

**Companionship for Leisure Activities:  
An Empirical Analysis Using The American Time Use Survey**

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## 1. Background

The activity-based travel-modeling paradigm recognizes that individuals undertake activity and travel not only independently but also together with other household and non-household members. It has also been argued that the desire for interaction with other people is an important stimulus for activity-travel generation and therefore warrants an explicit treatment in travel-demand models. However, Axhausen (2005) notes that this important “social” dimension of activity-travel behavior is not accommodated in travel modeling. Further, from a practical stand point, the modeling of inter-personal inter-dependencies in activity-travel patterns is necessary for realistic forecasts of travel patterns under alternate socio-economic-technological scenarios and due to changes in land-use and transportation system characteristics. The following examples serve to illustrate this point:

1. Vehicle occupancy levels are determined by decisions of individuals to travel together, which in turn could be motivated by the desire to participate in the destination activity jointly. Thus, the modeling of joint activity-travel pursuits is required for accurately determining the volume of vehicular travel in the system, and consequently for the evaluation of policies such as HOV/HOT lanes (Vovsha et al., 2003). Similarly, the response of individuals to car-pooling incentives depends on their ability to synchronize their travel-patterns with those of others.
2. Participation in joint leisure activities is constrained by the mandatory time commitments of all the concerned individuals (Gliebe and Koppelman, 2002 and Srinivasan and Bhat, 2006). Increased time availability for leisure for one or more of individuals because of employer based demand management strategies (such as early release from work, compressed work week, and home-based telecommuting) could result in increased likelihood of joint activities. Thus, the demand management actions could also alter the activity-travel patterns of persons not directly impacted by the policy. These secondary impacts cannot be captured by models that do not accommodate inter-personal interