.1497779	.076	1.000	-9.44E-02	.3939929
mid-sized	small	-.2439196*	.058	.001	-.4310744	-5.68E-02
	compact	-9.46E-02	.066	1.000	-.3060996	.1169441
	large	.4772727*	.116	.001	.1062261	.8483194
	luxury	-.1780187	.111	1.000	-.5348889	.1788516
	sports	-.2139065	.076	.188	-.4588298	3.102E-02
	minivan/van	.3070568*	.086	.012	3.296E-02	.5811517
	pickup	.3710632*	.075	.000	.1304941	.6116323
	SUV	5.520E-02	.070	1.000	-.1702866	.2806870
large	small	-.7211923*	.115	.000	-1.0909999	-.3513847
	compact	-.5718505*	.120	.000	-.9545674	-.1891335
	mid-sized	-.4772727*	.116	.001	-.8483194	-.1062261
	luxury	-.6552914*	.149	.000	-1.1339219	-.1766610
	sports	-.6911792*	.126	.000	-1.0933212	-.2890372
	minivan/van	-.1702159	.131	1.000	-.5907617	.2503299
	pickup	-.1062095	.125	1.000	-.5057145	.2932955
	SUV	-.4220725*	.122	.020	-.8126811	-3.15E-02
luxury	small	-6.59E-02	.111	1.000	-.4214827	.2896810
	compact	8.344E-02	.115	1.000	-.2855482	.4524301
	mid-sized	.1780187	.111	1.000	-.1788516	.5348889
	large	.6552914*	.149	.000	.1766610	1.1339219
	sports	-3.59E-02	.122	1.000	-.4249880	.3532124
	minivan/van	.4850755*	.127	.005	7.698E-02	.8931680
	pickup	.5490819*	.121	.000	.1627078	.9354561
	SUV	.2332189	.118	1.000	-.1439492	.6103871
sports	small	-3.00E-02	.076	1.000	-.2730553	.2130291
	compact	.1193288	.082	1.000	-.1429385	.3815960
	mid-sized	.2139065	.076	.188	-3.10E-02	.4588298
	large	.6911792*	.126	.000	.2890372	1.0933212
	luxury	3.589E-02	.122	1.000	-.3532124	.4249880
	minivan/van	.5209633*	.098	.000	.2060497	.8358769
	pickup	.5849697*	.089	.000	.2987599	.8711796
	SUV	.2691067	.085	.060	-4.55E-03	.5427614
minivan/van	small	-.5509764*	.085	.000	-.8233916	-.2785611
	compact	-.4016345*	.090	.000	-.6913320	-.1119370
	mid-sized	-.3070568*	.086	.012	-.5811517	-3.30E-02
	large	.1702159	.131	1.000	-.2503299	.5907617
	luxury	-.4850755*	.127	.005	-.8931680	-7.70E-02
	sports	-.5209633*	.098	.000	-.8358769	-.2060497
	pickup	6.401E-02	.097	1.000	-.2475327	.3755456
	SUV	-.2518566	.094	.261	-.5519023	4.819E-02
pickup	small	-.6149828*	.075	.000	-.8536364	-.3763292
	compact	-.4656410*	.081	.000	-.7238466	-.2074354
	mid-sized	-.3710632*	.075	.000	-.6116323	-.1304941
	large	.1062095	.125	1.000	-.2932955	.5057145
	luxury	-.5490819*	.121	.000	-.9354561	-.1627078
	sports	-.5849697*	.089	.000	-.8711796	-.2987599
	minivan/van	-6.40E-02	.097	1.000	-.3755456	.2475327
	SUV	-.3158630*	.084	.007	-.5856276	-4.61E-02
SUV	small	-.2991198*	.070	.001	-.5225618	-7.57E-02
	compact	-.1497779	.076	1.000	-.3939929	9.444E-02
	mid-sized	-5.52E-02	.070	1.000	-.2806870	.1702866
	large	.4220725*	.122	.020	3.146E-02	.8126811
	luxury	-.2332189	.118	1.000	-.6103871	.1439492
	sports	-.2691067	.085	.060	-.5427614	4.548E-03
	minivan/van	.2518566	.094	.261	-4.82E-02	.5519023
	pickup	.3158630*	.084	.007	4.610E-02	.5856276

*. The mean difference is significant at the .05 level.

- Adventure Seeker (Personality Factor)

Multiple Comparisons

Dependent Variable: 4 factor solution for B1, Adventure seeker (Type T)
Bonferroni

(I) Vehicle Type	(J) Vehicle Type	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval Lower Bound	95% Confidence Interval Upper Bound
small	compact	.1343018	.075	1.000	-.1045047	.3731082
	mid-sized	7.122E-02	.067	1.000	-.1422805	.2847150
	large	.1983293	.132	1.000	-.2235305	.6201890
	luxury	-4.66E-02	.127	1.000	-.4521916	.3590716
	sports	-.3244381*	.087	.007	-.6016896	-4.72E-02
	minivan/van	.1265965	.097	1.000	-.1841625	.4373554
	pickup	-2.29E-02	.085	1.000	-.2951114	.2493790
	SUV	-.1215512	.080	1.000	-.3764438	.1333413
compact	small	-.1343018	.075	1.000	-.3731082	.1045047
	mid-sized	-6.31E-02	.075	1.000	-.3043791	.1782100
	large	6.403E-02	.136	1.000	-.3725587	.5006136
	luxury	-.1808618	.131	1.000	-.6017879	.2400643
	sports	-.4587399*	.093	.000	-.7579224	-.1595573
	minivan/van	-7.71E-03	.103	1.000	-.3381791	.3227684
	pickup	-.1571680	.092	1.000	-.4517172	.1373812
	SUV	-.2558530	.087	.119	-.5344423	2.274E-02
mid-sized	small	-7.12E-02	.067	1.000	-.2847150	.1422805
	compact	6.308E-02	.075	1.000	-.1782100	.3043791
	large	.1271120	.132	1.000	-.2961612	.5503852
	luxury	-.1177772	.127	1.000	-.5248787	.2893242
	sports	-.3956553*	.087	.000	-.6750528	-.1162579
	minivan/van	5.538E-02	.098	1.000	-.2572958	.3680542
	pickup	-9.41E-02	.086	1.000	-.3685138	.1803469
	SUV	-.1927685	.080	.594	-.4499936	6.446E-02
large	small	-.1983293	.132	1.000	-.6201890	.2235305
	compact	-6.40E-02	.136	1.000	-.5006136	.3725587
	mid-sized	-.1271120	.132	1.000	-.5503852	.2961612
	luxury	-.2448892	.171	1.000	-.7908892	.3011107
	sports	-.5227673*	.143	.010	-.9815127	-6.40E-02
	minivan/van	-7.17E-02	.150	1.000	-.5514724	.4080068
	pickup	-.2211955	.142	1.000	-.6769327	.2345417
	SUV	-.3198805	.139	.779	-.7654690	.1257081
luxury	small	4.656E-02	.127	1.000	-.3590716	.4521916
	compact	.1808618	.131	1.000	-.2400643	.6017879
	mid-sized	.1177772	.127	1.000	-.2893242	.5248787
	large	.2448892	.171	1.000	-.3011107	.7908892
	sports	-.2778781	.139	1.000	-.7217460	.1659898
	minivan/van	.1731565	.145	1.000	-.2923770	.6386899
	pickup	2.369E-02	.138	1.000	-.4170644	.4644519
	SUV	-7.50E-02	.134	1.000	-.5052476	.3552651
sports	small	.3244381*	.087	.007	4.719E-02	.6016896
	compact	.4587399*	.093	.000	.1595573	.7579224
	mid-sized	.3956553*	.087	.000	.1162579	.6750528
	large	.5227673*	.143	.010	6.402E-02	.9815127
	luxury	.2778781	.139	1.000	-.1659898	.7217460
	minivan/van	.4510345*	.112	.002	9.180E-02	.8102738
	pickup	.3015719	.102	.113	-2.49E-02	.6280671
	SUV	.2028869	.097	1.000	-.1092860	.5150597
minivan/van	small	-.1265965	.097	1.000	-.4373554	.1841625
	compact	7.705E-03	.103	1.000	-.3227684	.3381791
	mid-sized	-5.54E-02	.098	1.000	-.3680542	.2572958
	large	7.173E-02	.150	1.000	-.4080068	.5514724
	luxury	-.1731565	.145	1.000	-.6386899	.2923770
	sports	-.4510345*	.112	.002	-.8102738	-9.18E-02
	pickup	-.1494627	.111	1.000	-.5048524	.2059271
	SUV	-.2481477	.107	.733	-.5904263	9.413E-02
pickup	small	2.287E-02	.085	1.000	-.2493790	.2951114
	compact	.1571680	.092	1.000	-.1373812	.4517172
	mid-sized	9.408E-02	.086	1.000	-.1803469	.3685138
	large	.2211955	.142	1.000	-.2345417	.6769327
	luxury	-2.37E-02	.138	1.000	-.4644519	.4170644
	sports	-.3015719	.102	.113	-.6280671	2.492E-02
	minivan/van	.1494627	.111	1.000	-.2059271	.5048524
	SUV	-9.87E-02	.096	1.000	-.4064202	.2090502
SUV	small	.1215512	.080	1.000	-.1333413	.3764438
	compact	.2558530	.087	.119	-2.27E-02	.5344423
	mid-sized	.1927685	.080	.594	-6.45E-02	.4499936
	large	.3198805	.139	.779	-.1257081	.7654690
	luxury	7.499E-02	.134	1.000	-.3552651	.5052476
	sports	-.2028869	.097	1.000	-.5150597	.1092860
	minivan/van	.2481477	.107	.733	-9.41E-02	.5904263
	pickup	9.869E-02	.096	1.000	-.2090502	.4064202

*. The mean difference is significant at the .05 level.

- Loner (Personality Factor)

Multiple Comparisons

Dependent Variable: 4 factor solution for B1, Loner
Bonferroni

(I) Vehicle Type	(J) Vehicle Type	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval Lower Bound	95% Confidence Interval Upper Bound
small	compact	.2284574	.075	.088	-1.26E-02	.4695405
	mid-sized	.2244303*	.067	.031	8.897E-03	.4399634
	large	.3659618	.133	.216	-5.99E-02	.7918434
	luxury	.2613374	.128	1.000	-.1481614	.6708361
	sports	4.006E-03	.087	1.000	-.2758888	.2839006
	minivan/van	.3600707*	.098	.009	4.635E-02	.6737923
	pickup	.1268028	.086	1.000	-.1480379	.4016435
	SUV	-1.81E-02	.080	1.000	-.2754663	.2391788
compact	small	-.2284574	.075	.088	-.4695405	1.263E-02
	mid-sized	-4.03E-03	.076	1.000	-.2476220	.2395679
	large	.1375044	.138	1.000	-.3032439	.5782528
	luxury	3.288E-02	.133	1.000	-.3920591	.4578190
	sports	-.2244515	.094	.628	-.5264863	7.758E-02
	minivan/van	.1316133	.104	1.000	-.2020110	.4652377
	pickup	-.1016546	.093	1.000	-.3990119	.1957028
	SUV	-.2466011	.088	.182	-.5278463	3.464E-02
mid-sized	small	-.2244303*	.067	.031	-.4399634	-8.90E-03
	compact	4.027E-03	.076	1.000	-.2395679	.2476220
	large	.1415315	.133	1.000	-.2857770	.5688400
	luxury	3.691E-02	.128	1.000	-.3740755	.4478896
	sports	-.2204244	.088	.447	-.5024855	6.164E-02
	minivan/van	.1356404	.099	1.000	-.1800155	.4512963
	pickup	-9.76E-02	.087	1.000	-.3746741	.1794191
	SUV	-.2425740	.081	.101	-.5022514	1.710E-02
large	small	-.3659618	.133	.216	-.7918434	5.992E-02
	compact	-.1375044	.138	1.000	-.5782528	.3032439
	mid-sized	-.1415315	.133	1.000	-.5688400	.2857770
	luxury	-.1046245	.172	1.000	-.6558297	.4465808
	sports	-.3619559	.145	.447	-.8250748	.1011629
	minivan/van	-5.89E-03	.151	1.000	-.4902043	.4784220
	pickup	-.2391590	.144	1.000	-.6992410	.2209230
	SUV	-.3841056	.140	.227	-.8339421	6.573E-02
luxury	small	-.2613374	.128	1.000	-.6708361	.1481614
	compact	-3.29E-02	.133	1.000	-.4578190	.3920591
	mid-sized	-3.69E-02	.128	1.000	-.4478896	.3740755
	large	.1046245	.172	1.000	-.4465808	.6558297
	sports	-.2573315	.140	1.000	-.7054309	.1907680
	minivan/van	9.873E-02	.147	1.000	-.3712383	.5687050
	pickup	-.1345345	.139	1.000	-.5794947	.3104256
	SUV	-.2794811	.136	1.000	-.7138392	.1548771
sports	small	-4.01E-03	.087	1.000	-.2839006	.2758888
	compact	.2244515	.094	.628	-7.76E-02	.5264863
	mid-sized	.2204244	.088	.447	-6.16E-02	.5024855
	large	.3619559	.145	.447	-.1011629	.8250748
	luxury	.2573315	.140	1.000	-.1907680	.7054309
	minivan/van	.3560648	.113	.061	-6.60E-03	.7187288
	pickup	.1227969	.103	1.000	-.2068110	.4524048
	SUV	-2.21E-02	.098	1.000	-.3372986	.2929993
minivan/van	small	-.3600707*	.098	.009	-.6737923	-4.63E-02
	compact	-.1316133	.104	1.000	-.4652377	.2020110
	mid-sized	-.1356404	.099	1.000	-.4512963	.1800155
	large	5.891E-03	.151	1.000	-.4784220	.4902043
	luxury	-9.87E-02	.147	1.000	-.5687050	.3712383
	sports	-.3560648	.113	.061	-.7187288	6.599E-03
	pickup	-.2332679	.112	1.000	-.5920457	.1255100
	SUV	-.3782144*	.108	.017	-.7237561	-3.27E-02
pickup	small	-.1268028	.086	1.000	-.4016435	.1480379
	compact	.1016546	.093	1.000	-.1957028	.3990119
	mid-sized	9.763E-02	.087	1.000	-.1794191	.3746741
	large	.2391590	.144	1.000	-.2209230	.6992410
	luxury	.1345345	.139	1.000	-.3104256	.5794947
	sports	-.1227969	.103	1.000	-.4524048	.2068110
	minivan/van	.2332679	.112	1.000	-.1255100	.5920457
	SUV	-.1449465	.097	1.000	-.4556155	.1657224
SUV	small	1.814E-02	.080	1.000	-.2391788	.2754663
	compact	.2466011	.088	.182	-3.46E-02	.5278463
	mid-sized	.2425740	.081	.101	-1.71E-02	.5022514
	large	.3841056	.140	.227	-6.57E-02	.8339421
	luxury	.2794811	.136	1.000	-.1548771	.7138392
	sports	2.215E-02	.098	1.000	-.2929993	.3372986
	minivan/van	.3782144*	.108	.017	3.267E-02	.7237561
	pickup	.1449465	.097	1.000	-.1657224	.4556155

*. The mean difference is significant at the .05 level.

- Calm (Personality Factor)

Multiple Comparisons

Dependent Variable: 4 factor solution for B1, Calm
Bonferroni

(I) Vehicle Type	(J) Vehicle Type	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval Lower Bound	95% Confidence Interval Upper Bound
small	compact	-1.79E-02	.067	1.000	-.2337408	.1978588
	mid-sized	6.239E-02	.060	1.000	-.1305359	.2553227
	large	.1847359	.119	1.000	-.1964818	.5659536
	luxury	.2601439	.114	.834	-.1064091	.6266969
	sports	.2825096*	.078	.011	3.197E-02	.5330507
	minivan/van	-.1426014	.088	1.000	-.4234218	.1382190
	pickup	.1163651	.077	1.000	-.1296520	.3623821
	SUV	.1886110	.072	.317	-4.17E-02	.4189471
compact	small	1.794E-02	.067	1.000	-.1978588	.2337408
	mid-sized	8.033E-02	.068	1.000	-.1377138	.2983826
	large	.2026769	.123	1.000	-.1918485	.5972022
	luxury	.2780849	.119	.696	-.1022891	.6584590
	sports	.3004506*	.084	.014	3.009E-02	.5708099
	minivan/van	-.1246604	.093	1.000	-.4232963	.1739755
	pickup	.1343060	.083	1.000	-.1318663	.4004784
	SUV	.2065520	.079	.313	-4.52E-02	.4583019
mid-sized	small	-6.24E-02	.060	1.000	-.2553227	.1305359
	compact	-8.03E-02	.068	1.000	-.2983826	.1377138
	large	.1223425	.119	1.000	-.2601525	.5048375
	luxury	.1977506	.115	1.000	-.1701306	.5656318
	sports	.2201163	.079	.191	-3.24E-02	.4725965
	minivan/van	-.2049948	.088	.730	-.4875467	7.756E-02
	pickup	5.397E-02	.077	1.000	-.1940200	.3019634
	SUV	.1262176	.073	1.000	-.1062264	.3586616
large	small	-.1847359	.119	1.000	-.5659536	.1964818
	compact	-.2026769	.123	1.000	-.5972022	.1918485
	mid-sized	-.1223425	.119	1.000	-.5048375	.2601525
	luxury	7.541E-02	.154	1.000	-.4179902	.5688063
	sports	9.777E-02	.129	1.000	-.3167761	.5123235
	minivan/van	-.3273373	.135	.566	-.7608587	.1061841
	pickup	-6.84E-02	.129	1.000	-.4802023	.3434606
	SUV	3.875E-03	.126	1.000	-.3987854	.4065355
luxury	small	-.2601439	.114	.834	-.6266969	.1064091
	compact	-.2780849	.119	.696	-.6584590	.1022891
	mid-sized	-.1977506	.115	1.000	-.5656318	.1701306
	large	-7.54E-02	.154	1.000	-.5688063	.4179902
	sports	2.237E-02	.125	1.000	-.3787399	.4234713
	minivan/van	-.4027453	.131	.079	-.8234292	1.794E-02
	pickup	-.1437789	.124	1.000	-.5420743	.2545166
	SUV	-7.15E-02	.121	1.000	-.4603383	.3172724
sports	small	-.2825096*	.078	.011	-.5330507	-3.20E-02
	compact	-.3004506*	.084	.014	-.5708099	-3.01E-02
	mid-sized	-.2201163	.079	.191	-.4725965	3.236E-02
	large	-9.78E-02	.129	1.000	-.5123235	.3167761
	luxury	-2.24E-02	.125	1.000	-.4234713	.3787399
	minivan/van	-.4251111*	.101	.001	-.7497411	-.1004810
	pickup	-.1661446	.092	1.000	-.4611852	.1288961
	SUV	-9.39E-02	.088	1.000	-.3759967	.1881994
minivan/van	small	.1426014	.088	1.000	-.1382190	.4234218
	compact	.1246604	.093	1.000	-.1739755	.4232963
	mid-sized	.2049948	.088	.730	-7.76E-02	.4875467
	large	.3273373	.135	.566	-.1061841	.7608587
	luxury	.4027453	.131	.079	-1.79E-02	.8234292
	sports	.4251111*	.101	.001	.1004810	.7497411
	pickup	.2589665	.100	.356	-6.22E-02	.5801179
	SUV	.3312124*	.097	.022	2.191E-02	.6405158
pickup	small	-.1163651	.077	1.000	-.3623821	.1296520
	compact	-.1343060	.083	1.000	-.4004784	.1318663
	mid-sized	-5.40E-02	.077	1.000	-.3019634	.1940200
	large	6.837E-02	.129	1.000	-.3434606	.4802023
	luxury	.1437789	.124	1.000	-.2545166	.5420743
	sports	.1661446	.092	1.000	-.1288961	.4611852
	minivan/van	-.2589665	.100	.356	-.5801179	6.218E-02
	SUV	7.225E-02	.087	1.000	-.2058420	.3503339
SUV	small	-.1886110	.072	.317	-.4189471	4.173E-02
	compact	-.2065520	.079	.313	-.4583019	4.520E-02
	mid-sized	-.1262176	.073	1.000	-.3586616	.1062264
	large	-3.88E-03	.126	1.000	-.4065355	.3987854
	luxury	7.153E-02	.121	1.000	-.3172724	.4603383
	sports	9.390E-02	.088	1.000	-.1881994	.3759967
	minivan/van	-.3312124*	.097	.022	-.6405158	-2.19E-02
	pickup	-7.22E-02	.087	1.000	-.3503339	.2058420

*. The mean difference is significant at the .05 level.

- Frustrated (Lifestyle Factor)

Multiple Comparisons

Dependent Variable: 4 factor solution for B2, Frustration
Bonferroni

(I) Vehicle Type	(J) Vehicle Type	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval Lower Bound	95% Confidence Interval Upper Bound
small	compact	-3.89E-02	.067	1.000	-.2546437	.1769040
	mid-sized	8.905E-03	.060	1.000	-.1840009	.2018113
	large	9.432E-03	.119	1.000	-.3717396	.3906042
	luxury	.1807058	.114	1.000	-.1858031	.5472148
	sports	6.983E-02	.078	1.000	-.1806783	.3203436
	minivan/van	3.426E-02	.088	1.000	-.2465292	.3150441
	pickup	-.1921000	.077	.450	-.4380875	5.389E-02
	SUV	9.598E-02	.072	1.000	-.1343284	.3262886
compact	small	3.887E-02	.067	1.000	-.1769040	.2546437
	mid-sized	4.778E-02	.068	1.000	-.1702469	.2657971
	large	4.830E-02	.123	1.000	-.3461758	.4427801
	luxury	.2195757	.119	1.000	-.1607526	.5999041
	sports	.1087025	.084	1.000	-.1616243	.3790293
	minivan/van	7.313E-02	.093	1.000	-.2254727	.3717273
	pickup	-.1532301	.083	1.000	-.4193705	.1129102
	SUV	.1348500	.079	1.000	-.1168697	.3865697
mid-sized	small	-8.91E-03	.060	1.000	-.2018113	.1840009
	compact	-4.78E-02	.068	1.000	-.2657971	.1702469
	large	5.271E-04	.119	1.000	-.3819220	.3829761
	luxury	.1718006	.115	1.000	-.1960364	.5396376
	sports	6.093E-02	.079	1.000	-.1915225	.3133774
	minivan/van	2.535E-02	.088	1.000	-.2571657	.3078701
	pickup	-.2010052	.077	.343	-.4489671	4.696E-02
	SUV	8.707E-02	.073	1.000	-.1453412	.3194910
large	small	-9.43E-03	.119	1.000	-.3906042	.3717396
	compact	-4.83E-02	.123	1.000	-.4427801	.3461758
	mid-sized	-5.27E-04	.119	1.000	-.3829761	.3819220
	luxury	.1712735	.154	1.000	-.3220654	.6646125
	sports	6.040E-02	.129	1.000	-.3540997	.4749003
	minivan/van	2.483E-02	.135	1.000	-.4086442	.4582944
	pickup	-.2015323	.129	1.000	-.6133142	.2102496
	SUV	8.655E-02	.126	1.000	-.3160643	.4891599
luxury	small	-.1807058	.114	1.000	-.5472148	.1858031
	compact	-.2195757	.119	1.000	-.5999041	.1607526
	mid-sized	-.1718006	.115	1.000	-.5396376	.1960364
	large	-.1712735	.154	1.000	-.6646125	.3220654
	sports	-.1108732	.125	1.000	-.5119306	.2901842
	minivan/van	-.1464484	.131	1.000	-.5670818	.2741849
	pickup	-.3728058	.124	.099	-.7710534	2.544E-02
	SUV	-8.47E-02	.121	1.000	-.4734844	.3040329
sports	small	-6.98E-02	.078	1.000	-.3203436	.1806783
	compact	-.1087025	.084	1.000	-.3790293	.1616243
	mid-sized	-6.09E-02	.079	1.000	-.3133774	.1915225
	large	-6.04E-02	.129	1.000	-.4749003	.3540997
	luxury	.1108732	.125	1.000	-.2901842	.5119306
	minivan/van	-3.56E-02	.101	1.000	-.3601663	.2890158
	pickup	-.2619326	.092	.163	-.5569378	3.307E-02
	SUV	2.615E-02	.088	1.000	-.2559167	.3082117
minivan/van	small	-3.43E-02	.088	1.000	-.3150441	.2465292
	compact	-7.31E-02	.093	1.000	-.3717273	.2254727
	mid-sized	-2.54E-02	.088	1.000	-.3078701	.2571657
	large	-2.48E-02	.135	1.000	-.4582944	.4086442
	luxury	.1464484	.131	1.000	-.2741849	.5670818
	sports	3.558E-02	.101	1.000	-.2890158	.3601663
	pickup	-.2263574	.100	.868	-.5474703	9.476E-02
	SUV	6.172E-02	.097	1.000	-.2475435	.3709890
pickup	small	.1921000	.077	.450	-5.39E-02	.4380875
	compact	.1532301	.083	1.000	-.1129102	.4193705
	mid-sized	.2010052	.077	.343	-4.70E-02	.4489671
	large	.2015323	.129	1.000	-.2102496	.6133142
	luxury	.3728058	.124	.099	-2.54E-02	.7710534
	sports	.2619326	.092	.163	-3.31E-02	.5569378
	minivan/van	.2263574	.100	.868	-9.48E-02	.5474703
	SUV	.2880801*	.087	.033	1.003E-02	.5661347
SUV	small	-9.60E-02	.072	1.000	-.3262886	.1343284
	compact	-.1348500	.079	1.000	-.3865697	.1168697
	mid-sized	-8.71E-02	.073	1.000	-.3194910	.1453412
	large	-8.65E-02	.126	1.000	-.4891599	.3160643
	luxury	8.473E-02	.121	1.000	-.3040329	.4734844
	sports	-2.61E-02	.088	1.000	-.3082117	.2559167
	minivan/van	-6.17E-02	.097	1.000	-.3709890	.2475435
	pickup	-.2880801*	.087	.033	-.5661347	-1.00E-02

*. The mean difference is significant at the .05 level.

- Family/Community Oriented (Lifestyle Factor)

Multiple Comparisons

Dependent Variable: 4 factor solution for B2, Family/communtiy related
Bonferroni

(I) Vehicle Type	(J) Vehicle Type	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval Lower Bound	95% Confidence Interval Upper Bound
small	compact	.1180386	.063	1.000	-8.46E-02	.3207027
	mid-sized	.1292770	.057	.808	-5.19E-02	.3104628
	large	.3019623	.112	.251	-5.61E-02	.6599754
	luxury	.1724486	.107	1.000	-.1717925	.5166896
	sports	2.519E-02	.073	1.000	-.2101009	.2604805
	minivan/van	.1003034	.082	1.000	-.1634235	.3640304
	pickup	.1763305	.072	.527	-5.47E-02	.4073726
	SUV	2.125E-02	.068	1.000	-.1950655	.2375658
compact	small	-.1180386	.063	1.000	-.3207027	8.463E-02
	mid-sized	1.124E-02	.064	1.000	-.1935372	.2160141
	large	.1839237	.116	1.000	-.1865870	.5544344
	luxury	5.441E-02	.112	1.000	-.3028108	.4116308
	sports	-9.28E-02	.079	1.000	-.3467514	.1610538
	minivan/van	-1.77E-02	.088	1.000	-.2981932	.2627229
	pickup	5.829E-02	.078	1.000	-.1916786	.3082624
	SUV	-9.68E-02	.074	1.000	-.3332145	.1396376
mid-sized	small	-.1292770	.057	.808	-.3104628	5.191E-02
	compact	-1.12E-02	.064	1.000	-.2160141	.1935372
	large	.1726853	.112	1.000	-.1865274	.5318979
	luxury	4.317E-02	.108	1.000	-.3023168	.3886600
	sports	-.1040872	.074	1.000	-.3411991	.1330247
	minivan/van	-2.90E-02	.083	1.000	-.2943266	.2363794
	pickup	4.705E-02	.073	1.000	-.1858430	.2799500
	SUV	-.1080269	.068	1.000	-.3263221	.1102684
large	small	-.3019623	.112	.251	-.6599754	5.605E-02
	compact	-.1839237	.116	1.000	-.5544344	.1865870
	mid-sized	-.1726853	.112	1.000	-.5318979	.1865274
	luxury	-.1295137	.145	1.000	-.5928789	.3338515
	sports	-.2767725	.122	.826	-.6660888	.1125438
	minivan/van	-.2016588	.127	1.000	-.6087919	.2054742
	pickup	-.1256318	.121	1.000	-.5123951	.2611316
	SUV	-.2807121	.118	.632	-.6588628	9.744E-02
luxury	small	-.1724486	.107	1.000	-.5166896	.1717925
	compact	-5.44E-02	.112	1.000	-.4116308	.3028108
	mid-sized	-4.32E-02	.108	1.000	-.3886600	.3023168
	large	.1295137	.145	1.000	-.3338515	.5928789
	sports	-.1472588	.118	1.000	-.5239492	.2294316
	minivan/van	-7.21E-02	.123	1.000	-.4672222	.3229318
	pickup	3.882E-03	.117	1.000	-.3701694	.3779332
	SUV	-.1511984	.114	1.000	-.5163373	.2139405
sports	small	-2.52E-02	.073	1.000	-.2604805	.2101009
	compact	9.285E-02	.079	1.000	-.1610538	.3467514
	mid-sized	.1040872	.074	1.000	-.1330247	.3411991
	large	.2767725	.122	.826	-.1125438	.6660888
	luxury	.1472588	.118	1.000	-.2294316	.5239492
	minivan/van	7.511E-02	.095	1.000	-.2297563	.3799836
	pickup	.1511407	.087	1.000	-.1259409	.4282223
	SUV	-3.94E-03	.083	1.000	-.2688665	.2609872
minivan/van	small	-.1003034	.082	1.000	-.3640304	.1634235
	compact	1.774E-02	.088	1.000	-.2627229	.2981932
	mid-sized	2.897E-02	.083	1.000	-.2363794	.2943266
	large	.2016588	.127	1.000	-.2054742	.6087919
	luxury	7.215E-02	.123	1.000	-.3229318	.4672222
	sports	-7.51E-02	.095	1.000	-.3799836	.2297563
	pickup	7.603E-02	.094	1.000	-.2255760	.3776301
	SUV	-7.91E-02	.091	1.000	-.3695295	.2114229
pickup	small	-.1763305	.072	.527	-.4073726	5.471E-02
	compact	-5.83E-02	.078	1.000	-.3082624	.1916786
	mid-sized	-4.71E-02	.073	1.000	-.2799500	.1858430
	large	.1256318	.121	1.000	-.2611316	.5123951
	luxury	-3.88E-03	.117	1.000	-.3779332	.3701694
	sports	-.1511407	.087	1.000	-.4282223	.1259409
	minivan/van	-7.60E-02	.094	1.000	-.3776301	.2255760
	SUV	-.1550804	.082	1.000	-.4162412	.1060804
SUV	small	-2.13E-02	.068	1.000	-.2375658	.1950655
	compact	9.679E-02	.074	1.000	-.1396376	.3332145
	mid-sized	.1080269	.068	1.000	-.1102684	.3263221
	large	.2807121	.118	.632	-9.74E-02	.6588628
	luxury	.1511984	.114	1.000	-.2139405	.5163373
	sports	3.940E-03	.083	1.000	-.2609872	.2688665
	minivan/van	7.905E-02	.091	1.000	-.2114229	.3695295
	pickup	.1550804	.082	1.000	-.1060804	.4162412

- Workaholic (Lifestyle Factor)

Multiple Comparisons

Dependent Variable: 4 factor solution for B2, Workaholic
Bonferroni

(I) Vehicle Type	(J) Vehicle Type	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval Lower Bound	95% Confidence Interval Upper Bound
small	compact	-.1569693	.062	.398	-.3545501	4.061E-02
	mid-sized	-.1182903	.055	1.000	-.2949315	5.835E-02
	large	-.2273405	.109	1.000	-.5763739	.1216928
	luxury	-.3297393	.105	.061	-.6653460	5.867E-03
	sports	-1.62E-02	.072	1.000	-.2456378	.2131405
	minivan/van	-.1192674	.080	1.000	-.3763795	.1378447
	pickup	-.2644831*	.070	.006	-.4897302	-3.92E-02
	SUV	-.1411242	.066	1.000	-.3520142	6.977E-02
compact	small	.1569693	.062	.398	-4.06E-02	.3545501
	mid-sized	3.868E-02	.062	1.000	-.1609605	.2383184
	large	-7.04E-02	.113	1.000	-.4315888	.2908462
	luxury	-.1727700	.109	1.000	-.5210310	.1754909
	sports	.1407206	.077	1.000	-.1068135	.3882548
	minivan/van	3.770E-02	.085	1.000	-.2357216	.3111254
	pickup	-.1075139	.076	1.000	-.3512146	.1361868
	SUV	1.585E-02	.072	1.000	-.2146509	.2463410
mid-sized	small	.1182903	.055	1.000	-5.84E-02	.2949315
	compact	-3.87E-02	.062	1.000	-.2383184	.1609605
	large	-.1090503	.109	1.000	-.4592531	.2411525
	luxury	-.2114490	.105	1.000	-.5482718	.1253737
	sports	.1020416	.072	1.000	-.1291230	.3332062
	minivan/van	-9.77E-04	.081	1.000	-.2596745	.2577203
	pickup	-.1461929	.071	1.000	-.3732478	8.086E-02
	SUV	-2.28E-02	.066	1.000	-.2356538	.1899859
large	small	.2273405	.109	1.000	-.1216928	.5763739
	compact	7.037E-02	.113	1.000	-.2908462	.4315888
	mid-sized	.1090503	.109	1.000	-.2411525	.4592531
	luxury	-.1023988	.141	1.000	-.5541418	.3493443
	sports	.2110919	.119	1.000	-.1684595	.5906433
	minivan/van	.1080732	.124	1.000	-.2888481	.5049945
	pickup	-3.71E-02	.118	1.000	-.4142051	.3399199
	SUV	8.622E-02	.115	1.000	-.2824495	.4548821
luxury	small	.3297393	.105	.061	-5.87E-03	.6653460
	compact	.1727700	.109	1.000	-.1754909	.5210310
	mid-sized	.2114490	.105	1.000	-.1253737	.5482718
	large	.1023988	.141	1.000	-.3493443	.5541418
	sports	.3134907	.115	.228	-5.38E-02	.6807329
	minivan/van	.2104719	.120	1.000	-.1746957	.5956396
	pickup	6.526E-02	.114	1.000	-.2994131	.4299255
	SUV	.1886151	.111	1.000	-.1673653	.5445955
sports	small	1.625E-02	.072	1.000	-.2131405	.2456378
	compact	-.1407206	.077	1.000	-.3882548	.1068135
	mid-sized	-.1020416	.072	1.000	-.3332062	.1291230
	large	-.2110919	.119	1.000	-.5906433	.1684595
	luxury	-.3134907	.115	.228	-.6807329	5.375E-02
	minivan/van	-.1030187	.093	1.000	-.4002418	.1942044
	pickup	-.2482345	.084	.119	-.5183663	2.190E-02
	SUV	-.1248756	.081	1.000	-.3831575	.1334064
minivan/van	small	.1192674	.080	1.000	-.1378447	.3763795
	compact	-3.77E-02	.085	1.000	-.3111254	.2357216
	mid-sized	9.771E-04	.081	1.000	-.2577203	.2596745
	large	-.1080732	.124	1.000	-.5049945	.2888481
	luxury	-.2104719	.120	1.000	-.5956396	.1746957
	sports	.1030187	.093	1.000	-.1942044	.4002418
	pickup	-.1452158	.092	1.000	-.4392539	.1488224
	SUV	-2.19E-02	.088	1.000	-.3050473	.2613336
pickup	small	.2644831*	.070	.006	3.924E-02	.4897302
	compact	.1075139	.076	1.000	-.1361868	.3512146
	mid-sized	.1461929	.071	1.000	-8.09E-02	.3732478
	large	3.714E-02	.118	1.000	-.3399199	.4142051
	luxury	-6.53E-02	.114	1.000	-.4299255	.2994131
	sports	.2482345	.084	.119	-2.19E-02	.5183663
	minivan/van	.1452158	.092	1.000	-.1488224	.4392539
	SUV	.1233589	.080	1.000	-.1312514	.3779692
SUV	small	.1411242	.066	1.000	-6.98E-02	.3520142
	compact	-1.58E-02	.072	1.000	-.2463410	.2146509
	mid-sized	2.283E-02	.066	1.000	-.1899859	.2356538
	large	-8.62E-02	.115	1.000	-.4548821	.2824495
	luxury	-.1886151	.111	1.000	-.5445955	.1673653
	sports	.1248756	.081	1.000	-.1334064	.3831575
	minivan/van	2.186E-02	.088	1.000	-.2613336	.3050473
	pickup	-.1233589	.080	1.000	-.3779692	.1312514

*. The mean difference is significant at the .05 level.

- Status Seeking (Lifestyle Factor)

Multiple Comparisons

Dependent Variable: 4 factor solution for B2, Status seeker
Bonferroni

(I) Vehicle Type	(J) Vehicle Type	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval Lower Bound	95% Confidence Interval Upper Bound
small	compact	-8.82E-02	.066	1.000	-.3005416	.1240863
	mid-sized	-.1384253	.059	.707	-.3282383	5.139E-02
	large	-.3339809	.117	.159	-.7090408	4.108E-02
	luxury	-.6428839*	.113	.000	-1.0035159	-.2822518
	sports	-.3479580*	.077	.000	-.5944521	-.1014639
	minivan/van	-1.40E-02	.086	1.000	-.2902727	.2622958
	pickup	-.2953783*	.076	.003	-.5374215	-5.33E-02
	SUV	-.2680501*	.071	.006	-.4946656	-4.14E-02
compact	small	8.823E-02	.066	1.000	-.1240863	.3005416
	mid-sized	-5.02E-02	.067	1.000	-.2647238	.1643284
	large	-.2457532	.121	1.000	-.6339058	.1423993
	luxury	-.5546562*	.117	.000	-.9288861	-.1804264
	sports	-.2597303	.083	.065	-.5257225	6.262E-03
	minivan/van	7.424E-02	.092	1.000	-.2195728	.3680512
	pickup	-.2071507	.082	.410	-.4690235	5.472E-02
	SUV	-.1798224	.077	.727	-.4275059	6.786E-02
mid-sized	small	.1384253	.059	.707	-5.14E-02	.3282383
	compact	5.020E-02	.067	1.000	-.1643284	.2647238
	large	-.1955555	.118	1.000	-.5718721	.1807610
	luxury	-.5044585*	.113	.000	-.8663973	-.1425197
	sports	-.2095326	.078	.251	-.4579346	3.887E-02
	minivan/van	.1244369	.087	1.000	-.1535509	.4024247
	pickup	-.1569530	.076	1.000	-.4009388	8.703E-02
	SUV	-.1296247	.071	1.000	-.3583141	9.906E-02
large	small	.3339809	.117	.159	-4.11E-02	.7090408
	compact	.2457532	.121	1.000	-.1423993	.6339058
	mid-sized	.1955555	.118	1.000	-.1807610	.5718721
	luxury	-.3089030	.152	1.000	-.7943313	.1765254
	sports	-1.40E-02	.127	1.000	-.4218307	.3938765
	minivan/van	.3199924	.133	.590	-.1065263	.7465111
	pickup	3.860E-02	.127	1.000	-.3665765	.4437816
	SUV	6.593E-02	.124	1.000	-.3302255	.4620871
luxury	small	.6428839*	.113	.000	.2822518	1.0035159
	compact	.5546562*	.117	.000	.1804264	.9288861
	mid-sized	.5044585*	.113	.000	.1425197	.8663973
	large	.3089030	.152	1.000	-.1765254	.7943313
	sports	.2949259	.123	.605	-9.97E-02	.6895524
	minivan/van	.6288954*	.129	.000	.2150068	1.0427840
	pickup	.3475055	.122	.164	-4.44E-02	.7393673
	SUV	.3748338	.119	.062	-7.69E-03	.7573588
sports	small	.3479580*	.077	.000	.1014639	.5944521
	compact	.2597303	.083	.065	-6.26E-03	.5257225
	mid-sized	.2095326	.078	.251	-3.89E-02	.4579346
	large	1.398E-02	.127	1.000	-.3938765	.4218307
	luxury	-.2949259	.123	.605	-.6895524	9.970E-02
	minivan/van	.3339695*	.100	.030	1.458E-02	.6533558
	pickup	5.258E-02	.091	1.000	-.2376952	.3428545
	SUV	7.991E-02	.087	1.000	-.1976334	.3574492
minivan/van	small	1.399E-02	.086	1.000	-.2622958	.2902727
	compact	-7.42E-02	.092	1.000	-.3680512	.2195728
	mid-sized	-.1244369	.087	1.000	-.4024247	.1535509
	large	-.3199924	.133	.590	-.7465111	.1065263
	luxury	-.6288954*	.129	.000	-1.0427840	-.2150068
	sports	-.3339695*	.100	.030	-.6533558	-1.46E-02
	pickup	-.2813899	.099	.158	-.5973537	3.457E-02
	SUV	-.2540616	.095	.273	-.5583688	5.025E-02
pickup	small	.2953783*	.076	.003	5.334E-02	.5374215
	compact	.2071507	.082	.410	-5.47E-02	.4690235
	mid-sized	.1569530	.076	1.000	-8.70E-02	.4009388
	large	-3.86E-02	.127	1.000	-.4437816	.3665765
	luxury	-.3475055	.122	.164	-.7393673	4.436E-02
	sports	-5.26E-02	.091	1.000	-.3428545	.2376952
	minivan/van	.2813899	.099	.158	-3.46E-02	.5973537
	SUV	2.733E-02	.085	1.000	-.2462677	.3009242
SUV	small	.2680501*	.071	.006	4.143E-02	.4946656
	compact	.1798224	.077	.727	-6.79E-02	.4275059
	mid-sized	.1296247	.071	1.000	-9.91E-02	.3583141
	large	-6.59E-02	.124	1.000	-.4620871	.3302255
	luxury	-.3748338	.119	.062	-.7573588	7.691E-03
	sports	-7.99E-02	.087	1.000	-.3574492	.1976334
	minivan/van	.2540616	.095	.273	-5.02E-02	.5583688
	pickup	-2.73E-02	.085	1.000	-.3009242	.2462677

*. The mean difference is significant at the .05 level.

- Short-Distance Miles Traveled by Personal Vehicle (Objective Mobility)

Multiple Comparisons

Dependent Variable: Counting only short-distance trips, what is your total distance driver/passenger in any personal vehicle

Bonferroni

(I) Vehicle Type	(J) Vehicle Type	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval Lower Bound	95% Confidence Interval Upper Bound
small	compact	-6.84	13.948	1.000	-51.50	37.83
	mid-sized	-19.56	12.470	1.000	-59.49	20.38
	large	-15.72	24.640	1.000	-94.62	63.19
	luxury	-7.98E-02	23.693	1.000	-75.95	75.79
	sports	-26.18	16.194	1.000	-78.04	25.68
	minivan/van	-30.81	18.151	1.000	-88.94	27.31
	pickup	-73.40*	15.902	.000	-124.32	-22.48
	SUV	-32.81	14.914	1.000	-80.57	14.95
compact	small	6.84	13.948	1.000	-37.83	51.50
	mid-sized	-12.72	14.094	1.000	-57.85	32.41
	large	-8.88	25.501	1.000	-90.54	72.78
	luxury	6.76	24.586	1.000	-71.98	85.49
	sports	-19.35	17.475	1.000	-75.31	36.61
	minivan/van	-23.98	19.303	1.000	-85.79	37.84
	pickup	-66.56*	17.204	.004	-121.65	-11.47
	SUV	-25.98	16.296	1.000	-78.16	26.21
mid-sized	small	19.56	12.470	1.000	-20.38	59.49
	compact	12.72	14.094	1.000	-32.41	57.85
	large	3.84	24.723	1.000	-75.33	83.01
	luxury	19.48	23.778	1.000	-56.67	95.62
	sports	-6.63	16.319	1.000	-58.88	45.63
	minivan/van	-11.26	18.263	1.000	-69.74	47.23
	pickup	-53.84*	16.029	.029	-105.17	-2.51
	SUV	-13.26	15.050	1.000	-61.45	34.94
large	small	15.72	24.640	1.000	-63.19	94.62
	compact	8.88	25.501	1.000	-72.78	90.54
	mid-sized	-3.84	24.723	1.000	-83.01	75.33
	luxury	15.64	31.891	1.000	-86.49	117.76
	sports	-10.46	26.795	1.000	-96.27	75.34
	minivan/van	-15.09	28.021	1.000	-104.83	74.64
	pickup	-57.68	26.619	1.000	-142.92	27.56
	SUV	-17.09	26.041	1.000	-100.49	66.30
luxury	small	7.98E-02	23.693	1.000	-75.79	75.95
	compact	-6.76	24.586	1.000	-85.49	71.98
	mid-sized	-19.48	23.778	1.000	-95.62	56.67
	large	-15.64	31.891	1.000	-117.76	86.49
	sports	-26.10	25.926	1.000	-109.12	56.92
	minivan/van	-30.73	27.191	1.000	-117.81	56.34
	pickup	-73.32	25.744	.160	-155.76	9.12
	SUV	-32.73	25.146	1.000	-113.26	47.79
sports	small	26.18	16.194	1.000	-25.68	78.04
	compact	19.35	17.475	1.000	-36.61	75.31
	mid-sized	6.63	16.319	1.000	-45.63	58.88
	large	10.46	26.795	1.000	-75.34	96.27
	luxury	26.10	25.926	1.000	-56.92	109.12
	minivan/van	-4.63	20.983	1.000	-71.82	62.56
	pickup	-47.22	19.070	.482	-108.28	13.85
	SUV	-6.63	18.255	1.000	-65.09	51.83
minivan/van	small	30.81	18.151	1.000	-27.31	88.94
	compact	23.98	19.303	1.000	-37.84	85.79
	mid-sized	11.26	18.263	1.000	-47.23	69.74
	large	15.09	28.021	1.000	-74.64	104.83
	luxury	30.73	27.191	1.000	-56.34	117.81
	sports	4.63	20.983	1.000	-62.56	71.82
	pickup	-42.58	20.758	1.000	-109.06	23.89
	SUV	-2.00	20.011	1.000	-66.08	62.08
pickup	small	73.40*	15.902	.000	22.48	124.32
	compact	66.56*	17.204	.004	11.47	121.65
	mid-sized	53.84*	16.029	.029	2.51	105.17
	large	57.68	26.619	1.000	-27.56	142.92
	luxury	73.32	25.744	.160	-9.12	155.76
	sports	47.22	19.070	.482	-13.85	108.28
	minivan/van	42.58	20.758	1.000	-23.89	109.06
	SUV	40.59	17.996	.873	-17.04	98.21
SUV	small	32.81	14.914	1.000	-14.95	80.57
	compact	25.98	16.296	1.000	-26.21	78.16
	mid-sized	13.26	15.050	1.000	-34.94	61.45
	large	17.09	26.041	1.000	-66.30	100.49
	luxury	32.73	25.146	1.000	-47.79	113.26
	sports	6.63	18.255	1.000	-51.83	65.09
	minivan/van	2.00	20.011	1.000	-62.08	66.08
	pickup	-40.59	17.996	.873	-98.21	17.04

*. The mean difference is significant at the .05 level.

- Overall Short-Distance Miles Traveled (Objective Mobility)

Multiple Comparisons

Dependent Variable: Total for all short-distance trips - miles/week
Bonferroni

(I) Vehicle Type	(J) Vehicle Type	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval Lower Bound	95% Confidence Interval Upper Bound
small	compact	-4.33	15.371	1.000	-53.55	44.89
	mid-sized	-22.63	13.742	1.000	-66.64	21.37
	large	-12.34	27.154	1.000	-99.29	74.62
	luxury	18.66	26.109	1.000	-64.95	102.27
	sports	-27.90	17.846	1.000	-85.05	29.25
	minivan/van	-45.02	20.003	.884	-109.07	19.04
	pickup	-81.75*	17.524	.000	-137.86	-25.63
	SUV	-30.05	16.435	1.000	-82.68	22.58
compact	small	4.33	15.371	1.000	-44.89	53.55
	mid-sized	-18.30	15.531	1.000	-68.04	31.43
	large	-8.01	28.102	1.000	-98.00	81.98
	luxury	22.99	27.094	1.000	-63.77	109.75
	sports	-23.57	19.257	1.000	-85.24	38.10
	minivan/van	-40.68	21.272	1.000	-108.80	27.43
	pickup	-77.41*	18.959	.002	-138.13	-16.70
	SUV	-25.72	17.958	1.000	-83.22	31.79
mid-sized	small	22.63	13.742	1.000	-21.37	66.64
	compact	18.30	15.531	1.000	-31.43	68.04
	large	10.30	27.245	1.000	-76.95	97.54
	luxury	41.29	26.204	1.000	-42.62	125.21
	sports	-5.26	17.984	1.000	-62.85	52.33
	minivan/van	-22.38	20.126	1.000	-86.83	42.07
	pickup	-59.11*	17.664	.030	-115.68	-2.54
	SUV	-7.41	16.585	1.000	-60.52	45.70
large	small	12.34	27.154	1.000	-74.62	99.29
	compact	8.01	28.102	1.000	-81.98	98.00
	mid-sized	-10.30	27.245	1.000	-97.54	76.95
	luxury	30.99	35.144	1.000	-81.55	143.54
	sports	-15.56	29.528	1.000	-110.12	78.99
	minivan/van	-32.68	30.879	1.000	-131.56	66.21
	pickup	-69.41	29.334	.651	-163.35	24.53
	SUV	-17.71	28.697	1.000	-109.61	74.19
luxury	small	-18.66	26.109	1.000	-102.27	64.95
	compact	-22.99	27.094	1.000	-109.75	63.77
	mid-sized	-41.29	26.204	1.000	-125.21	42.62
	large	-30.99	35.144	1.000	-143.54	81.55
	sports	-46.56	28.570	1.000	-138.05	44.93
	minivan/van	-63.67	29.965	1.000	-159.63	32.28
	pickup	-100.40*	28.370	.015	-191.25	-9.55
	SUV	-48.71	27.711	1.000	-137.44	40.03
sports	small	27.90	17.846	1.000	-29.25	85.05
	compact	23.57	19.257	1.000	-38.10	85.24
	mid-sized	5.26	17.984	1.000	-52.33	62.85
	large	15.56	29.528	1.000	-78.99	110.12
	luxury	46.56	28.570	1.000	-44.93	138.05
	minivan/van	-17.12	23.123	1.000	-91.16	56.93
	pickup	-53.85	21.015	.378	-121.14	13.45
	SUV	-2.15	20.117	1.000	-66.57	62.27
minivan/van	small	45.02	20.003	.884	-19.04	109.07
	compact	40.68	21.272	1.000	-27.43	108.80
	mid-sized	22.38	20.126	1.000	-42.07	86.83
	large	32.68	30.879	1.000	-66.21	131.56
	luxury	63.67	29.965	1.000	-32.28	159.63
	sports	17.12	23.123	1.000	-56.93	91.16
	pickup	-36.73	22.875	1.000	-109.98	36.52
	SUV	14.97	22.052	1.000	-55.65	85.59
pickup	small	81.75*	17.524	.000	25.63	137.86
	compact	77.41*	18.959	.002	16.70	138.13
	mid-sized	59.11*	17.664	.030	2.54	115.68
	large	69.41	29.334	.651	-24.53	163.35
	luxury	100.40*	28.370	.015	9.55	191.25
	sports	53.85	21.015	.378	-13.45	121.14
	minivan/van	36.73	22.875	1.000	-36.52	109.98
	SUV	51.70	19.831	.332	-11.81	115.20
SUV	small	30.05	16.435	1.000	-22.58	82.68
	compact	25.72	17.958	1.000	-31.79	83.22
	mid-sized	7.41	16.585	1.000	-45.70	60.52
	large	17.71	28.697	1.000	-74.19	109.61
	luxury	48.71	27.711	1.000	-40.03	137.44
	sports	2.15	20.117	1.000	-62.27	66.57
	minivan/van	-14.97	22.052	1.000	-85.59	55.65
	pickup	-51.70	19.831	.332	-115.20	11.81

*. The mean difference is significant at the .05 level.

- Long-Distance Miles Traveled by Airplane (Objective Mobility)

Multiple Comparisons

Dependent Variable: OM_WE_AR
Bonferroni

(I) Vehicle Type	(J) Vehicle Type	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval Lower Bound	95% Confidence Interval Upper Bound
small	compact	408.10	950.364	1.000	-2635.29	3451.49
	mid-sized	122.15	850.234	1.000	-2600.59	2844.89
	large	480.98	1688.303	1.000	-4925.55	5887.51
	luxury	-9616.39*	1622.125	.000	-14810.99	-4421.79
	sports	-2862.98	1106.571	.351	-6406.60	680.64
	minivan/van	1629.18	1234.052	1.000	-2322.68	5581.04
	pickup	1883.21	1086.318	1.000	-1595.56	5361.97
	SUV	-2649.85	1012.815	.323	-5893.23	593.53
compact	small	-408.10	950.364	1.000	-3451.49	2635.29
	mid-sized	-285.95	959.314	1.000	-3358.00	2786.10
	large	72.88	1745.781	1.000	-5517.71	5663.47
	luxury	-10024.49*	1681.867	.000	-15410.40	-4638.57
	sports	-3271.08	1192.429	.221	-7089.65	547.49
	minivan/van	1221.08	1311.591	1.000	-2979.09	5421.25
	pickup	1475.11	1173.658	1.000	-2283.35	5233.57
	SUV	-3057.95	1105.975	.207	-6599.66	483.76
mid-sized	small	-122.15	850.234	1.000	-2844.89	2600.59
	compact	285.95	959.314	1.000	-2786.10	3358.00
	large	358.83	1693.357	1.000	-5063.88	5781.54
	luxury	-9738.54*	1627.385	.000	-14949.98	-4527.09
	sports	-2985.13	1114.268	.268	-6553.40	583.14
	minivan/van	1507.03	1240.958	1.000	-2466.95	5481.01
	pickup	1761.06	1094.157	1.000	-1742.81	5264.93
	SUV	-2772.00	1021.218	.241	-6042.29	498.30
large	small	-480.98	1688.303	1.000	-5887.51	4925.55
	compact	-72.88	1745.781	1.000	-5663.47	5517.71
	mid-sized	-358.83	1693.357	1.000	-5781.54	5063.88
	luxury	-10097.37*	2185.372	.000	-17095.68	-3099.05
	sports	-3343.96	1835.500	1.000	-9221.86	2533.94
	minivan/van	1148.20	1915.058	1.000	-4984.48	7280.87
	pickup	1402.23	1823.362	1.000	-4436.80	7241.26
	SUV	-3130.83	1780.549	1.000	-8832.76	2571.10
luxury	small	9616.39*	1622.125	.000	4421.79	14810.99
	compact	10024.49*	1681.867	.000	4638.57	15410.40
	mid-sized	9738.54*	1627.385	.000	4527.09	14949.98
	large	10097.37*	2185.372	.000	3099.05	17095.68
	sports	6753.41*	1774.820	.005	1069.82	12436.99
	minivan/van	11245.57*	1856.979	.000	5298.88	17192.25
	pickup	11499.60*	1762.264	.000	5856.22	17142.97
	SUV	6966.54*	1717.929	.002	1465.14	12467.94
sports	small	2862.98	1106.571	.351	-680.64	6406.60
	compact	3271.08	1192.429	.221	-547.49	7089.65
	mid-sized	2985.13	1114.268	.268	-583.14	6553.40
	large	3343.96	1835.500	1.000	-2533.94	9221.86
	luxury	-6753.41*	1774.820	.005	-12436.99	-1069.82
	minivan/van	4492.16	1428.839	.061	-83.48	9067.79
	pickup	4746.19*	1303.374	.010	572.34	8920.04
	SUV	213.13	1242.775	1.000	-3766.66	4192.92
minivan/van	small	-1629.18	1234.052	1.000	-5581.04	2322.68
	compact	-1221.08	1311.591	1.000	-5421.25	2979.09
	mid-sized	-1507.03	1240.958	1.000	-5481.01	2466.95
	large	-1148.20	1915.058	1.000	-7280.87	4984.48
	luxury	-11245.57*	1856.979	.000	-17192.25	-5298.88
	sports	-4492.16	1428.839	.061	-9067.79	83.48
	pickup	254.03	1413.212	1.000	-4271.56	4779.62
	SUV	-4279.03	1357.525	.059	-8626.29	68.24
pickup	small	-1883.21	1086.318	1.000	-5361.97	1595.56
	compact	-1475.11	1173.658	1.000	-5233.57	2283.35
	mid-sized	-1761.06	1094.157	1.000	-5264.93	1742.81
	large	-1402.23	1823.362	1.000	-7241.26	4436.80
	luxury	-11499.60*	1762.264	.000	-17142.97	-5856.22
	sports	-4746.19*	1303.374	.010	-8920.04	-572.34
	minivan/van	-254.03	1413.212	1.000	-4779.62	4271.56
	SUV	-4533.06*	1224.776	.008	-8455.21	-610.90
SUV	small	2649.85	1012.815	.323	-593.53	5893.23
	compact	3057.95	1105.975	.207	-483.76	6599.66
	mid-sized	2772.00	1021.218	.241	-498.30	6042.29
	large	3130.83	1780.549	1.000	-2571.10	8832.76
	luxury	-6966.54*	1717.929	.002	-12467.94	-1465.14
	sports	-213.13	1242.775	1.000	-4192.92	3766.66
	minivan/van	4279.03	1357.525	.059	-68.24	8626.29
	pickup	4533.06*	1224.776	.008	610.90	8455.21

*. The mean difference is significant at the .05 level.

- Sum of the Log-Miles for Long-Distance Trips by Airplane (Objective Mobility)

Multiple Comparisons

Dependent Variable: LN_WE_AR
Bonferroni

(I) Vehicle Type	(J) Vehicle Type	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval Lower Bound	95% Confidence Interval Upper Bound
small	compact	-.7089	4.735	1.000	-15.8728	14.4549
	mid-sized	-4.5355	4.236	1.000	-18.1017	9.0307
	large	-.6935	8.412	1.000	-27.6318	26.2448
	luxury	-43.1368*	8.082	.000	-69.0191	-17.2544
	sports	-13.6719	5.514	.477	-31.3282	3.9843
	minivan/van	6.1605	6.149	1.000	-13.5299	25.8508
	pickup	9.3748	5.413	1.000	-7.9583	26.7079
	SUV	-15.0728	5.046	.103	-31.2331	1.0875
compact	small	.7089	4.735	1.000	-14.4549	15.8728
	mid-sized	-3.8266	4.780	1.000	-19.1332	11.4801
	large	1.545E-02	8.698	1.000	-27.8399	27.8708
	luxury	-42.4278*	8.380	.000	-69.2634	-15.5922
	sports	-12.9630	5.941	1.000	-31.9892	6.0632
	minivan/van	6.8694	6.535	1.000	-14.0581	27.7969
	pickup	10.0838	5.848	1.000	-8.6429	28.8105
	SUV	-14.3638	5.511	.332	-32.0106	3.2829
mid-sized	small	4.5355	4.236	1.000	-9.0307	18.1017
	compact	3.8266	4.780	1.000	-11.4801	19.1332
	large	3.8420	8.437	1.000	-23.1769	30.8609
	luxury	-38.6012*	8.109	.000	-64.5675	-12.6349
	sports	-9.1364	5.552	1.000	-26.9155	8.6426
	minivan/van	10.6960	6.183	1.000	-9.1045	30.4965
	pickup	13.9103	5.452	.389	-3.5478	31.3685
	SUV	-10.5373	5.088	1.000	-26.8317	5.7571
large	small	.6935	8.412	1.000	-26.2448	27.6318
	compact	-1.54E-02	8.698	1.000	-27.8708	27.8399
	mid-sized	-3.8420	8.437	1.000	-30.8609	23.1769
	luxury	-42.4433*	10.889	.004	-77.3127	-7.5738
	sports	-12.9784	9.145	1.000	-42.2654	16.3085
	minivan/van	6.8540	9.542	1.000	-23.7024	37.4103
	pickup	10.0683	9.085	1.000	-19.0249	39.1616
	SUV	-14.3793	8.872	1.000	-42.7894	14.0308
luxury	small	43.1368*	8.082	.000	17.2544	69.0191
	compact	42.4278*	8.380	.000	15.5922	69.2634
	mid-sized	38.6012*	8.109	.000	12.6349	64.5675
	large	42.4433*	10.889	.004	7.5738	77.3127
	sports	29.4648*	8.843	.032	1.1461	57.7835
	minivan/van	49.2972*	9.252	.000	19.6676	78.9268
	pickup	52.5116*	8.781	.000	24.3932	80.6300
	SUV	28.0640*	8.560	.038	.6530	55.4749
sports	small	13.6719	5.514	.477	-3.9843	31.3282
	compact	12.9630	5.941	1.000	-6.0632	31.9892
	mid-sized	9.1364	5.552	1.000	-8.6426	26.9155
	large	12.9784	9.145	1.000	-16.3085	42.2654
	luxury	-29.4648*	8.843	.032	-57.7835	-1.1461
	minivan/van	19.8324	7.119	.194	-2.9659	42.6307
	pickup	23.0468*	6.494	.014	2.2504	43.8432
	SUV	-1.4008	6.192	1.000	-21.2304	18.4287
minivan/van	small	-6.1605	6.149	1.000	-25.8508	13.5299
	compact	-6.8694	6.535	1.000	-27.7969	14.0581
	mid-sized	-10.6960	6.183	1.000	-30.4965	9.1045
	large	-6.8540	9.542	1.000	-37.4103	23.7024
	luxury	-49.2972*	9.252	.000	-78.9268	-19.6676
	sports	-19.8324	7.119	.194	-42.6307	2.9659
	pickup	3.2144	7.041	1.000	-19.3346	25.7633
	SUV	-21.2332	6.764	.062	-42.8937	.4272
pickup	small	-9.3748	5.413	1.000	-26.7079	7.9583
	compact	-10.0838	5.848	1.000	-28.8105	8.6429
	mid-sized	-13.9103	5.452	.389	-31.3685	3.5478
	large	-10.0683	9.085	1.000	-39.1616	19.0249
	luxury	-52.5116*	8.781	.000	-80.6300	-24.3932
	sports	-23.0468*	6.494	.014	-43.8432	-2.2504
	minivan/van	-3.2144	7.041	1.000	-25.7633	19.3346
	SUV	-24.4476*	6.103	.002	-43.9899	-4.9053
SUV	small	15.0728	5.046	.103	-1.0875	31.2331
	compact	14.3638	5.511	.332	-3.2829	32.0106
	mid-sized	10.5373	5.088	1.000	-5.7571	26.8317
	large	14.3793	8.872	1.000	-14.0308	42.7894
	luxury	-28.0640*	8.560	.038	-55.4749	-.6530
	sports	1.4008	6.192	1.000	-18.4287	21.2304
	minivan/van	21.2332	6.764	.062	-.4272	42.8937
	pickup	24.4476*	6.103	.002	4.9053	43.9899

*. The mean difference is significant at the .05 level.

- Short-Distance Trips by Personal Vehicle (Perceived Mobility)

Multiple Comparisons

Dependent Variable: For short-distance trips, I think that I travel... as a driver/passenger in any personal vehicle

Bonferroni

(I) Vehicle Type	(J) Vehicle Type	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound
small	compact	3.13E-02	.094	1.000	-.27	.33
	mid-sized	-.20	.084	.692	-.47	7.22E-02
	large	-.17	.166	1.000	-.70	.37
	luxury	-8.34E-03	.160	1.000	-.52	.50
	sports	-2.31E-02	.109	1.000	-.37	.33
	minivan/van	-.40*	.122	.040	-.79	-7.42E-03
	pickup	-.19	.107	1.000	-.53	.16
	SUV	-.24	.100	.561	-.56	7.84E-02
compact	small	-3.13E-02	.094	1.000	-.33	.27
	mid-sized	-.23	.095	.589	-.53	7.60E-02
	large	-.20	.172	1.000	-.75	.35
	luxury	-3.96E-02	.166	1.000	-.57	.49
	sports	-5.44E-02	.118	1.000	-.43	.32
	minivan/van	-.43*	.130	.034	-.85	-1.39E-02
	pickup	-.22	.116	1.000	-.59	.15
	SUV	-.27	.110	.450	-.63	7.70E-02
mid-sized	small	.20	.084	.692	-7.22E-02	.47
	compact	.23	.095	.589	-7.60E-02	.53
	large	3.03E-02	.167	1.000	-.50	.56
	luxury	.19	.160	1.000	-.32	.70
	sports	.17	.110	1.000	-.18	.53
	minivan/van	-.20	.123	1.000	-.60	.19
	pickup	1.14E-02	.108	1.000	-.33	.36
	SUV	-4.60E-02	.101	1.000	-.37	.28
large	small	.17	.166	1.000	-.37	.70
	compact	.20	.172	1.000	-.35	.75
	mid-sized	-3.03E-02	.167	1.000	-.56	.50
	luxury	.16	.215	1.000	-.53	.85
	sports	.14	.181	1.000	-.43	.72
	minivan/van	-.23	.189	1.000	-.84	.37
	pickup	-1.89E-02	.179	1.000	-.59	.56
	SUV	-7.63E-02	.175	1.000	-.64	.49
luxury	small	8.34E-03	.160	1.000	-.50	.52
	compact	3.96E-02	.166	1.000	-.49	.57
	mid-sized	-.19	.160	1.000	-.70	.32
	large	-.16	.215	1.000	-.85	.53
	sports	-1.47E-02	.175	1.000	-.57	.55
	minivan/van	-.39	.183	1.000	-.98	.20
	pickup	-.18	.174	1.000	-.73	.38
	SUV	-.23	.169	1.000	-.78	.31
sports	small	2.31E-02	.109	1.000	-.33	.37
	compact	5.44E-02	.118	1.000	-.32	.43
	mid-sized	-.17	.110	1.000	-.53	.18
	large	-.14	.181	1.000	-.72	.43
	luxury	1.47E-02	.175	1.000	-.55	.57
	minivan/van	-.38	.141	.284	-.83	7.68E-02
	pickup	-.16	.129	1.000	-.57	.25
	SUV	-.22	.123	1.000	-.61	.17
minivan/van	small	.40*	.122	.040	7.42E-03	.79
	compact	.43*	.130	.034	1.39E-02	.85
	mid-sized	.20	.123	1.000	-.19	.60
	large	.23	.189	1.000	-.37	.84
	luxury	.39	.183	1.000	-.20	.98
	sports	.38	.141	.284	-7.68E-02	.83
	pickup	.21	.140	1.000	-.23	.66
	SUV	.16	.135	1.000	-.28	.59
pickup	small	.19	.107	1.000	-.16	.53
	compact	.22	.116	1.000	-.15	.59
	mid-sized	-1.14E-02	.108	1.000	-.36	.33
	large	1.89E-02	.179	1.000	-.56	.59
	luxury	.18	.174	1.000	-.38	.73
	sports	.16	.129	1.000	-.25	.57
	minivan/van	-.21	.140	1.000	-.66	.23
	SUV	-5.74E-02	.121	1.000	-.45	.33
SUV	small	.24	.100	.561	-7.84E-02	.56
	compact	.27	.110	.450	-7.70E-02	.63
	mid-sized	4.60E-02	.101	1.000	-.28	.37
	large	7.63E-02	.175	1.000	-.49	.64
	luxury	.23	.169	1.000	-.31	.78
	sports	.22	.123	1.000	-.17	.61
	minivan/van	-.16	.135	1.000	-.59	.28
	pickup	5.74E-02	.121	1.000	-.33	.45

*. The mean difference is significant at the .05 level.

- Overall Short-Distance Trips (Perceived Mobility)

Multiple Comparisons

Dependent Variable: For short-distance trips, OVERALL I think that I travel...
Bonferroni

(I) Vehicle Type	(J) Vehicle Type	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval Lower Bound	95% Confidence Interval Upper Bound
small	compact	.14	.085	1.000	-.13	.41
	mid-sized	4.56E-02	.076	1.000	-.20	.29
	large	-.15	.150	1.000	-.63	.32
	luxury	.11	.144	1.000	-.36	.57
	sports	-.13	.098	1.000	-.45	.18
	minivan/van	-.30	.110	.251	-.65	5.53E-02
	pickup	-2.91E-02	.097	1.000	-.34	.28
	SUV	-.11	.090	1.000	-.40	.18
compact	small	-.14	.085	1.000	-.41	.13
	mid-sized	-9.30E-02	.086	1.000	-.37	.18
	large	-.29	.155	1.000	-.79	.20
	luxury	-3.30E-02	.149	1.000	-.51	.45
	sports	-.27	.106	.363	-.61	6.66E-02
	minivan/van	-.44*	.117	.007	-.81	-6.10E-02
	pickup	-.17	.105	1.000	-.50	.17
	SUV	-.25	.099	.467	-.56	7.07E-02
mid-sized	small	-4.56E-02	.076	1.000	-.29	.20
	compact	9.30E-02	.086	1.000	-.18	.37
	large	-.20	.150	1.000	-.68	.28
	luxury	6.00E-02	.145	1.000	-.40	.52
	sports	-.18	.099	1.000	-.50	.14
	minivan/van	-.34	.111	.072	-.70	1.18E-02
	pickup	-7.48E-02	.097	1.000	-.39	.24
	SUV	-.15	.091	1.000	-.45	.14
large	small	.15	.150	1.000	-.32	.63
	compact	.29	.155	1.000	-.20	.79
	mid-sized	.20	.150	1.000	-.28	.68
	luxury	.26	.194	1.000	-.36	.88
	sports	2.00E-02	.163	1.000	-.50	.54
	minivan/van	-.14	.170	1.000	-.69	.40
	pickup	.13	.162	1.000	-.39	.64
	SUV	4.75E-02	.158	1.000	-.46	.55
luxury	small	-.11	.144	1.000	-.57	.36
	compact	3.30E-02	.149	1.000	-.45	.51
	mid-sized	-6.00E-02	.145	1.000	-.52	.40
	large	-.26	.194	1.000	-.88	.36
	sports	-.24	.158	1.000	-.75	.26
	minivan/van	-.40	.165	.528	-.93	.13
	pickup	-.13	.156	1.000	-.64	.37
	SUV	-.21	.153	1.000	-.70	.28
sports	small	.13	.098	1.000	-.18	.45
	compact	.27	.106	.363	-6.66E-02	.61
	mid-sized	.18	.099	1.000	-.14	.50
	large	-2.00E-02	.163	1.000	-.54	.50
	luxury	.24	.158	1.000	-.26	.75
	minivan/van	-.16	.128	1.000	-.57	.25
	pickup	.11	.116	1.000	-.27	.48
	SUV	2.75E-02	.111	1.000	-.33	.38
minivan/van	small	.30	.110	.251	-5.53E-02	.65
	compact	.44*	.117	.007	6.10E-02	.81
	mid-sized	.34	.111	.072	-1.18E-02	.70
	large	.14	.170	1.000	-.40	.69
	luxury	.40	.165	.528	-.13	.93
	sports	.16	.128	1.000	-.25	.57
	pickup	.27	.126	1.000	-.14	.67
	SUV	.19	.122	1.000	-.20	.58
pickup	small	2.91E-02	.097	1.000	-.28	.34
	compact	.17	.105	1.000	-.17	.50
	mid-sized	7.48E-02	.097	1.000	-.24	.39
	large	-.13	.162	1.000	-.64	.39
	luxury	.13	.156	1.000	-.37	.64
	sports	-.11	.116	1.000	-.48	.27
	minivan/van	-.27	.126	1.000	-.67	.14
	SUV	-7.83E-02	.109	1.000	-.43	.27
SUV	small	.11	.090	1.000	-.18	.40
	compact	.25	.099	.467	-7.07E-02	.56
	mid-sized	.15	.091	1.000	-.14	.45
	large	-4.75E-02	.158	1.000	-.55	.46
	luxury	.21	.153	1.000	-.28	.70
	sports	-2.75E-02	.111	1.000	-.38	.33
	minivan/van	-.19	.122	1.000	-.58	.20
	pickup	7.83E-02	.109	1.000	-.27	.43

*. The mean difference is significant at the .05 level.

- Long-Distance Trips by Personal Vehicle (Perceived Mobility)

Multiple Comparisons

Dependent Variable: For long-distance trips, I think that I travel... as a driver/passenger in any personal vehicle

Bonferroni

(I) Vehicle Type	(J) Vehicle Type	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval Lower Bound	95% Confidence Interval Upper Bound
small	compact	.13	.104	1.000	-.21	.46
	mid-sized	-.20	.093	1.000	-.49	.10
	large	-.24	.184	1.000	-.83	.35
	luxury	.14	.177	1.000	-.43	.70
	sports	.11	.121	1.000	-.28	.50
	minivan/van	-.67*	.136	.000	-1.10	-.23
	pickup	-.32	.119	.231	-.70	5.63E-02
	SUV	-.28	.111	.411	-.64	7.45E-02
compact	small	-.13	.104	1.000	-.46	.21
	mid-sized	-.32	.105	.079	-.66	1.41E-02
	large	-.37	.191	1.000	-.98	.24
	luxury	8.22E-03	.184	1.000	-.58	.60
	sports	-1.59E-02	.131	1.000	-.43	.40
	minivan/van	-.79*	.144	.000	-1.26	-.33
	pickup	-.45*	.129	.016	-.86	-4.02E-02
	SUV	-.41*	.122	.028	-.80	-2.01E-02
mid-sized	small	.20	.093	1.000	-.10	.49
	compact	.32	.105	.079	-1.41E-02	.66
	large	-4.70E-02	.185	1.000	-.64	.54
	luxury	.33	.178	1.000	-.24	.90
	sports	.31	.122	.427	-8.33E-02	.70
	minivan/van	-.47*	.136	.021	-.91	-3.40E-02
	pickup	-.13	.120	1.000	-.51	.25
	SUV	-8.63E-02	.112	1.000	-.45	.27
large	small	.24	.184	1.000	-.35	.83
	compact	.37	.191	1.000	-.24	.98
	mid-sized	4.70E-02	.185	1.000	-.54	.64
	luxury	.38	.238	1.000	-.38	1.14
	sports	.35	.200	1.000	-.29	1.00
	minivan/van	-.42	.209	1.000	-1.09	.25
	pickup	-8.18E-02	.199	1.000	-.72	.56
	SUV	-3.93E-02	.194	1.000	-.66	.58
luxury	small	-.14	.177	1.000	-.70	.43
	compact	-8.22E-03	.184	1.000	-.60	.58
	mid-sized	-.33	.178	1.000	-.90	.24
	large	-.38	.238	1.000	-1.14	.38
	sports	-2.41E-02	.194	1.000	-.64	.60
	minivan/van	-.80*	.203	.003	-1.45	-.15
	pickup	-.46	.192	.607	-1.08	.16
	SUV	-.42	.188	.946	-1.02	.18
sports	small	-.11	.121	1.000	-.50	.28
	compact	1.59E-02	.131	1.000	-.40	.43
	mid-sized	-.31	.122	.427	-.70	8.33E-02
	large	-.35	.200	1.000	-1.00	.29
	luxury	2.41E-02	.194	1.000	-.60	.64
	minivan/van	-.78*	.157	.000	-1.28	-.28
	pickup	-.44	.142	.081	-.89	2.03E-02
	SUV	-.39	.136	.141	-.83	4.27E-02
minivan/van	small	.67*	.136	.000	.23	1.10
	compact	.79*	.144	.000	.33	1.26
	mid-sized	.47*	.136	.021	3.40E-02	.91
	large	.42	.209	1.000	-.25	1.09
	luxury	.80*	.203	.003	.15	1.45
	sports	.78*	.157	.000	.28	1.28
	pickup	.34	.155	.990	-.15	.84
	SUV	.38	.149	.364	-9.37E-02	.86
pickup	small	.32	.119	.231	-5.63E-02	.70
	compact	.45*	.129	.016	4.02E-02	.86
	mid-sized	.13	.120	1.000	-.25	.51
	large	8.18E-02	.199	1.000	-.56	.72
	luxury	.46	.192	.607	-.16	1.08
	sports	.44	.142	.081	-2.03E-02	.89
	minivan/van	-.34	.155	.990	-.84	.15
	SUV	4.25E-02	.134	1.000	-.39	.47
SUV	small	.28	.111	.411	-7.45E-02	.64
	compact	.41*	.122	.028	2.01E-02	.80
	mid-sized	8.63E-02	.112	1.000	-.27	.45
	large	3.93E-02	.194	1.000	-.58	.66
	luxury	.42	.188	.946	-.18	1.02
	sports	.39	.136	.141	-4.27E-02	.83
	minivan/van	-.38	.149	.364	-.86	9.37E-02
	pickup	-4.25E-02	.134	1.000	-.47	.39

*. The mean difference is significant at the .05 level.

- Long-Distance Trips by Airplane (Perceived Mobility)

Multiple Comparisons

Dependent Variable: For long-distance trips, I think that I travel... in an airplane
Bonferroni

(I) Vehicle Type	(J) Vehicle Type	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval Lower Bound	95% Confidence Interval Upper Bound
small	compact	8.52E-02	.096	1.000	-.22	.39
	mid-sized	9.90E-02	.086	1.000	-.18	.37
	large	.17	.170	1.000	-.37	.72
	luxury	-.31	.163	1.000	-.83	.21
	sports	-.14	.111	1.000	-.50	.22
	minivan/van	.23	.125	1.000	-.17	.63
	pickup	.51*	.109	.000	.16	.86
	SUV	-3.28E-02	.102	1.000	-.36	.30
compact	small	-8.52E-02	.096	1.000	-.39	.22
	mid-sized	1.38E-02	.097	1.000	-.30	.32
	large	8.80E-02	.175	1.000	-.47	.65
	luxury	-.40	.169	.678	-.94	.14
	sports	-.23	.120	1.000	-.61	.16
	minivan/van	.15	.133	1.000	-.28	.57
	pickup	.43*	.118	.011	4.85E-02	.81
	SUV	-.12	.112	1.000	-.48	.24
mid-sized	small	-9.90E-02	.086	1.000	-.37	.18
	compact	-1.38E-02	.097	1.000	-.32	.30
	large	7.42E-02	.170	1.000	-.47	.62
	luxury	-.41	.164	.432	-.94	.11
	sports	-.24	.112	1.000	-.60	.12
	minivan/van	.14	.126	1.000	-.27	.54
	pickup	.41*	.110	.007	6.06E-02	.77
	SUV	-.13	.103	1.000	-.46	.20
large	small	-.17	.170	1.000	-.72	.37
	compact	-8.80E-02	.175	1.000	-.65	.47
	mid-sized	-7.42E-02	.170	1.000	-.62	.47
	luxury	-.49	.219	.973	-1.19	.22
	sports	-.31	.184	1.000	-.91	.28
	minivan/van	6.15E-02	.193	1.000	-.56	.68
	pickup	.34	.183	1.000	-.25	.93
	SUV	-.21	.179	1.000	-.78	.37
luxury	small	.31	.163	1.000	-.21	.83
	compact	.40	.169	.678	-.14	.94
	mid-sized	.41	.164	.432	-.11	.94
	large	.49	.219	.973	-.22	1.19
	sports	.17	.178	1.000	-.40	.74
	minivan/van	.55	.187	.126	-5.20E-02	1.15
	pickup	.83*	.177	.000	.26	1.39
	SUV	.28	.173	1.000	-.27	.83
sports	small	.14	.111	1.000	-.22	.50
	compact	.23	.120	1.000	-.16	.61
	mid-sized	.24	.112	1.000	-.12	.60
	large	.31	.184	1.000	-.28	.91
	luxury	-.17	.178	1.000	-.74	.40
	minivan/van	.38	.144	.333	-8.61E-02	.84
	pickup	.65*	.131	.000	.23	1.07
	SUV	.11	.125	1.000	-.29	.51
minivan/van	small	-.23	.125	1.000	-.63	.17
	compact	-.15	.133	1.000	-.57	.28
	mid-sized	-.14	.126	1.000	-.54	.27
	large	-6.15E-02	.193	1.000	-.68	.56
	luxury	-.55	.187	.126	-1.15	5.20E-02
	sports	-.38	.144	.333	-.84	8.61E-02
	pickup	.28	.143	1.000	-.18	.74
	SUV	-.27	.138	1.000	-.71	.17
pickup	small	-.51*	.109	.000	-.86	-.16
	compact	-.43*	.118	.011	-.81	-4.85E-02
	mid-sized	-.41*	.110	.007	-.77	-6.06E-02
	large	-.34	.183	1.000	-.93	.25
	luxury	-.83*	.177	.000	-1.39	-.26
	sports	-.65*	.131	.000	-1.07	-.23
	minivan/van	-.28	.143	1.000	-.74	.18
	SUV	-.55*	.124	.000	-.94	-.15
SUV	small	3.28E-02	.102	1.000	-.30	.36
	compact	.12	.112	1.000	-.24	.48
	mid-sized	.13	.103	1.000	-.20	.46
	large	.21	.179	1.000	-.37	.78
	luxury	-.28	.173	1.000	-.83	.27
	sports	-.11	.125	1.000	-.51	.29
	minivan/van	.27	.138	1.000	-.17	.71
	pickup	.55*	.124	.000	.15	.94

*. The mean difference is significant at the .05 level.

- Overall Long-Distance Trips (Perceived Mobility)

Multiple Comparisons

Dependent Variable: For long-distance trips, OVERALL I think that I travel...
Bonferroni

(I) Vehicle Type	(J) Vehicle Type	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval Lower Bound	95% Confidence Interval Upper Bound
small	compact	6.68E-02	.082	1.000	-.20	.33
	mid-sized	-4.40E-02	.073	1.000	-.28	.19
	large	-.29	.145	1.000	-.75	.18
	luxury	-.34	.140	.545	-.79	.11
	sports	-.14	.095	1.000	-.45	.16
	minivan/van	-.28	.107	.333	-.62	6.38E-02
	pickup	-2.35E-02	.094	1.000	-.32	.28
	SUV	-.16	.088	1.000	-.44	.12
compact	small	-6.68E-02	.082	1.000	-.33	.20
	mid-sized	-.11	.083	1.000	-.38	.16
	large	-.35	.150	.663	-.84	.13
	luxury	-.41	.145	.184	-.87	5.76E-02
	sports	-.21	.103	1.000	-.54	.12
	minivan/van	-.35	.114	.087	-.71	1.87E-02
	pickup	-9.03E-02	.101	1.000	-.41	.23
	SUV	-.23	.096	.594	-.54	7.69E-02
mid-sized	small	4.40E-02	.073	1.000	-.19	.28
	compact	.11	.083	1.000	-.16	.38
	large	-.24	.146	1.000	-.71	.22
	luxury	-.30	.140	1.000	-.74	.15
	sports	-9.79E-02	.096	1.000	-.41	.21
	minivan/van	-.23	.108	1.000	-.58	.11
	pickup	2.05E-02	.094	1.000	-.28	.32
	SUV	-.12	.089	1.000	-.40	.16
large	small	.29	.145	1.000	-.18	.75
	compact	.35	.150	.663	-.13	.84
	mid-sized	.24	.146	1.000	-.22	.71
	luxury	-5.17E-02	.188	1.000	-.65	.55
	sports	.15	.158	1.000	-.36	.65
	minivan/van	9.01E-03	.165	1.000	-.52	.54
	pickup	.26	.157	1.000	-.24	.77
	SUV	.12	.153	1.000	-.37	.62
luxury	small	.34	.140	.545	-.11	.79
	compact	.41	.145	.184	-5.76E-02	.87
	mid-sized	.30	.140	1.000	-.15	.74
	large	5.17E-02	.188	1.000	-.55	.65
	sports	.20	.153	1.000	-.29	.69
	minivan/van	6.07E-02	.160	1.000	-.45	.57
	pickup	.32	.152	1.000	-.17	.80
	SUV	.18	.148	1.000	-.30	.65
sports	small	.14	.095	1.000	-.16	.45
	compact	.21	.103	1.000	-.12	.54
	mid-sized	9.79E-02	.096	1.000	-.21	.41
	large	-.15	.158	1.000	-.65	.36
	luxury	-.20	.153	1.000	-.69	.29
	minivan/van	-.14	.124	1.000	-.53	.26
	pickup	.12	.112	1.000	-.24	.48
	SUV	-2.13E-02	.107	1.000	-.37	.32
minivan/van	small	.28	.107	.333	-6.38E-02	.62
	compact	.35	.114	.087	-1.87E-02	.71
	mid-sized	.23	.108	1.000	-.11	.58
	large	-9.01E-03	.165	1.000	-.54	.52
	luxury	-6.07E-02	.160	1.000	-.57	.45
	sports	.14	.124	1.000	-.26	.53
	pickup	.26	.122	1.000	-.14	.65
	SUV	.12	.118	1.000	-.26	.49
pickup	small	2.35E-02	.094	1.000	-.28	.32
	compact	9.03E-02	.101	1.000	-.23	.41
	mid-sized	-2.05E-02	.094	1.000	-.32	.28
	large	-.26	.157	1.000	-.77	.24
	luxury	-.32	.152	1.000	-.80	.17
	sports	-.12	.112	1.000	-.48	.24
	minivan/van	-.26	.122	1.000	-.65	.14
	SUV	-.14	.106	1.000	-.48	.20
SUV	small	.16	.088	1.000	-.12	.44
	compact	.23	.096	.594	-7.69E-02	.54
	mid-sized	.12	.089	1.000	-.16	.40
	large	-.12	.153	1.000	-.62	.37
	luxury	-.18	.148	1.000	-.65	.30
	sports	2.13E-02	.107	1.000	-.32	.37
	minivan/van	-.12	.118	1.000	-.49	.26
	pickup	.14	.106	1.000	-.20	.48

- Short-Distance Trips by Personal Vehicle (Travel Liking)

Multiple Comparisons

Dependent Variable: Liking for short-distance trips, in a personal vehicle
Bonferroni

(I) Vehicle Type	(J) Vehicle Type	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval Lower Bound	95% Confidence Interval Upper Bound
small	compact	-6.82E-02	.071	1.000	-.30	.16
	mid-sized	-.16	.064	.498	-.36	4.69E-02
	large	-.30	.126	.647	-.70	.10
	luxury	-.22	.121	1.000	-.60	.17
	sports	-.16	.083	1.000	-.43	1.00E-01
	minivan/van	-.35*	.093	.005	-.65	-5.82E-02
	pickup	-.25	.081	.084	-.51	1.23E-02
	SUV	-.28*	.076	.010	-.52	-3.37E-02
compact	small	6.82E-02	.071	1.000	-.16	.30
	mid-sized	-8.86E-02	.072	1.000	-.32	.14
	large	-.23	.130	1.000	-.65	.19
	luxury	-.15	.125	1.000	-.55	.25
	sports	-9.63E-02	.089	1.000	-.38	.19
	minivan/van	-.29	.098	.132	-.60	2.88E-02
	pickup	-.18	.088	1.000	-.46	.10
	SUV	-.21	.083	.432	-.47	5.71E-02
mid-sized	small	.16	.064	.498	-4.69E-02	.36
	compact	8.86E-02	.072	1.000	-.14	.32
	large	-.14	.126	1.000	-.54	.26
	luxury	-6.03E-02	.121	1.000	-.45	.33
	sports	-7.75E-03	.083	1.000	-.27	.26
	minivan/van	-.20	.093	1.000	-.50	.10
	pickup	-9.06E-02	.082	1.000	-.35	.17
	SUV	-.12	.077	1.000	-.37	.13
large	small	.30	.126	.647	-.10	.70
	compact	.23	.130	1.000	-.19	.65
	mid-sized	.14	.126	1.000	-.26	.54
	luxury	8.07E-02	.163	1.000	-.44	.60
	sports	.13	.137	1.000	-.30	.57
	minivan/van	-5.69E-02	.143	1.000	-.51	.40
	pickup	5.03E-02	.136	1.000	-.38	.49
	SUV	2.08E-02	.133	1.000	-.40	.45
luxury	small	.22	.121	1.000	-.17	.60
	compact	.15	.125	1.000	-.25	.55
	mid-sized	6.03E-02	.121	1.000	-.33	.45
	large	-8.07E-02	.163	1.000	-.60	.44
	sports	5.25E-02	.132	1.000	-.37	.48
	minivan/van	-.14	.139	1.000	-.58	.31
	pickup	-3.04E-02	.131	1.000	-.45	.39
	SUV	-5.99E-02	.128	1.000	-.47	.35
sports	small	.16	.083	1.000	-1.00E-01	.43
	compact	9.63E-02	.089	1.000	-.19	.38
	mid-sized	7.75E-03	.083	1.000	-.26	.27
	large	-.13	.137	1.000	-.57	.30
	luxury	-5.25E-02	.132	1.000	-.48	.37
	minivan/van	-.19	.107	1.000	-.53	.15
	pickup	-8.29E-02	.097	1.000	-.39	.23
	SUV	-.11	.093	1.000	-.41	.19
minivan/van	small	.35*	.093	.005	5.82E-02	.65
	compact	.29	.098	.132	-2.88E-02	.60
	mid-sized	.20	.093	1.000	-.10	.50
	large	5.69E-02	.143	1.000	-.40	.51
	luxury	.14	.139	1.000	-.31	.58
	sports	.19	.107	1.000	-.15	.53
	pickup	.11	.106	1.000	-.23	.45
	SUV	7.78E-02	.102	1.000	-.25	.40
pickup	small	.25	.081	.084	-1.23E-02	.51
	compact	.18	.088	1.000	-.10	.46
	mid-sized	9.06E-02	.082	1.000	-.17	.35
	large	-5.03E-02	.136	1.000	-.49	.38
	luxury	3.04E-02	.131	1.000	-.39	.45
	sports	8.29E-02	.097	1.000	-.23	.39
	minivan/van	-.11	.106	1.000	-.45	.23
	SUV	-2.95E-02	.092	1.000	-.32	.26
SUV	small	.28*	.076	.010	3.37E-02	.52
	compact	.21	.083	.432	-5.71E-02	.47
	mid-sized	.12	.077	1.000	-.13	.37
	large	-2.08E-02	.133	1.000	-.45	.40
	luxury	5.99E-02	.128	1.000	-.35	.47
	sports	.11	.093	1.000	-.19	.41
	minivan/van	-7.78E-02	.102	1.000	-.40	.25
	pickup	2.95E-02	.092	1.000	-.26	.32

*. The mean difference is significant at the .05 level.

- Long-Distance Trips by Personal Vehicle (Travel Liking)

Multiple Comparisons

Dependent Variable: Liking for long-distance trips, in a personal vehicle
Bonferroni

(I) Vehicle Type	(J) Vehicle Type	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval Lower Bound	95% Confidence Interval Upper Bound
small	compact	-5.41E-02	.079	1.000	-.31	.20
	mid-sized	-9.64E-02	.071	1.000	-.32	.13
	large	-.25	.140	1.000	-.70	.20
	luxury	6.86E-03	.134	1.000	-.42	.44
	sports	-8.01E-02	.092	1.000	-.37	.21
	minivan/van	-.37*	.103	.013	-.70	-3.82E-02
	pickup	-.17	.090	1.000	-.46	.12
	SUV	-.23	.084	.216	-.50	3.80E-02
compact	small	5.41E-02	.079	1.000	-.20	.31
	mid-sized	-4.23E-02	.080	1.000	-.30	.21
	large	-.19	.144	1.000	-.66	.27
	luxury	6.10E-02	.139	1.000	-.39	.51
	sports	-2.60E-02	.099	1.000	-.34	.29
	minivan/van	-.31	.109	.152	-.66	3.68E-02
	pickup	-.11	.097	1.000	-.43	.20
	SUV	-.18	.092	1.000	-.47	.12
mid-sized	small	9.64E-02	.071	1.000	-.13	.32
	compact	4.23E-02	.080	1.000	-.21	.30
	large	-.15	.140	1.000	-.60	.30
	luxury	.10	.135	1.000	-.33	.53
	sports	1.62E-02	.092	1.000	-.28	.31
	minivan/van	-.27	.103	.319	-.60	6.02E-02
	pickup	-7.07E-02	.091	1.000	-.36	.22
	SUV	-.14	.085	1.000	-.41	.14
large	small	.25	.140	1.000	-.20	.70
	compact	.19	.144	1.000	-.27	.66
	mid-sized	.15	.140	1.000	-.30	.60
	luxury	.26	.181	1.000	-.32	.83
	sports	.17	.152	1.000	-.32	.65
	minivan/van	-.12	.159	1.000	-.63	.39
	pickup	8.18E-02	.151	1.000	-.40	.56
	SUV	1.68E-02	.147	1.000	-.46	.49
luxury	small	-6.86E-03	.134	1.000	-.44	.42
	compact	-6.10E-02	.139	1.000	-.51	.39
	mid-sized	-.10	.135	1.000	-.53	.33
	large	-.26	.181	1.000	-.83	.32
	sports	-8.70E-02	.147	1.000	-.56	.38
	minivan/van	-.37	.154	.547	-.87	.12
	pickup	-.17	.146	1.000	-.64	.29
	SUV	-.24	.142	1.000	-.69	.22
sports	small	8.01E-02	.092	1.000	-.21	.37
	compact	2.60E-02	.099	1.000	-.29	.34
	mid-sized	-1.62E-02	.092	1.000	-.31	.28
	large	-.17	.152	1.000	-.65	.32
	luxury	8.70E-02	.147	1.000	-.38	.56
	minivan/van	-.29	.119	.567	-.67	9.33E-02
	pickup	-8.69E-02	.108	1.000	-.43	.26
	SUV	-.15	.103	1.000	-.48	.18
minivan/van	small	.37*	.103	.013	3.82E-02	.70
	compact	.31	.109	.152	-3.68E-02	.66
	mid-sized	.27	.103	.319	-6.02E-02	.60
	large	.12	.159	1.000	-.39	.63
	luxury	.37	.154	.547	-.12	.87
	sports	.29	.119	.567	-9.33E-02	.67
	pickup	.20	.118	1.000	-.18	.58
	SUV	.14	.113	1.000	-.23	.50
pickup	small	.17	.090	1.000	-.12	.46
	compact	.11	.097	1.000	-.20	.43
	mid-sized	7.07E-02	.091	1.000	-.22	.36
	large	-8.18E-02	.151	1.000	-.56	.40
	luxury	.17	.146	1.000	-.29	.64
	sports	8.69E-02	.108	1.000	-.26	.43
	minivan/van	-.20	.118	1.000	-.58	.18
	SUV	-6.49E-02	.102	1.000	-.39	.26
SUV	small	.23	.084	.216	-3.80E-02	.50
	compact	.18	.092	1.000	-.12	.47
	mid-sized	.14	.085	1.000	-.14	.41
	large	-1.68E-02	.147	1.000	-.49	.46
	luxury	.24	.142	1.000	-.22	.69
	sports	.15	.103	1.000	-.18	.48
	minivan/van	-.14	.113	1.000	-.50	.23
	pickup	6.49E-02	.102	1.000	-.26	.39

*. The mean difference is significant at the .05 level.

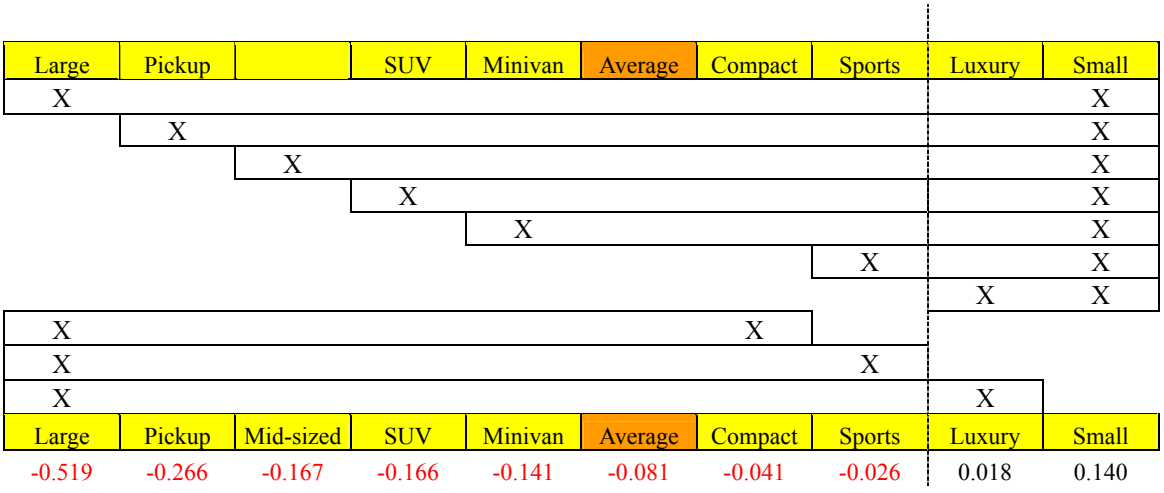
2. Bar Charts

We present bar charts to illustrate the significant differences among vehicle type groups. On the bar charts that follow, each horizontal bar (between x and x) indicates a pair of categories whose means are significantly different at a level of $\alpha = 0.05$, according to the Bonferroni tests reported in Part 1 of this Appendix. The bar charts are not to scale, but the mean values for each category are shown, with negative means appearing in red. "Average" is the sample mean for that variable.

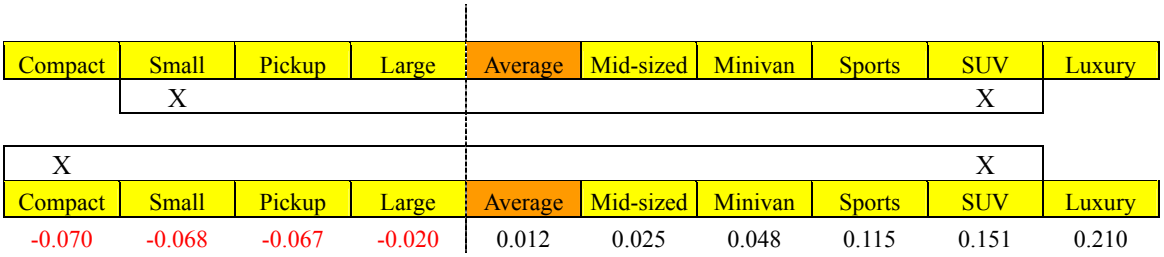
- Travel Dislike (Travel Attitude Factor)

Note: This variable has no pairs of vehicle type categories whose means are significantly different at a level of $\alpha = 0.05$.

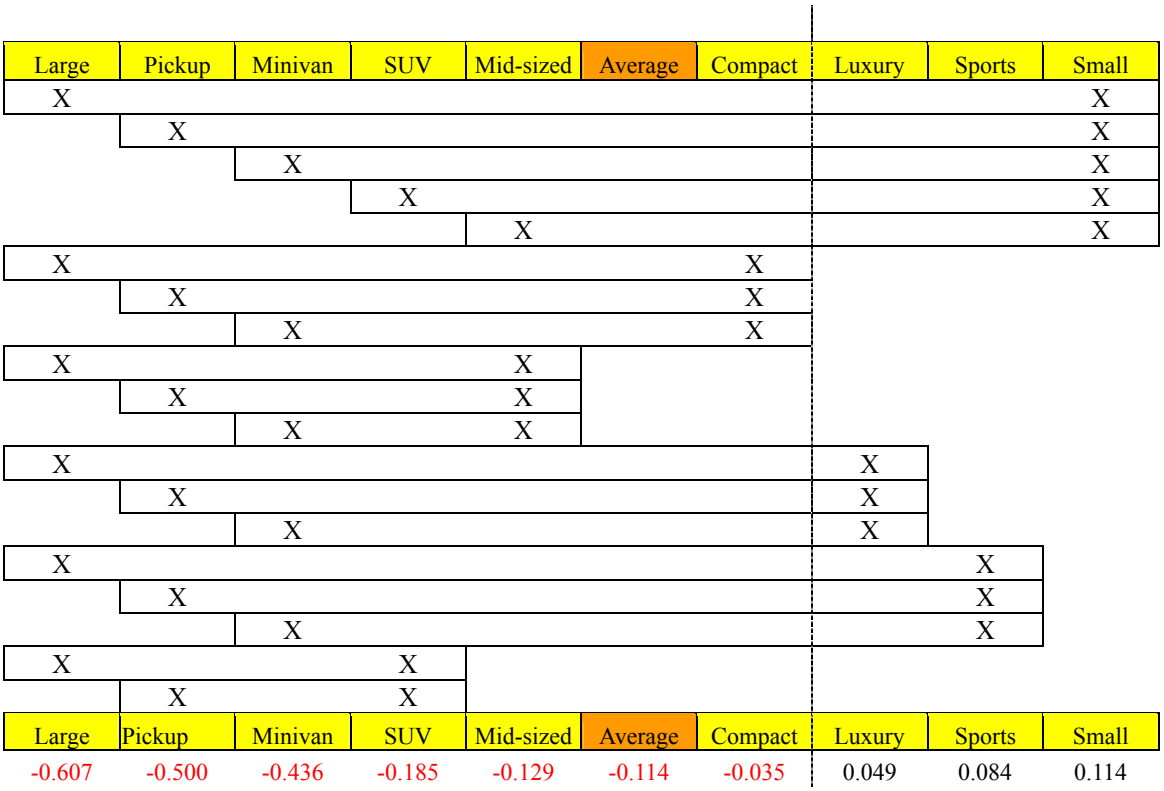
- Pro-environmental Solutions (Travel Attitude Factor)



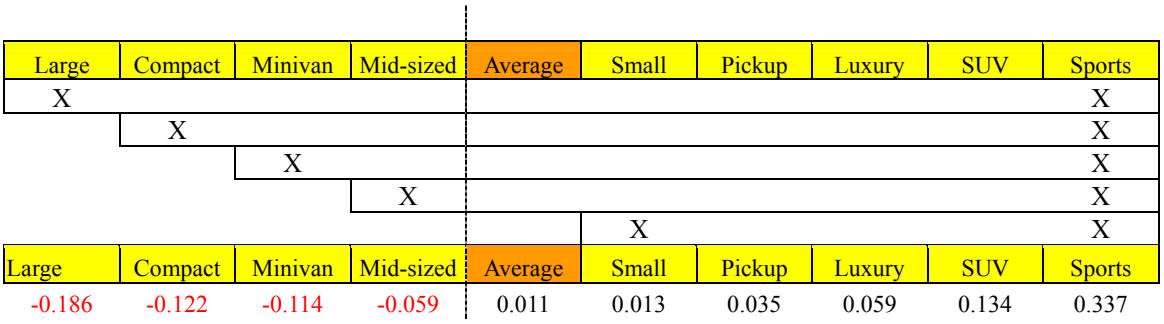
- Travel Freedom (Travel Attitude Factor)



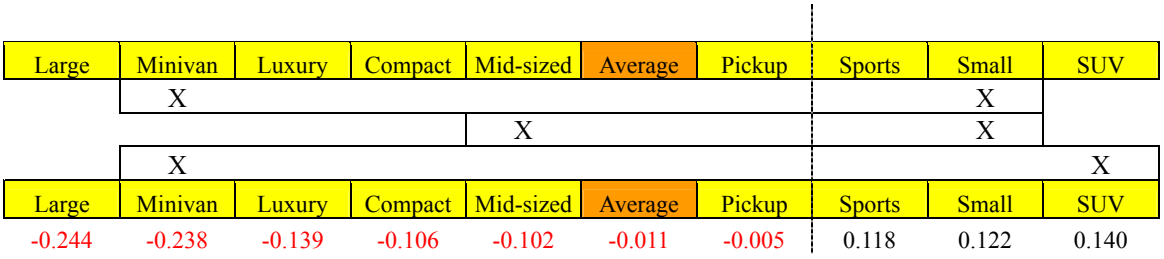
- Pro-high Density (Travel Attitude Factor)



- Adventure Seeker (Personality Factor)



- Loner (Personality Factor)



- Calm (Personality Factor)

Sports		SUV		Pickup	Average	Mid-sized	Small	Compact	Minivan
X									X
X								X	
X							X		
		X							X
Sports	Luxury	SUV	Large	Pickup	Average	Mid-sized	Small	Compact	Minivan
-0.214	-0.192	-0.120	-0.116	-0.048	-0.005	0.006	0.068	0.086	0.211

- Frustrated (Lifestyle Factor)

Luxury	SUV	Sports	Minivan	Mid-sized	Large	Average	Small	Compact	Pickup
	X								X
Luxury	SUV	Sports	Minivan	Mid-sized	Large	Average	Small	Compact	Pickup
-0.181	-0.096	-0.070	-0.034	-0.009	-0.009	-0.004	0.000	0.039	0.192

- Family/Community Oriented (Lifestyle Factor)

Note: This variable has no pairs of vehicle type categories whose means are significantly different at a level of $\alpha = 0.05$.

- Workaholic (Lifestyle Factor)

Small	Sports	Average	Mid-sized	Minivan	SUV	Compact	Large		Luxury
X								X	
Small	Sports	Average	Mid-sized	Minivan	SUV	Compact	Large	Pickup	Luxury
-0.115	-0.099	0.000	0.003	0.004	0.026	0.042	0.112	0.149	0.214

- Status Seeker (Lifestyle Factor)

Small	Minivan	Compact	Mid-sized	Average		Pickup	Large	Sports	Luxury
X									X
X								X	
X						X			
X					X				
	X							X	
	X								X
		X							X
			X						X
Small	Minivan	Compact	Mid-sized	Average	SUV	Pickup	Large	Sports	Luxury
-0.162	-0.148	-0.074	-0.023	0.003	0.106	0.134	0.172	0.186	0.481

- Short-Distance Miles Traveled by Personal Vehicle (Objective Mobility)

Small	Luxury	Compact	Large	Mid-sized	Average	Sports	Minivan	SUV	Pickup
X									X
		X							X
				X					X

Small	Luxury	Compact	Large	Mid-sized	Average	Sports	Minivan	SUV	Pickup
149	149	156	165	169	170	175	180	182	223

- Overall Short-Distance Miles Traveled (Objective Mobility)

Luxury	Small	Compact	Large	Average	Mid-sized	Sports	SUV	Minivan	Pickup
X									X
	X								X
		X							X
					X				X

Luxury	Small	Compact	Large	Average	Mid-sized	Sports	SUV	Minivan	Pickup
165	184	188	196	205	206	212	214	229	266

- Long-Distance Miles Traveled by Airplane (Objective Mobility)

Pickup	Minivan	Large	Compact	Mid-sized	Small		SUV	Sports	
X									X
	X								X
		X							X
			X						X
				X					X
					X				X
							X		X
								X	X
X								X	
X							X		

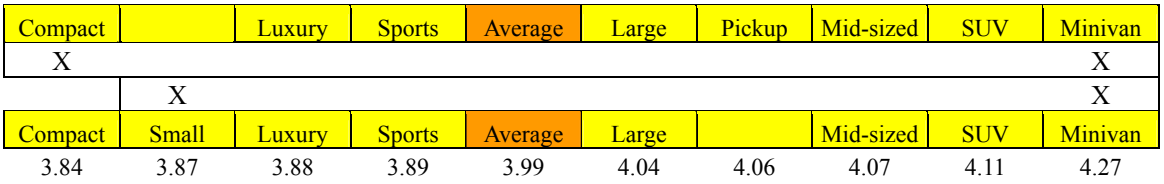
Pickup	Minivan	Large	Compact	Mid-sized	Small	Average	SUV	Sports	Luxury
3,048	3,302	4,450	4,523	4,809	4,931	5,436	7,581	7,794	14,547

- Sum of the Log-Miles for Long-Distance Trips by Airplane (Objective Mobility)

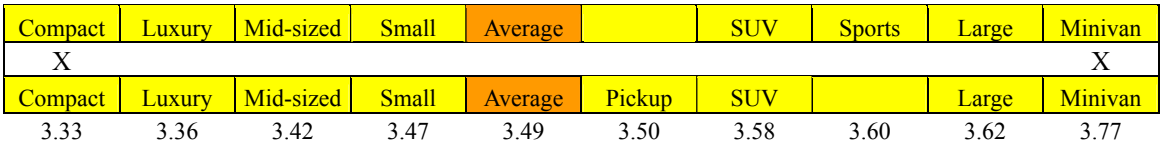
Pickup	Minivan	Small	Large	Compact	Average	Mid-sized	Sports	SUV	Luxury
X									X
	X								X
		X							X
			X						X
				X					X
						X			X
							X		X
								X	X
X								X	
X							X		

Pickup	Minivan	Small	Large	Compact		Mid-sized	Sports	SUV	Luxury
17.2	20.4	26.5	27.2	27.2	30.7	31.1	40.2	41.6	69.7

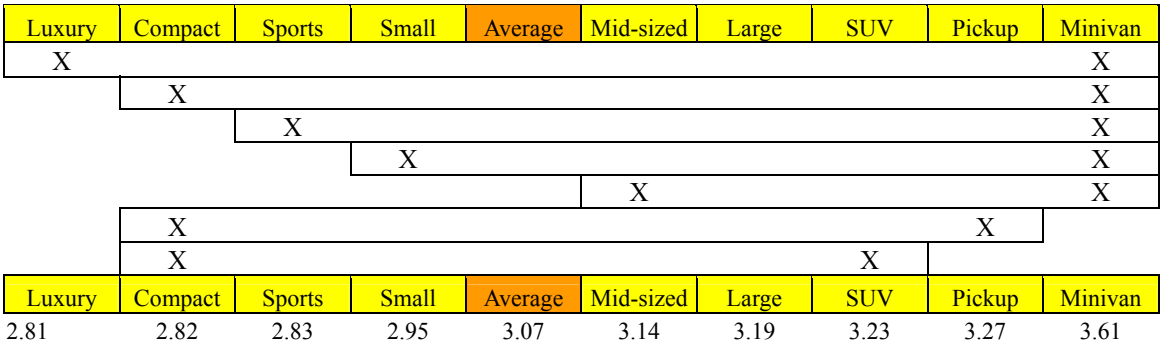
- Short-Distance Trips by Personal Vehicle (Perceived Mobility)



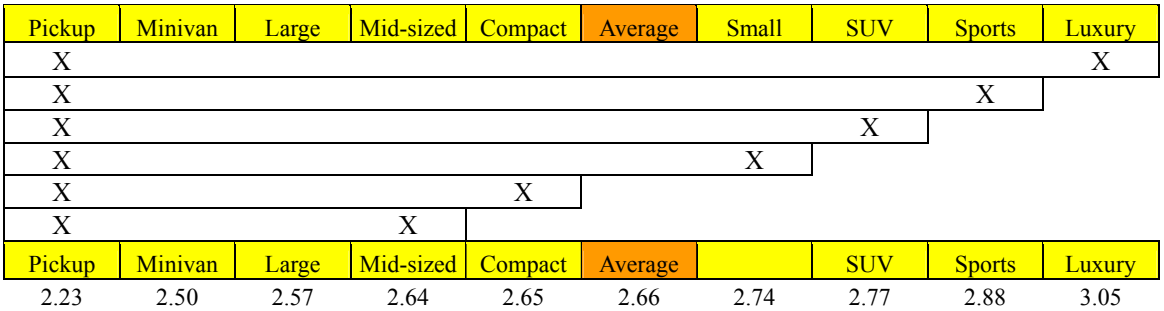
- Overall Short-Distance Trips (Perceived Mobility)



- Long-Distance Trips by Personal Vehicle (Perceived Mobility)



- Long-Distance Trips by Airplane (Perceived Mobility)



- Overall Long-Distance Trips (Perceived Mobility)

Note: This variable has no pairs of vehicle type categories whose means are significantly different at a level of $\alpha = 0.05$.

- Short-Distance Trips by Personal Vehicle (Travel Liking)

Small	Compact	Mid-sized	Average	Sports	Luxury		SUV	Large	Minivan
X									X
X							X		

Small	Compact	Mid-sized	Average	Sports	Luxury	Pickup	SUV	Large	Minivan
3.44	3.51	3.59	3.59	3.60	3.66	3.69	3.72	3.74	3.79

- Long-Distance Trips by Personal Vehicle (Travel Liking)

Luxury	Small	Compact	Sports	Mid-sized	Average	Pickup	SUV	Large	Minivan
	X								X

Luxury	Small	Compact	Sports	Mid-sized	Average	Pickup	SUV	Large	Minivan
3.31	3.32	3.37	3.40	3.41	3.43	3.48	3.55	3.57	3.68

APPENDIX 3. CROSS-TABULATIONS INVOLVING DEMOGRAPHIC VARIABLES

1. Neighborhood by Vehicle Type

NEWTYPE1 * CITYCODE Crosstabulation

			CITYCODE			
			Concord	Pleasant Hill	North San Francisco	Total
NEWTYPE1	small	Count	68	83	221	372
		% within NEWTYPE1	18.3%	22.3%	59.4%	100.0%
		% within CITYCODE	15.7%	16.1%	29.9%	22.1%
		% of Total	4.0%	4.9%	13.1%	22.1%
	compact	Count	63	68	106	237
		% within NEWTYPE1	26.6%	28.7%	44.7%	100.0%
		% within CITYCODE	14.5%	13.2%	14.3%	14.0%
		% of Total	3.7%	4.0%	6.3%	14.0%
	mid-sized	Count	88	123	142	353
		% within NEWTYPE1	24.9%	34.8%	40.2%	100.0%
		% within CITYCODE	20.3%	23.9%	19.2%	20.9%
		% of Total	5.2%	7.3%	8.4%	20.9%
	large	Count	24	18	11	53
		% within NEWTYPE1	45.3%	34.0%	20.8%	100.0%
		% within CITYCODE	5.5%	3.5%	1.5%	3.1%
		% of Total	1.4%	1.1%	.7%	3.1%
	luxury	Count	11	11	36	58
		% within NEWTYPE1	19.0%	19.0%	62.1%	100.0%
		% within CITYCODE	2.5%	2.1%	4.9%	3.4%
		% of Total	.7%	.7%	2.1%	3.4%
	sports	Count	30	41	80	151
		% within NEWTYPE1	19.9%	27.2%	53.0%	100.0%
		% within CITYCODE	6.9%	8.0%	10.8%	9.0%
		% of Total	1.8%	2.4%	4.7%	9.0%
	minivan/van	Count	50	34	27	111
		% within NEWTYPE1	45.0%	30.6%	24.3%	100.0%
		% within CITYCODE	11.5%	6.6%	3.6%	6.6%
		% of Total	3.0%	2.0%	1.6%	6.6%
	pickup	Count	58	65	36	159
		% within NEWTYPE1	36.5%	40.9%	22.6%	100.0%
		% within CITYCODE	13.4%	12.6%	4.9%	9.4%
		% of Total	3.4%	3.9%	2.1%	9.4%
	SUV	Count	41	71	81	193
		% within NEWTYPE1	21.2%	36.8%	42.0%	100.0%
		% within CITYCODE	9.5%	13.8%	10.9%	11.4%
		% of Total	2.4%	4.2%	4.8%	11.4%
Total		Count	433	514	740	1687
		% within NEWTYPE1	25.7%	30.5%	43.9%	100.0%
		% within CITYCODE	100.0%	100.0%	100.0%	100.0%
		% of Total	25.7%	30.5%	43.9%	100.0%

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	127.440[a]	16	.000
Likelihood Ratio	128.080	16	.000
Linear-by-Linear Association	27.165	1	.000
N of Valid Cases	1687		

a. 0 cells (.0%) have expected count less than 5. The minimum expected count is 13.60.

2. Gender by Vehicle Type

Car Type (new) * Are you male or female? Crosstabulation

			Are you male or female?		
			Female	Male	Total
Car Type (new)	small	Count	227	143	370
		% within Car Type (new)	61.4%	38.6%	100.0%
		% within Are you male or female?	26.0%	17.7%	22.0%
		% of Total	13.5%	8.5%	22.0%
	compact	Count	129	108	237
		% within Car Type (new)	54.4%	45.6%	100.0%
		% within Are you male or female?	14.8%	13.4%	14.1%
		% of Total	7.7%	6.4%	14.1%
	mid-sized	Count	202	148	350
		% within Car Type (new)	57.7%	42.3%	100.0%
		% within Are you male or female?	23.2%	18.3%	20.8%
		% of Total	12.0%	8.8%	20.8%
	large	Count	25	27	52
		% within Car Type (new)	48.1%	51.9%	100.0%
		% within Are you male or female?	2.9%	3.3%	3.1%
		% of Total	1.5%	1.6%	3.1%
	luxury	Count	28	30	58
		% within Car Type (new)	48.3%	51.7%	100.0%
		% within Are you male or female?	3.2%	3.7%	3.5%
		% of Total	1.7%	1.8%	3.5%
	sports	Count	78	73	151
		% within Car Type (new)	51.7%	48.3%	100.0%
		% within Are you male or female?	8.9%	9.0%	9.0%
		% of Total	4.6%	4.3%	9.0%
	minivan/van	Count	62	49	111
		% within Car Type (new)	55.9%	44.1%	100.0%
		% within Are you male or female?	7.1%	6.1%	6.6%
		% of Total	3.7%	2.9%	6.6%
	pickup	Count	21	137	158
		% within Car Type (new)	13.3%	86.7%	100.0%
		% within Are you male or female?	2.4%	17.0%	9.4%
		% of Total	1.3%	8.2%	9.4%
	SUV	Count	100	93	193
		% within Car Type (new)	51.8%	48.2%	100.0%
		% within Are you male or female?	11.5%	11.5%	11.5%
		% of Total	6.0%	5.5%	11.5%
Total		Count	872	808	1680
		% within Car Type (new)	51.9%	48.1%	100.0%
		% within Are you male or female?	100.0%	100.0%	100.0%
		% of Total	51.9%	48.1%	100.0%

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	114.243[a]	8	.000
Likelihood Ratio	124.318	8	.000
Linear-by-Linear Association	40.788	1	.000
N of Valid Cases	1680		

a. 0 cells (.0%) have expected count less than 5. The minimum expected count is 25.01.

3. Age by Vehicle Type

Car Type (new) * Age (combined -23 with 24-40, 65-74 with 75-) Crosstabulation

			Age (combined -23 with 24-40, 65-74 with 75-)			
			40 or younger	41-64	65 or older	Total
Car Type (new)	small	Count	199	142	31	372
		% within Car Type (new)	53.5%	38.2%	8.3%	100.0%
		% within Age (combined -23 with 24-40, 65-74 with 75-)	30.5%	17.3%	14.4%	22.1%
		% of Total	11.8%	8.4%	1.8%	22.1%
	compact	Count	87	115	35	237
		% within Car Type (new)	36.7%	48.5%	14.8%	100.0%
		% within Age (combined -23 with 24-40, 65-74 with 75-)	13.3%	14.0%	16.2%	14.0%
		% of Total	5.2%	6.8%	2.1%	14.0%
	mid-sized	Count	98	188	67	353
		% within Car Type (new)	27.8%	53.3%	19.0%	100.0%
		% within Age (combined -23 with 24-40, 65-74 with 75-)	15.0%	23.0%	31.0%	20.9%
		% of Total	5.8%	11.1%	4.0%	20.9%
	large	Count	9	24	20	53
		% within Car Type (new)	17.0%	45.3%	37.7%	100.0%
		% within Age (combined -23 with 24-40, 65-74 with 75-)	1.4%	2.9%	9.3%	3.1%
		% of Total	.5%	1.4%	1.2%	3.1%
	luxury	Count	11	32	15	58
		% within Car Type (new)	19.0%	55.2%	25.9%	100.0%
		% within Age (combined -23 with 24-40, 65-74 with 75-)	1.7%	3.9%	6.9%	3.4%
		% of Total	.7%	1.9%	.9%	3.4%
	sports	Count	72	71	8	151
		% within Car Type (new)	47.7%	47.0%	5.3%	100.0%
		% within Age (combined -23 with 24-40, 65-74 with 75-)	11.0%	8.7%	3.7%	9.0%
		% of Total	4.3%	4.2%	.5%	9.0%
	minivan/van	Count	29	63	19	111
		% within Car Type (new)	26.1%	56.8%	17.1%	100.0%
		% within Age (combined -23 with 24-40, 65-74 with 75-)	4.4%	7.7%	8.8%	6.6%
		% of Total	1.7%	3.7%	1.1%	6.6%
	pickup	Count	53	95	11	159
		% within Car Type (new)	33.3%	59.7%	6.9%	100.0%
		% within Age (combined -23 with 24-40, 65-74 with 75-)	8.1%	11.6%	5.1%	9.4%
		% of Total	3.1%	5.6%	.7%	9.4%
	SUV	Count	94	89	10	193
		% within Car Type (new)	48.7%	46.1%	5.2%	100.0%
		% within Age (combined -23 with 24-40, 65-74 with 75-)	14.4%	10.9%	4.6%	11.4%
		% of Total	5.6%	5.3%	.6%	11.4%
Total		Count	652	819	216	1687
		% within Car Type (new)	38.6%	48.5%	12.8%	100.0%
		% within Age (combined -23 with 24-40, 65-74 with 75-)	100.0%	100.0%	100.0%	100.0%
		% of Total	38.6%	48.5%	12.8%	100.0%

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	146.697[a]	16	.000
Likelihood Ratio	142.850	16	.000
Linear-by-Linear Association	.025	1	.875
N of Valid Cases	1687		

a. 0 cells (.0%) have expected count less than 5. The minimum expected count is 6.79.

4. Education by Vehicle Type

Car Type (new) * Education (combined some high school with high school diploma) Crosstabulation

			Education (combined some high school with high school diploma)					
			some or high school diploma	some college or technical school	4-year college/technical school degree	some graduate school	completed graduate degree	Total
Car Type (new)	small	Count	20	88	136	42	85	371
		% within Car Type (new)	5.4%	23.7%	36.7%	11.3%	22.9%	100.0%
		% within Education (combined some high school with high school diploma)	16.3%	19.6%	25.9%	22.1%	21.3%	22.0%
		% of Total	1.2%	5.2%	8.1%	2.5%	5.0%	22.0%
	compact	Count	14	62	68	26	67	237
		% within Car Type (new)	5.9%	26.2%	28.7%	11.0%	28.3%	100.0%
		% within Education (combined some high school with high school diploma)	11.4%	13.8%	13.0%	13.7%	16.8%	14.1%
		% of Total	.8%	3.7%	4.0%	1.5%	4.0%	14.1%
	mid-sized	Count	26	92	115	39	81	353
		% within Car Type (new)	7.4%	26.1%	32.6%	11.0%	22.9%	100.0%
		% within Education (combined some high school with high school diploma)	21.1%	20.5%	21.9%	20.5%	20.3%	20.9%
		% of Total	1.5%	5.5%	6.8%	2.3%	4.8%	20.9%
	large	Count	10	17	12	3	11	53
		% within Car Type (new)	18.9%	32.1%	22.6%	5.7%	20.8%	100.0%
		% within Education (combined some high school with high school diploma)	8.1%	3.8%	2.3%	1.6%	2.8%	3.1%
		% of Total	.6%	1.0%	.7%	.2%	.7%	3.1%
	luxury	Count	1	13	16	11	17	58
		% within Car Type (new)	1.7%	22.4%	27.6%	19.0%	29.3%	100.0%
		% within Education (combined some high school with high school diploma)	.8%	2.9%	3.0%	5.8%	4.3%	3.4%
		% of Total	.1%	.8%	.9%	.7%	1.0%	3.4%
	sports	Count	7	32	53	22	37	151
		% within Car Type (new)	4.6%	21.2%	35.1%	14.6%	24.5%	100.0%
		% within Education (combined some high school with high school diploma)	5.7%	7.1%	10.1%	11.6%	9.3%	9.0%
		% of Total	.4%	1.9%	3.1%	1.3%	2.2%	9.0%
	minivan/van	Count	10	42	20	16	23	111
		% within Car Type (new)	9.0%	37.8%	18.0%	14.4%	20.7%	100.0%
		% within Education (combined some high school with high school diploma)	8.1%	9.4%	3.8%	8.4%	5.8%	6.6%
		% of Total	.6%	2.5%	1.2%	.9%	1.4%	6.6%
	pickup	Count	20	68	37	10	24	159
		% within Car Type (new)	12.6%	42.8%	23.3%	6.3%	15.1%	100.0%
		% within Education (combined some high school with high school diploma)	16.3%	15.2%	7.0%	5.3%	6.0%	9.4%
		% of Total	1.2%	4.0%	2.2%	.6%	1.4%	9.4%
	SUV	Count	15	34	68	21	55	193
		% within Car Type (new)	7.8%	17.6%	35.2%	10.9%	28.5%	100.0%
		% within Education (combined some high school with high school diploma)	12.2%	7.6%	13.0%	11.1%	13.8%	11.4%
		% of Total	.9%	2.0%	4.0%	1.2%	3.3%	11.4%
Total		Count	123	448	525	190	400	1686
		% within Car Type (new)	7.3%	26.6%	31.1%	11.3%	23.7%	100.0%
		% within Education (combined some high school with high school diploma)	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
		% of Total	7.3%	26.6%	31.1%	11.3%	23.7%	100.0%

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	91.284[a]	32	.000
Likelihood Ratio	88.636	32	.000
Linear-by-Linear Association	2.804	1	.094
N of Valid Cases	1686		

a. 2 cells (4.4%) have expected count less than 5. The minimum expected count is 3.87.

5. Employment Status by Vehicle Type

Car Type (new) * Employment status (combined unemployed with homemaker and non-employed student Crosstabulation

			Employment status (combined unemployed with homemaker and non-employed student				
			full-time	part-time	unemployed	retired	Total
Car Type (new)	small	Count	272	50	18	32	372
		% within Car Type (new)	73.1%	13.4%	4.8%	8.6%	100.0%
		% within Employment status (combined unemployed with homemaker and non-employed student	24.1%	22.0%	17.1%	14.1%	22.1%
		% of Total	16.1%	3.0%	1.1%	1.9%	22.1%
	compact	Count	151	37	21	28	237
		% within Car Type (new)	63.7%	15.6%	8.9%	11.8%	100.0%
		% within Employment status (combined unemployed with homemaker and non-employed student	13.4%	16.3%	20.0%	12.3%	14.1%
		% of Total	9.0%	2.2%	1.2%	1.7%	14.1%
	mid-sized	Count	217	44	21	71	353
		% within Car Type (new)	61.5%	12.5%	5.9%	20.1%	100.0%
		% within Employment status (combined unemployed with homemaker and non-employed student	19.3%	19.4%	20.0%	31.3%	20.9%
		% of Total	12.9%	2.6%	1.2%	4.2%	20.9%
	large	Count	20	11		22	53
		% within Car Type (new)	37.7%	20.8%		41.5%	100.0%
		% within Employment status (combined unemployed with homemaker and non-employed student	1.8%	4.8%		9.7%	3.1%
		% of Total	1.2%	.7%		1.3%	3.1%
	luxury	Count	28	11	5	13	57
		% within Car Type (new)	49.1%	19.3%	8.8%	22.8%	100.0%
		% within Employment status (combined unemployed with homemaker and non-employed student	2.5%	4.8%	4.8%	5.7%	3.4%
		% of Total	1.7%	.7%	.3%	.8%	3.4%
	sports	Count	105	27	6	13	151
		% within Car Type (new)	69.5%	17.9%	4.0%	8.6%	100.0%
		% within Employment status (combined unemployed with homemaker and non-employed student	9.3%	11.9%	5.7%	5.7%	9.0%
		% of Total	6.2%	1.6%	.4%	.8%	9.0%
	minivan/van	Count	59	19	14	19	111
		% within Car Type (new)	53.2%	17.1%	12.6%	17.1%	100.0%
		% within Employment status (combined unemployed with homemaker and non-employed student	5.2%	8.4%	13.3%	8.4%	6.6%
		% of Total	3.5%	1.1%	.8%	1.1%	6.6%
	pickup	Count	124	11	7	17	159
		% within Car Type (new)	78.0%	6.9%	4.4%	10.7%	100.0%
		% within Employment status (combined unemployed with homemaker and non-employed student	11.0%	4.8%	6.7%	7.5%	9.4%
		% of Total	7.4%	.7%	.4%	1.0%	9.4%
	SUV	Count	151	17	13	12	193
		% within Car Type (new)	78.2%	8.8%	6.7%	6.2%	100.0%
		% within Employment status (combined unemployed with homemaker and non-employed student	13.4%	7.5%	12.4%	5.3%	11.4%
		% of Total	9.0%	1.0%	.8%	.7%	11.4%
Total		Count	1127	227	105	227	1686
		% within Car Type (new)	66.8%	13.5%	6.2%	13.5%	100.0%
		% within Employment status (combined unemployed with homemaker and non-employed student	100.0%	100.0%	100.0%	100.0%	100.0%
		% of Total	66.8%	13.5%	6.2%	13.5%	100.0%

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	122.094[a]	24	.000
Likelihood Ratio	115.794	24	.000
Linear-by-Linear Association	1.272	1	.259
N of Valid Cases	1686		

a. 2 cells (5.6%) have expected count less than 5. The minimum expected count is 3.30.

6. Occupation by Vehicle Type

Car Type (new) * Occupation (combined service/repair with production/construction, and discard other) Crosstabulation

			Occupation (combined service/repair with production/construction, and discard other)						
			homemaker	sales	production/construction/service/repair	manager/administrator	clerical/administrative support	professional/technical	Total
Car Type (new)	small	Count	10	30	27	60	51	185	363
		% within Car Type (new)	2.8%	8.3%	7.4%	16.5%	14.0%	51.0%	100.0%
		% within Occupation (combined service/repair with production/construction, and discard other)	12.7%	20.4%	18.2%	17.1%	30.9%	24.3%	22.0%
		% of Total	.6%	1.8%	1.6%	3.6%	3.1%	11.2%	22.0%
	compact	Count	12	19	14	46	20	118	229
		% within Car Type (new)	5.2%	8.3%	6.1%	20.1%	8.7%	51.5%	100.0%
		% within Occupation (combined service/repair with production/construction, and discard other)	15.2%	12.9%	9.5%	13.1%	12.1%	15.5%	13.9%
		% of Total	.7%	1.2%	.8%	2.8%	1.2%	7.2%	13.9%
	mid-sized	Count	24	41	24	68	34	156	347
		% within Car Type (new)	6.9%	11.8%	6.9%	19.6%	9.8%	45.0%	100.0%
		% within Occupation (combined service/repair with production/construction, and discard other)	30.4%	27.9%	16.2%	19.4%	20.6%	20.5%	21.0%
		% of Total	1.5%	2.5%	1.5%	4.1%	2.1%	9.5%	21.0%
	large	Count	2	8	5	16	6	15	52
		% within Car Type (new)	3.8%	15.4%	9.6%	30.8%	11.5%	28.8%	100.0%
		% within Occupation (combined service/repair with production/construction, and discard other)	2.5%	5.4%	3.4%	4.6%	3.6%	2.0%	3.2%
		% of Total	.1%	.5%	.3%	1.0%	.4%	.9%	3.2%
	luxury	Count	2	8	1	16	4	25	56
		% within Car Type (new)	3.6%	14.3%	1.8%	28.6%	7.1%	44.6%	100.0%
		% within Occupation (combined service/repair with production/construction, and discard other)	2.5%	5.4%	.7%	4.6%	2.4%	3.3%	3.4%
		% of Total	.1%	.5%	.1%	1.0%	.2%	1.5%	3.4%
	sports	Count	6	11	11	34	16	72	150
		% within Car Type (new)	4.0%	7.3%	7.3%	22.7%	10.7%	48.0%	100.0%
		% within Occupation (combined service/repair with production/construction, and discard other)	7.6%	7.5%	7.4%	9.7%	9.7%	9.5%	9.1%
		% of Total	.4%	.7%	.7%	2.1%	1.0%	4.4%	9.1%
	minivan/van	Count	13	9	16	19	10	42	109
		% within Car Type (new)	11.9%	8.3%	14.7%	17.4%	9.2%	38.5%	100.0%
		% within Occupation (combined service/repair with production/construction, and discard other)	16.5%	6.1%	10.8%	5.4%	6.1%	5.5%	6.6%
		% of Total	.8%	.5%	1.0%	1.2%	.6%	2.5%	6.6%
	pickup	Count		9	35	42	12	55	153
		% within Car Type (new)		5.9%	22.9%	27.5%	7.8%	35.9%	100.0%
		% within Occupation (combined service/repair with production/construction, and discard other)		6.1%	23.6%	12.0%	7.3%	7.2%	9.3%
		% of Total		.5%	2.1%	2.5%	.7%	3.3%	9.3%
	SUV	Count	10	12	15	49	12	92	190
		% within Car Type (new)	5.3%	6.3%	7.9%	25.8%	6.3%	48.4%	100.0%
		% within Occupation (combined service/repair with production/construction, and discard other)	12.7%	8.2%	10.1%	14.0%	7.3%	12.1%	11.5%
		% of Total	.6%	.7%	.9%	3.0%	.7%	5.6%	11.5%
Total		Count	79	147	148	350	165	760	1649
		% within Car Type (new)	4.8%	8.9%	9.0%	21.2%	10.0%	46.1%	100.0%
		% within Occupation (combined service/repair with production/construction, and discard other)	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
		% of Total	4.8%	8.9%	9.0%	21.2%	10.0%	46.1%	100.0%

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	118.604[a]	40	.000
Likelihood Ratio	113.786	40	.000
Linear-by-Linear Association	4.566	1	.033
N of Valid Cases	1649		

a. 5 cells (9.3%) have expected count less than 5. The minimum expected count is 2.49.

7. Personal Income by Vehicle Type

Car Type (new) * Approximate PERSONAL income Crosstabulation

			Approximate PERSONAL income						
			Less than $15,000	$15,00 - $34,999	$35,000 - $54,999	$55,000 - $74,999	$75,000 - $94,999	$95,000 or more	Total
Car Type (new)	small	Count	39	103	120	48	19	24	353
		% within Car Type (new)	11.0%	29.2%	34.0%	13.6%	5.4%	6.8%	100.0%
		% within Approximate PERSONAL income	24.8%	29.6%	26.4%	16.4%	12.3%	11.5%	21.9%
		% of Total	2.4%	6.4%	7.4%	3.0%	1.2%	1.5%	21.9%
	compact	Count	23	48	67	48	24	18	228
		% within Car Type (new)	10.1%	21.1%	29.4%	21.1%	10.5%	7.9%	100.0%
		% within Approximate PERSONAL income	14.6%	13.8%	14.7%	16.4%	15.6%	8.6%	14.1%
		% of Total	1.4%	3.0%	4.1%	3.0%	1.5%	1.1%	14.1%
	mid-sized	Count	29	66	80	64	39	59	337
		% within Car Type (new)	8.6%	19.6%	23.7%	19.0%	11.6%	17.5%	100.0%
		% within Approximate PERSONAL income	18.5%	19.0%	17.6%	21.9%	25.3%	28.2%	20.9%
		% of Total	1.8%	4.1%	5.0%	4.0%	2.4%	3.7%	20.9%
	large	Count	8	9	13	9	3	7	49
		% within Car Type (new)	16.3%	18.4%	26.5%	18.4%	6.1%	14.3%	100.0%
		% within Approximate PERSONAL income	5.1%	2.6%	2.9%	3.1%	1.9%	3.3%	3.0%
		% of Total	.5%	.6%	.8%	.6%	.2%	.4%	3.0%
	luxury	Count	4	5	10	13	5	20	57
		% within Car Type (new)	7.0%	8.8%	17.5%	22.8%	8.8%	35.1%	100.0%
		% within Approximate PERSONAL income	2.5%	1.4%	2.2%	4.5%	3.2%	9.6%	3.5%
		% of Total	.2%	.3%	.6%	.8%	.3%	1.2%	3.5%
	sports	Count	7	35	41	22	16	24	145
		% within Car Type (new)	4.8%	24.1%	28.3%	15.2%	11.0%	16.6%	100.0%
		% within Approximate PERSONAL income	4.5%	10.1%	9.0%	7.5%	10.4%	11.5%	9.0%
		% of Total	.4%	2.2%	2.5%	1.4%	1.0%	1.5%	9.0%
	minivan/van	Count	21	18	31	18	9	11	108
		% within Car Type (new)	19.4%	16.7%	28.7%	16.7%	8.3%	10.2%	100.0%
		% within Approximate PERSONAL income	13.4%	5.2%	6.8%	6.2%	5.8%	5.3%	6.7%
		% of Total	1.3%	1.1%	1.9%	1.1%	.6%	.7%	6.7%
	pickup	Count	8	37	50	32	16	12	155
		% within Car Type (new)	5.2%	23.9%	32.3%	20.6%	10.3%	7.7%	100.0%
		% within Approximate PERSONAL income	5.1%	10.6%	11.0%	11.0%	10.4%	5.7%	9.6%
		% of Total	.5%	2.3%	3.1%	2.0%	1.0%	.7%	9.6%
	SUV	Count	18	27	43	38	23	34	183
		% within Car Type (new)	9.8%	14.8%	23.5%	20.8%	12.6%	18.6%	100.0%
		% within Approximate PERSONAL income	11.5%	7.8%	9.5%	13.0%	14.9%	16.3%	11.3%
		% of Total	1.1%	1.7%	2.7%	2.4%	1.4%	2.1%	11.3%
Total		Count	157	348	455	292	154	209	1615
		% within Car Type (new)	9.7%	21.5%	28.2%	18.1%	9.5%	12.9%	100.0%
		% within Approximate PERSONAL income	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
		% of Total	9.7%	21.5%	28.2%	18.1%	9.5%	12.9%	100.0%

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	123.978[a]	40	.000
Likelihood Ratio	120.536	40	.000
Linear-by-Linear Association	16.657	1	.000
N of Valid Cases	1615		

a. 2 cells (3.7%) have expected count less than 5. The minimum expected count is 4.67.

8. Household Income by Vehicle Type

Car Type (new) * Household income (combined less than 15,000 with 15,000-34,999) Crosstabulation

			Household income (combined less than 15,000 with 15,000-34,999)					
			less than $35,000	$35,000-$54,999	$55,000-$74,999	$75,000-$94,999	$95,000 or more	Total
Car Type (new)	small	Count	71	98	66	57	66	358
		% within Car Type (new)	19.8%	27.4%	18.4%	15.9%	18.4%	100.0%
		% within Household income (combined less than 15,000 with 15,000-34,999)	31.7%	28.8%	22.5%	20.7%	13.7%	22.2%
		% of Total	4.4%	6.1%	4.1%	3.5%	4.1%	22.2%
	compact	Count	37	51	47	33	58	226
		% within Car Type (new)	16.4%	22.6%	20.8%	14.6%	25.7%	100.0%
		% within Household income (combined less than 15,000 with 15,000-34,999)	16.5%	15.0%	16.0%	12.0%	12.0%	14.0%
		% of Total	2.3%	3.2%	2.9%	2.0%	3.6%	14.0%
	mid-sized	Count	41	49	68	64	115	337
		% within Car Type (new)	12.2%	14.5%	20.2%	19.0%	34.1%	100.0%
		% within Household income (combined less than 15,000 with 15,000-34,999)	18.3%	14.4%	23.2%	23.2%	23.8%	20.9%
		% of Total	2.5%	3.0%	4.2%	4.0%	7.1%	20.9%
	large	Count	9	11	10	9	10	49
		% within Car Type (new)	18.4%	22.4%	20.4%	18.4%	20.4%	100.0%
		% within Household income (combined less than 15,000 with 15,000-34,999)	4.0%	3.2%	3.4%	3.3%	2.1%	3.0%
		% of Total	.6%	.7%	.6%	.6%	.6%	3.0%
	luxury	Count	3	6	8	7	33	57
		% within Car Type (new)	5.3%	10.5%	14.0%	12.3%	57.9%	100.0%
		% within Household income (combined less than 15,000 with 15,000-34,999)	1.3%	1.8%	2.7%	2.5%	6.8%	3.5%
		% of Total	.2%	.4%	.5%	.4%	2.0%	3.5%
	sports	Count	17	31	20	24	52	144
		% within Car Type (new)	11.8%	21.5%	13.9%	16.7%	36.1%	100.0%
		% within Household income (combined less than 15,000 with 15,000-34,999)	7.6%	9.1%	6.8%	8.7%	10.8%	8.9%
		% of Total	1.1%	1.9%	1.2%	1.5%	3.2%	8.9%
	minivan/van	Count	10	24	22	25	28	109
		% within Car Type (new)	9.2%	22.0%	20.2%	22.9%	25.7%	100.0%
		% within Household income (combined less than 15,000 with 15,000-34,999)	4.5%	7.1%	7.5%	9.1%	5.8%	6.7%
		% of Total	.6%	1.5%	1.4%	1.5%	1.7%	6.7%
	pickup	Count	20	44	31	21	38	154
		% within Car Type (new)	13.0%	28.6%	20.1%	13.6%	24.7%	100.0%
		% within Household income (combined less than 15,000 with 15,000-34,999)	8.9%	12.9%	10.6%	7.6%	7.9%	9.5%
		% of Total	1.2%	2.7%	1.9%	1.3%	2.4%	9.5%
	SUV	Count	16	26	21	36	83	182
		% within Car Type (new)	8.8%	14.3%	11.5%	19.8%	45.6%	100.0%
		% within Household income (combined less than 15,000 with 15,000-34,999)	7.1%	7.6%	7.2%	13.0%	17.2%	11.3%
		% of Total	1.0%	1.6%	1.3%	2.2%	5.1%	11.3%
Total		Count	224	340	293	276	483	1616
		% within Car Type (new)	13.9%	21.0%	18.1%	17.1%	29.9%	100.0%
		% within Household income (combined less than 15,000 with 15,000-34,999)	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
		% of Total	13.9%	21.0%	18.1%	17.1%	29.9%	100.0%

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	115.248[a]	32	.000
Likelihood Ratio	114.760	32	.000
Linear-by-Linear Association	31.507	1	.000
N of Valid Cases	1616		

a. 0 cells (.0%) have expected count less than 5. The minimum expected count is 6.79.

9. Number of Vehicles by Vehicle Type

NEWTYPE1 * F6_ALT1 Crosstabulation

			F6_ALT1				
			1	2	3	4 or more	Total
NEWTYPE1	small	Count	174	145	31	16	366
		% within NEWTYPE1	47.5%	39.6%	8.5%	4.4%	100.0%
		% within F6_ALT1	29.0%	20.2%	13.2%	13.3%	21.9%
		% of Total	10.4%	8.7%	1.9%	1.0%	21.9%
	compact	Count	117	83	24	12	236
		% within NEWTYPE1	49.6%	35.2%	10.2%	5.1%	100.0%
		% within F6_ALT1	19.5%	11.5%	10.3%	10.0%	14.1%
		% of Total	7.0%	5.0%	1.4%	.7%	14.1%
	mid-sized	Count	117	154	57	23	351
		% within NEWTYPE1	33.3%	43.9%	16.2%	6.6%	100.0%
		% within F6_ALT1	19.5%	21.4%	24.4%	19.2%	21.0%
		% of Total	7.0%	9.2%	3.4%	1.4%	21.0%
	large	Count	17	19	10	6	52
		% within NEWTYPE1	32.7%	36.5%	19.2%	11.5%	100.0%
		% within F6_ALT1	2.8%	2.6%	4.3%	5.0%	3.1%
		% of Total	1.0%	1.1%	.6%	.4%	3.1%
	luxury	Count	16	23	11	8	58
		% within NEWTYPE1	27.6%	39.7%	19.0%	13.8%	100.0%
		% within F6_ALT1	2.7%	3.2%	4.7%	6.7%	3.5%
		% of Total	1.0%	1.4%	.7%	.5%	3.5%
	sports	Count	53	64	20	12	149
		% within NEWTYPE1	35.6%	43.0%	13.4%	8.1%	100.0%
		% within F6_ALT1	8.8%	8.9%	8.5%	10.0%	8.9%
		% of Total	3.2%	3.8%	1.2%	.7%	8.9%
	minivan/van	Count	18	59	21	13	111
		% within NEWTYPE1	16.2%	53.2%	18.9%	11.7%	100.0%
		% within F6_ALT1	3.0%	8.2%	9.0%	10.8%	6.6%
		% of Total	1.1%	3.5%	1.3%	.8%	6.6%
	pickup	Count	30	80	30	16	156
		% within NEWTYPE1	19.2%	51.3%	19.2%	10.3%	100.0%
		% within F6_ALT1	5.0%	11.1%	12.8%	13.3%	9.3%
		% of Total	1.8%	4.8%	1.8%	1.0%	9.3%
	SUV	Count	57	92	30	14	193
		% within NEWTYPE1	29.5%	47.7%	15.5%	7.3%	100.0%
		% within F6_ALT1	9.5%	12.8%	12.8%	11.7%	11.5%
		% of Total	3.4%	5.5%	1.8%	.8%	11.5%
Total		Count	599	719	234	120	1672
		% within NEWTYPE1	35.8%	43.0%	14.0%	7.2%	100.0%
		% within F6_ALT1	100.0%	100.0%	100.0%	100.0%	100.0%
		% of Total	35.8%	43.0%	14.0%	7.2%	100.0%

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	100.616[a]	24	.000
Likelihood Ratio	103.534	24	.000
Linear-by-Linear Association	49.913	1	.000
N of Valid Cases	1672		

a. 2 cells (5.6%) have expected count less than 5. The minimum expected count is 3.73.

10. Number of Driver's Licenses by Vehicle Type

Car Type (new) * number of driver licenses in a household (created 4 or more, 4-6) Crosstabulation

			number of driver licenses in a household (created 4 or more, 4-6)				
			1	2	3	4 or more	Total
Car Type (new)	small	Count	137	180	38	16	371
		% within Car Type (new)	36.9%	48.5%	10.2%	4.3%	100.0%
		% within number of driver licenses in a household (created 4 or more, 4-6)	27.6%	20.5%	17.2%	18.0%	22.0%
		% of Total	8.1%	10.7%	2.3%	.9%	22.0%
	compact	Count	89	102	29	17	237
		% within Car Type (new)	37.6%	43.0%	12.2%	7.2%	100.0%
		% within number of driver licenses in a household (created 4 or more, 4-6)	17.9%	11.6%	13.1%	19.1%	14.1%
		% of Total	5.3%	6.1%	1.7%	1.0%	14.1%
	mid-sized	Count	95	194	50	13	352
		% within Car Type (new)	27.0%	55.1%	14.2%	3.7%	100.0%
		% within number of driver licenses in a household (created 4 or more, 4-6)	19.2%	22.1%	22.6%	14.6%	20.9%
		% of Total	5.6%	11.5%	3.0%	.8%	20.9%
	large	Count	16	31	5	1	53
		% within Car Type (new)	30.2%	58.5%	9.4%	1.9%	100.0%
		% within number of driver licenses in a household (created 4 or more, 4-6)	3.2%	3.5%	2.3%	1.1%	3.1%
		% of Total	.9%	1.8%	.3%	.1%	3.1%
	luxury	Count	18	24	14	2	58
		% within Car Type (new)	31.0%	41.4%	24.1%	3.4%	100.0%
		% within number of driver licenses in a household (created 4 or more, 4-6)	3.6%	2.7%	6.3%	2.2%	3.4%
		% of Total	1.1%	1.4%	.8%	.1%	3.4%
	sports	Count	46	80	20	5	151
		% within Car Type (new)	30.5%	53.0%	13.2%	3.3%	100.0%
		% within number of driver licenses in a household (created 4 or more, 4-6)	9.3%	9.1%	9.0%	5.6%	9.0%
		% of Total	2.7%	4.7%	1.2%	.3%	9.0%
	minivan/van	Count	18	64	17	12	111
		% within Car Type (new)	16.2%	57.7%	15.3%	10.8%	100.0%
		% within number of driver licenses in a household (created 4 or more, 4-6)	3.6%	7.3%	7.7%	13.5%	6.6%
		% of Total	1.1%	3.8%	1.0%	.7%	6.6%
	pickup	Count	41	85	22	11	159
		% within Car Type (new)	25.8%	53.5%	13.8%	6.9%	100.0%
		% within number of driver licenses in a household (created 4 or more, 4-6)	8.3%	9.7%	10.0%	12.4%	9.4%
		% of Total	2.4%	5.0%	1.3%	.7%	9.4%
	SUV	Count	36	119	26	12	193
		% within Car Type (new)	18.7%	61.7%	13.5%	6.2%	100.0%
		% within number of driver licenses in a household (created 4 or more, 4-6)	7.3%	13.5%	11.8%	13.5%	11.5%
		% of Total	2.1%	7.1%	1.5%	.7%	11.5%
Total		Count	496	879	221	89	1685
		% within Car Type (new)	29.4%	52.2%	13.1%	5.3%	100.0%
		% within number of driver licenses in a household (created 4 or more, 4-6)	100.0%	100.0%	100.0%	100.0%	100.0%
		% of Total	29.4%	52.2%	13.1%	5.3%	100.0%

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	62.544[a]	24	.000
Likelihood Ratio	62.445	24	.000
Linear-by-Linear Association	19.645	1	.000
N of Valid Cases	1685		

a. 2 cells (5.6%) have expected count less than 5. The minimum expected count is 2.80.

11. Number of Workers by Vehicle Type

Car Type (new) * number of workers in a household (created 3 or more, 3-7) Crosstabulation

			number of workers in a household (created 3 or more, 3-7)				
			0	1	2	3 or more	Total
Car Type (new)	small	Count	24	146	168	30	368
		% within Car Type (new)	6.5%	39.7%	45.7%	8.2%	100.0%
		% within number of workers in a household (created 3 or more, 3-7)	14.5%	24.3%	23.0%	18.2%	22.1%
		% of Total	1.4%	8.8%	10.1%	1.8%	22.1%
	compact	Count	22	89	87	32	230
		% within Car Type (new)	9.6%	38.7%	37.8%	13.9%	100.0%
		% within number of workers in a household (created 3 or more, 3-7)	13.3%	14.8%	11.9%	19.4%	13.8%
		% of Total	1.3%	5.4%	5.2%	1.9%	13.8%
	mid-sized	Count	46	117	153	26	342
		% within Car Type (new)	13.5%	34.2%	44.7%	7.6%	100.0%
		% within number of workers in a household (created 3 or more, 3-7)	27.9%	19.5%	20.9%	15.8%	20.6%
		% of Total	2.8%	7.0%	9.2%	1.6%	20.6%
	large	Count	15	17	18	3	53
		% within Car Type (new)	28.3%	32.1%	34.0%	5.7%	100.0%
		% within number of workers in a household (created 3 or more, 3-7)	9.1%	2.8%	2.5%	1.8%	3.2%
		% of Total	.9%	1.0%	1.1%	.2%	3.2%
	luxury	Count	9	21	24	4	58
		% within Car Type (new)	15.5%	36.2%	41.4%	6.9%	100.0%
		% within number of workers in a household (created 3 or more, 3-7)	5.5%	3.5%	3.3%	2.4%	3.5%
		% of Total	.5%	1.3%	1.4%	.2%	3.5%
	sports	Count	7	58	71	15	151
		% within Car Type (new)	4.6%	38.4%	47.0%	9.9%	100.0%
		% within number of workers in a household (created 3 or more, 3-7)	4.2%	9.7%	9.7%	9.1%	9.1%
		% of Total	.4%	3.5%	4.3%	.9%	9.1%
	minivan/van	Count	15	29	46	20	110
		% within Car Type (new)	13.6%	26.4%	41.8%	18.2%	100.0%
		% within number of workers in a household (created 3 or more, 3-7)	9.1%	4.8%	6.3%	12.1%	6.6%
		% of Total	.9%	1.7%	2.8%	1.2%	6.6%
	pickup	Count	14	59	72	14	159
		% within Car Type (new)	8.8%	37.1%	45.3%	8.8%	100.0%
		% within number of workers in a household (created 3 or more, 3-7)	8.5%	9.8%	9.8%	8.5%	9.6%
		% of Total	.8%	3.5%	4.3%	.8%	9.6%
	SUV	Count	13	64	93	21	191
		% within Car Type (new)	6.8%	33.5%	48.7%	11.0%	100.0%
		% within number of workers in a household (created 3 or more, 3-7)	7.9%	10.7%	12.7%	12.7%	11.5%
		% of Total	.8%	3.9%	5.6%	1.3%	11.5%
Total		Count	165	600	732	165	1662
		% within Car Type (new)	9.9%	36.1%	44.0%	9.9%	100.0%
		% within number of workers in a household (created 3 or more, 3-7)	100.0%	100.0%	100.0%	100.0%	100.0%
		% of Total	9.9%	36.1%	44.0%	9.9%	100.0%

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	63.331[a]	24	.000
Likelihood Ratio	57.312	24	.000
Linear-by-Linear Association	2.472	1	.116
N of Valid Cases	1662		

a. 0 cells (.0%) have expected count less than 5. The minimum expected count is 5.26.

12. Number of Household Members by Vehicle Type

Car Type (new) * number of persons in a household (created 5 or more, 5-9) Crosstabulation

			number of persons in a household (created 5 or more, 5-9)					
			1	2	3	4	5 or more	Total
Car Type (new)	small	Count	122	142	70	29	9	372
		% within Car Type (new)	32.8%	38.2%	18.8%	7.8%	2.4%	100.0%
		% within number of persons in a household (created 5 or more, 5-9)	30.0%	20.9%	23.4%	13.6%	10.1%	22.1%
		% of Total	7.2%	8.4%	4.1%	1.7%	.5%	22.1%
	compact	Count	72	82	44	25	14	237
		% within Car Type (new)	30.4%	34.6%	18.6%	10.5%	5.9%	100.0%
		% within number of persons in a household (created 5 or more, 5-9)	17.7%	12.1%	14.7%	11.7%	15.7%	14.0%
		% of Total	4.3%	4.9%	2.6%	1.5%	.8%	14.0%
	mid-sized	Count	76	140	61	65	11	353
		% within Car Type (new)	21.5%	39.7%	17.3%	18.4%	3.1%	100.0%
		% within number of persons in a household (created 5 or more, 5-9)	18.7%	20.6%	20.4%	30.4%	12.4%	20.9%
		% of Total	4.5%	8.3%	3.6%	3.9%	.7%	20.9%
	large	Count	9	33	8	1	2	53
		% within Car Type (new)	17.0%	62.3%	15.1%	1.9%	3.8%	100.0%
		% within number of persons in a household (created 5 or more, 5-9)	2.2%	4.9%	2.7%	.5%	2.2%	3.1%
		% of Total	.5%	2.0%	.5%	.1%	.1%	3.1%
	luxury	Count	10	24	15	6	3	58
		% within Car Type (new)	17.2%	41.4%	25.9%	10.3%	5.2%	100.0%
		% within number of persons in a household (created 5 or more, 5-9)	2.5%	3.5%	5.0%	2.8%	3.4%	3.4%
		% of Total	.6%	1.4%	.9%	.4%	.2%	3.4%
	sports	Count	38	77	23	8	5	151
		% within Car Type (new)	25.2%	51.0%	15.2%	5.3%	3.3%	100.0%
		% within number of persons in a household (created 5 or more, 5-9)	9.4%	11.3%	7.7%	3.7%	5.6%	9.0%
		% of Total	2.3%	4.6%	1.4%	.5%	.3%	9.0%
	minivan/van	Count	10	32	13	31	25	111
		% within Car Type (new)	9.0%	28.8%	11.7%	27.9%	22.5%	100.0%
		% within number of persons in a household (created 5 or more, 5-9)	2.5%	4.7%	4.3%	14.5%	28.1%	6.6%
		% of Total	.6%	1.9%	.8%	1.8%	1.5%	6.6%
	pickup	Count	38	63	31	20	7	159
		% within Car Type (new)	23.9%	39.6%	19.5%	12.6%	4.4%	100.0%
		% within number of persons in a household (created 5 or more, 5-9)	9.4%	9.3%	10.4%	9.3%	7.9%	9.4%
		% of Total	2.3%	3.7%	1.8%	1.2%	.4%	9.4%
	SUV	Count	31	86	34	29	13	193
		% within Car Type (new)	16.1%	44.6%	17.6%	15.0%	6.7%	100.0%
		% within number of persons in a household (created 5 or more, 5-9)	7.6%	12.7%	11.4%	13.6%	14.6%	11.4%
		% of Total	1.8%	5.1%	2.0%	1.7%	.8%	11.4%
Total		Count	406	679	299	214	89	1687
		% within Car Type (new)	24.1%	40.2%	17.7%	12.7%	5.3%	100.0%
		% within number of persons in a household (created 5 or more, 5-9)	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
		% of Total	24.1%	40.2%	17.7%	12.7%	5.3%	100.0%

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	181.685[a]	32	.000
Likelihood Ratio	156.966	32	.000
Linear-by-Linear Association	27.881	1	.000
N of Valid Cases	1687		

a. 2 cells (4.4%) have expected count less than 5. The minimum expected count is 2.80.

13. Number of Household Members under 19 by Vehicle Type

NEWTYPE1 * AGE18ALT Crosstabulation

			AGE18ALT			
			0	1	2 or more	Total
NEWTYPE1	small	Count	298	43	28	369
		% within NEWTYPE1	80.8%	11.7%	7.6%	100.0%
		% within AGE18ALT	24.1%	20.4%	12.1%	22.0%
		% of Total	17.7%	2.6%	1.7%	22.0%
	compact	Count	178	28	30	236
		% within NEWTYPE1	75.4%	11.9%	12.7%	100.0%
		% within AGE18ALT	14.4%	13.3%	13.0%	14.0%
		% of Total	10.6%	1.7%	1.8%	14.0%
	mid-sized	Count	248	47	58	353
		% within NEWTYPE1	70.3%	13.3%	16.4%	100.0%
		% within AGE18ALT	20.0%	22.3%	25.1%	21.0%
		% of Total	14.8%	2.8%	3.5%	21.0%
	large	Count	48	2	3	53
		% within NEWTYPE1	90.6%	3.8%	5.7%	100.0%
		% within AGE18ALT	3.9%	.9%	1.3%	3.2%
		% of Total	2.9%	.1%	.2%	3.2%
	luxury	Count	42	9	7	58
		% within NEWTYPE1	72.4%	15.5%	12.1%	100.0%
		% within AGE18ALT	3.4%	4.3%	3.0%	3.5%
		% of Total	2.5%	.5%	.4%	3.5%
	sports	Count	124	17	8	149
		% within NEWTYPE1	83.2%	11.4%	5.4%	100.0%
		% within AGE18ALT	10.0%	8.1%	3.5%	8.9%
		% of Total	7.4%	1.0%	.5%	8.9%
	minivan/van	Count	45	19	47	111
		% within NEWTYPE1	40.5%	17.1%	42.3%	100.0%
		% within AGE18ALT	3.6%	9.0%	20.3%	6.6%
		% of Total	2.7%	1.1%	2.8%	6.6%
	pickup	Count	122	19	18	159
		% within NEWTYPE1	76.7%	11.9%	11.3%	100.0%
		% within AGE18ALT	9.8%	9.0%	7.8%	9.5%
		% of Total	7.3%	1.1%	1.1%	9.5%
	SUV	Count	134	27	32	193
		% within NEWTYPE1	69.4%	14.0%	16.6%	100.0%
		% within AGE18ALT	10.8%	12.8%	13.9%	11.5%
		% of Total	8.0%	1.6%	1.9%	11.5%
Total		Count	1239	211	231	1681
		% within NEWTYPE1	73.7%	12.6%	13.7%	100.0%
		% within AGE18ALT	100.0%	100.0%	100.0%	100.0%
		% of Total	73.7%	12.6%	13.7%	100.0%

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	121.124[a]	16	.000
Likelihood Ratio	106.252	16	.000
Linear-by-Linear Association	14.991	1	.000
N of Valid Cases	1681		

a. 0 cells (.0%) have expected count less than 5. The minimum expected count is 6.65.

14. Number of Household Members Age 19-40 by Vehicle Type

NEWTYPE1 * AL19_40 Crosstabulation

			AL19_40				
			0	1	2	3 or more	Total
NEWTYPE1	small	Count	135	115	102	17	369
		% within NEWTYPE1	36.6%	31.2%	27.6%	4.6%	100.0%
		% within AL19_40	16.6%	27.3%	26.7%	27.4%	22.0%
		% of Total	8.0%	6.8%	6.1%	1.0%	22.0%
	compact	Count	116	65	41	14	236
		% within NEWTYPE1	49.2%	27.5%	17.4%	5.9%	100.0%
		% within AL19_40	14.2%	15.4%	10.7%	22.6%	14.0%
		% of Total	6.9%	3.9%	2.4%	.8%	14.0%
	mid-sized	Count	207	75	66	5	353
		% within NEWTYPE1	58.6%	21.2%	18.7%	1.4%	100.0%
		% within AL19_40	25.4%	17.8%	17.3%	8.1%	21.0%
		% of Total	12.3%	4.5%	3.9%	.3%	21.0%
	large	Count	39	8	4	2	53
		% within NEWTYPE1	73.6%	15.1%	7.5%	3.8%	100.0%
		% within AL19_40	4.8%	1.9%	1.0%	3.2%	3.2%
		% of Total	2.3%	.5%	.2%	.1%	3.2%
	luxury	Count	40	11	6	1	58
		% within NEWTYPE1	69.0%	19.0%	10.3%	1.7%	100.0%
		% within AL19_40	4.9%	2.6%	1.6%	1.6%	3.5%
		% of Total	2.4%	.7%	.4%	.1%	3.5%
	sports	Count	65	37	39	8	149
		% within NEWTYPE1	43.6%	24.8%	26.2%	5.4%	100.0%
		% within AL19_40	8.0%	8.8%	10.2%	12.9%	8.9%
		% of Total	3.9%	2.2%	2.3%	.5%	8.9%
	minivan/van	Count	60	23	26	2	111
		% within NEWTYPE1	54.1%	20.7%	23.4%	1.8%	100.0%
		% within AL19_40	7.4%	5.5%	6.8%	3.2%	6.6%
		% of Total	3.6%	1.4%	1.5%	.1%	6.6%
	pickup	Count	79	38	35	7	159
		% within NEWTYPE1	49.7%	23.9%	22.0%	4.4%	100.0%
		% within AL19_40	9.7%	9.0%	9.2%	11.3%	9.5%
		% of Total	4.7%	2.3%	2.1%	.4%	9.5%
	SUV	Count	74	50	63	6	193
		% within NEWTYPE1	38.3%	25.9%	32.6%	3.1%	100.0%
		% within AL19_40	9.1%	11.8%	16.5%	9.7%	11.5%
		% of Total	4.4%	3.0%	3.7%	.4%	11.5%
Total		Count	815	422	382	62	1681
		% within NEWTYPE1	48.5%	25.1%	22.7%	3.7%	100.0%
		% within AL19_40	100.0%	100.0%	100.0%	100.0%	100.0%
		% of Total	48.5%	25.1%	22.7%	3.7%	100.0%

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	87.945[a]	24	.000
Likelihood Ratio	90.712	24	.000
Linear-by-Linear Association	.085	1	.771
N of Valid Cases	1681		

a. 3 cells (8.3%) have expected count less than 5. The minimum expected count is 1.95.

15. Number of Household Members Age 41-64 by Vehicle Type

NEWTYPE1 * AL41_64 Crosstabulation

			AL41_64			
			0	1	2 or more	Total
NEWTYPE1	small	Count	199	103	67	369
		% within NEWTYPE1	53.9%	27.9%	18.2%	100.0%
		% within AL41_64	27.0%	22.3%	13.9%	22.0%
		% of Total	11.8%	6.1%	4.0%	22.0%
	compact	Count	99	80	57	236
		% within NEWTYPE1	41.9%	33.9%	24.2%	100.0%
		% within AL41_64	13.4%	17.4%	11.8%	14.0%
		% of Total	5.9%	4.8%	3.4%	14.0%
	mid-sized	Count	141	90	122	353
		% within NEWTYPE1	39.9%	25.5%	34.6%	100.0%
		% within AL41_64	19.1%	19.5%	25.3%	21.0%
		% of Total	8.4%	5.4%	7.3%	21.0%
	large	Count	26	13	14	53
		% within NEWTYPE1	49.1%	24.5%	26.4%	100.0%
		% within AL41_64	3.5%	2.8%	2.9%	3.2%
		% of Total	1.5%	.8%	.8%	3.2%
	luxury	Count	21	16	21	58
		% within NEWTYPE1	36.2%	27.6%	36.2%	100.0%
		% within AL41_64	2.8%	3.5%	4.3%	3.5%
		% of Total	1.2%	1.0%	1.2%	3.5%
	sports	Count	67	45	37	149
		% within NEWTYPE1	45.0%	30.2%	24.8%	100.0%
		% within AL41_64	9.1%	9.8%	7.7%	8.9%
		% of Total	4.0%	2.7%	2.2%	8.9%
	minivan/van	Count	41	19	51	111
		% within NEWTYPE1	36.9%	17.1%	45.9%	100.0%
		% within AL41_64	5.6%	4.1%	10.6%	6.6%
		% of Total	2.4%	1.1%	3.0%	6.6%
	pickup	Count	55	54	50	159
		% within NEWTYPE1	34.6%	34.0%	31.4%	100.0%
		% within AL41_64	7.5%	11.7%	10.4%	9.5%
		% of Total	3.3%	3.2%	3.0%	9.5%
	SUV	Count	88	41	64	193
		% within NEWTYPE1	45.6%	21.2%	33.2%	100.0%
		% within AL41_64	11.9%	8.9%	13.3%	11.5%
		% of Total	5.2%	2.4%	3.8%	11.5%
Total		Count	737	461	483	1681
		% within NEWTYPE1	43.8%	27.4%	28.7%	100.0%
		% within AL41_64	100.0%	100.0%	100.0%	100.0%
		% of Total	43.8%	27.4%	28.7%	100.0%

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	65.182[a]	16	.000
Likelihood Ratio	65.580	16	.000
Linear-by-Linear Association	15.384	1	.000
N of Valid Cases	1681		

a. 0 cells (.0%) have expected count less than 5. The minimum expected count is 14.53.

16. Number of Household Members Age 65 or Older by Vehicle Type

NEWTYPE1 * ALT65TO Crosstabulation

			ALT65TO			
			0	1	2 or more	Total
NEWTYPE1	small	Count	323	31	15	369
		% within NEWTYPE1	87.5%	8.4%	4.1%	100.0%
		% within ALT65TO	23.1%	19.7%	11.7%	22.0%
		% of Total	19.2%	1.8%	.9%	22.0%
	compact	Count	194	30	12	236
		% within NEWTYPE1	82.2%	12.7%	5.1%	100.0%
		% within ALT65TO	13.9%	19.1%	9.4%	14.0%
		% of Total	11.5%	1.8%	.7%	14.0%
	mid-sized	Count	271	43	39	353
		% within NEWTYPE1	76.8%	12.2%	11.0%	100.0%
		% within ALT65TO	19.4%	27.4%	30.5%	21.0%
		% of Total	16.1%	2.6%	2.3%	21.0%
	large	Count	27	11	15	53
		% within NEWTYPE1	50.9%	20.8%	28.3%	100.0%
		% within ALT65TO	1.9%	7.0%	11.7%	3.2%
		% of Total	1.6%	.7%	.9%	3.2%
	luxury	Count	35	13	10	58
		% within NEWTYPE1	60.3%	22.4%	17.2%	100.0%
		% within ALT65TO	2.5%	8.3%	7.8%	3.5%
		% of Total	2.1%	.8%	.6%	3.5%
	sports	Count	135	8	6	149
		% within NEWTYPE1	90.6%	5.4%	4.0%	100.0%
		% within ALT65TO	9.7%	5.1%	4.7%	8.9%
		% of Total	8.0%	.5%	.4%	8.9%
	minivan/van	Count	91	8	12	111
		% within NEWTYPE1	82.0%	7.2%	10.8%	100.0%
		% within ALT65TO	6.5%	5.1%	9.4%	6.6%
		% of Total	5.4%	.5%	.7%	6.6%
	pickup	Count	141	7	11	159
		% within NEWTYPE1	88.7%	4.4%	6.9%	100.0%
		% within ALT65TO	10.1%	4.5%	8.6%	9.5%
		% of Total	8.4%	.4%	.7%	9.5%
	SUV	Count	179	6	8	193
		% within NEWTYPE1	92.7%	3.1%	4.1%	100.0%
		% within ALT65TO	12.8%	3.8%	6.3%	11.5%
		% of Total	10.6%	.4%	.5%	11.5%
Total		Count	1396	157	128	1681
		% within NEWTYPE1	83.0%	9.3%	7.6%	100.0%
		% within ALT65TO	100.0%	100.0%	100.0%	100.0%
		% of Total	83.0%	9.3%	7.6%	100.0%

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	113.673[a]	16	.000
Likelihood Ratio	101.486	16	.000
Linear-by-Linear Association	2.404	1	.121
N of Valid Cases	1681		

a. 3 cells (11.1%) have expected count less than 5. The minimum expected count is 4.04.

APPENDIX 4. CROSS-TABULATIONS INVOLVING ATTITUDINAL, AND PERSONALITY AND LIFESTYLE CLUSTERS

1. Six Attitudinal Clusters by Vehicle Type

Vehicle Type * Cluster Number of Case Crosstabulation

			Cluster Number of Case						
			Affluent Professional	Transit Using Urbanite	Homemakers and Older Worker	Travel Hater	Excess Traveler	Adventurous, Car-oriented Suburbanite	Total
Vehicle Type	small	Count	62	75	68	37	97	33	372
		% within Vehicle Type	16.7%	20.2%	18.3%	9.9%	26.1%	8.9%	100.0%
		% within Cluster Number of Case	19.9%	34.1%	19.4%	18.0%	29.8%	12.1%	22.1%
	compact	Count	49	32	56	31	43	26	237
		% within Vehicle Type	20.7%	13.5%	23.6%	13.1%	18.1%	11.0%	100.0%
		% within Cluster Number of Case	15.8%	14.5%	16.0%	15.0%	13.2%	9.5%	14.0%
	mid-sized	Count	82	30	84	50	59	48	353
		% within Vehicle Type	23.2%	8.5%	23.8%	14.2%	16.7%	13.6%	100.0%
		% within Cluster Number of Case	26.4%	13.6%	23.9%	24.3%	18.1%	17.6%	20.9%
	large	Count	7	5	15	8	4	14	53
		% within Vehicle Type	13.2%	9.4%	28.3%	15.1%	7.5%	26.4%	100.0%
		% within Cluster Number of Case	2.3%	2.3%	4.3%	3.9%	1.2%	5.1%	3.1%
	luxury	Count	10	7	6	9	16	10	58
		% within Vehicle Type	17.2%	12.1%	10.3%	15.5%	27.6%	17.2%	100.0%
		% within Cluster Number of Case	3.2%	3.2%	1.7%	4.4%	4.9%	3.7%	3.4%
	sports	Count	30	21	23	14	38	25	151
		% within Vehicle Type	19.9%	13.9%	15.2%	9.3%	25.2%	16.6%	100.0%
		% within Cluster Number of Case	9.6%	9.5%	6.6%	6.8%	11.7%	9.2%	9.0%
	minivan/van	Count	15	14	27	13	15	27	111
		% within Vehicle Type	13.5%	12.6%	24.3%	11.7%	13.5%	24.3%	100.0%
		% within Cluster Number of Case	4.8%	6.4%	7.7%	6.3%	4.6%	9.9%	6.6%
	pickup	Count	19	21	42	19	17	41	159
		% within Vehicle Type	11.9%	13.2%	26.4%	11.9%	10.7%	25.8%	100.0%
		% within Cluster Number of Case	6.1%	9.5%	12.0%	9.2%	5.2%	15.0%	9.4%
	SUV	Count	37	15	30	25	37	49	193
		% within Vehicle Type	19.2%	7.8%	15.5%	13.0%	19.2%	25.4%	100.0%
		% within Cluster Number of Case	11.9%	6.8%	8.5%	12.1%	11.3%	17.9%	11.4%
Total		Count	311	220	351	206	326	273	1687
		% within Vehicle Type	18.4%	13.0%	20.8%	12.2%	19.3%	16.2%	100.0%
		% within Cluster Number of Case	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	129.211[a]	40	.000
Likelihood Ratio	130.172	40	.000
Linear-by-Linear Association	19.573	1	.000
N of Valid Cases	1687		

a. 0 cells (.0%) have expected count less than 5. The minimum expected count is 6.47.

2. Eleven Personality and Lifestyle Clusters by Vehicle Type

Vehicle Type * Cluster Number of Case Crosstabulation

			Cluster Number of Case											
			New Family Model	Homebodies	Mobile Yuppies	Transit Advocates	Assistant V.P.s	Status Seeking Workaholics	Suburban and Stationary	Older and Independent	The Middle-of-the-roaders	Travel Lovin' Transit User	Frustrated Loner	Total
Vehicle Type	small	Count	34	29	30	46	31	21	37	31	29	46	38	372
		% within Vehicle Typ	9.1%	7.8%	8.1%	12.4%	8.3%	5.6%	9.9%	8.3%	7.8%	12.4%	10.2%	100.0%
		% within Cluster Number of Case	18.2%	21.5%	25.4%	27.9%	17.0%	13.8%	19.8%	19.5%	19.3%	39.7%	27.9%	22.1%
	compact	Count	22	21	13	29	24	19	38	21	19	12	19	237
		% within Vehicle Typ	9.3%	8.9%	5.5%	12.2%	10.1%	8.0%	16.0%	8.9%	8.0%	5.1%	8.0%	100.0%
		% within Cluster Number of Case	11.8%	15.6%	11.0%	17.6%	13.2%	12.5%	20.3%	13.2%	12.7%	10.3%	14.0%	14.0%
	mid-sized	Count	33	27	16	31	49	38	40	34	46	17	22	353
		% within Vehicle Typ	9.3%	7.6%	4.5%	8.8%	13.9%	10.8%	11.3%	9.6%	13.0%	4.8%	6.2%	100.0%
		% within Cluster Number of Case	17.6%	20.0%	13.6%	18.8%	26.9%	25.0%	21.4%	21.4%	30.7%	14.7%	16.2%	20.9%
	large	Count	7	7		2	8	4	7	4	7	1	6	53
		% within Vehicle Typ	13.2%	13.2%		3.8%	15.1%	7.5%	13.2%	7.5%	13.2%	1.9%	11.3%	100.0%
		% within Cluster Number of Case	3.7%	5.2%		1.2%	4.4%	2.6%	3.7%	2.5%	4.7%	.9%	4.4%	3.1%
	luxury	Count	9	2	2	6	7	13	6	8	2	1	2	58
		% within Vehicle Typ	15.5%	3.4%	3.4%	10.3%	12.1%	22.4%	10.3%	13.8%	3.4%	1.7%	3.4%	100.0%
		% within Cluster Number of Case	4.8%	1.5%	1.7%	3.6%	3.8%	8.6%	3.2%	5.0%	1.3%	.9%	1.5%	3.4%
	sports	Count	21	11	19	15	14	18	9	11	6	12	15	151
		% within Vehicle Typ	13.9%	7.3%	12.6%	9.9%	9.3%	11.9%	6.0%	7.3%	4.0%	7.9%	9.9%	100.0%
		% within Cluster Number of Case	11.2%	8.1%	16.1%	9.1%	7.7%	11.8%	4.8%	6.9%	4.0%	10.3%	11.0%	9.0%
	minivan/van	Count	10	11	7	9	13	8	16	9	13	10	5	111
		% within Vehicle Typ	9.0%	9.9%	6.3%	8.1%	11.7%	7.2%	14.4%	8.1%	11.7%	9.0%	4.5%	100.0%
		% within Cluster Number of Case	5.3%	8.1%	5.9%	5.5%	7.1%	5.3%	8.6%	5.7%	8.7%	8.6%	3.7%	6.6%
	pickup	Count	22	9	11	11	23	18	17	15	11	7	15	159
		% within Vehicle Typ	13.8%	5.7%	6.9%	6.9%	14.5%	11.3%	10.7%	9.4%	6.9%	4.4%	9.4%	100.0%
		% within Cluster Number of Case	11.8%	6.7%	9.3%	6.7%	12.6%	11.8%	9.1%	9.4%	7.3%	6.0%	11.0%	9.4%
	SUV	Count	29	18	20	16	13	13	17	26	17	10	14	193
		% within Vehicle Typ	15.0%	9.3%	10.4%	8.3%	6.7%	6.7%	8.8%	13.5%	8.8%	5.2%	7.3%	100.0%
		% within Cluster Number of Case	15.5%	13.3%	16.9%	9.7%	7.1%	8.6%	9.1%	16.4%	11.3%	8.6%	10.3%	11.4%
Total		Count	187	135	118	165	182	152	187	159	150	116	136	1687
		% within Vehicle Typ	11.1%	8.0%	7.0%	9.8%	10.8%	9.0%	11.1%	9.4%	8.9%	6.9%	8.1%	100.0%
		% within Cluster Number of Case	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

*** Chi-squared Tests Before and After Excluding Large Car Category**

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	145.961[a]	80	.000
Likelihood Ratio	146.321	80	.000
Linear-by-Linear Association	6.148	1	.013
N of Valid Cases	1687		

a. 11 cells (11.1%) have expected count less than 5. The minimum expected count is 3.64.

Before (Nine Vehicle Categories)

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	132.063[a]	70	.000
Likelihood Ratio	128.588	70	.000
Linear-by-Linear Association	6.160	1	.013
N of Valid Cases	1634		

a. 4 cells (4.5%) have expected count less than 5. The minimum expected count is 4.08.

After (Eight Vehicle Categories)

3. Summaries of Cross-tabulation Analyses

Table A1: Six Attitudinal Clusters by Vehicle Type

Six Attitudinal Clusters	Small	Compact	Mid-sized	Large	Luxury	Sports	Minivan/Van	Pickup	SUV	Average (%)
Affluent Professionals		H	H	L			L	L		18.4
Transit-using Urbanites	H		L	L					L	13.0
Homemakers and Older Workers				H	L	L	H	H		20.8
Travel Haters	L			H	H	L				12.2
Excess Travelers	H			L	H	H	L	L		19.3
Adventurous, Car-oriented Suburbanites	L	L		H			**H**	**H**	**H**	16.2

Notes:
The 'L' and 'H' in cells refer to proportions that are substantially lower or higher, respectively, than the average sample proportion of that cluster.
A cell with a bold letter has a standard residual (difference between observed and expected frequencies) of greater than 2 in absolute value.

Table A2: Eleven Personality and Lifestyle Clusters by Vehicle Type

11 Personality and Lifestyle Clusters	Small	Compact	Mid-sized	Large	Luxury	Sports	Minivan/Van	Pickup	SUV	Average (%)
New Family Model					H	H		H	H	11.1
Homebodies				H*	L*		H			8.0
Mobile Yuppies				L*	L*	**H**			H	7.0
Transit Advocates	H	H		L				L		9.8
Assistant V.P.s			H	H				H	L	10.8
Status Seeking Workaholics	**L**			*	**H**	H				9.0
Suburban and Stationary		**H**				L	H			11.1
Older and Independent				*	H	L			H	9.4
Middle-of-the-roaders			**H**	H*	L	**L**	H			8.9
Travel Lovin' Transit Users	**H**			L*	L*		H			6.9
Frustrated Loners	H			H*	L*	H	L			8.1

Notes:
* Expected cell count less than 5.0; these results are less reliable.
The 'L' and 'H' in cells refer to proportions that are substantially lower or higher, respectively, than the average sample proportion of that cluster.
A cell with a bold letter has a standard residual (difference between observed and expected frequencies) of greater than 2 in absolute value.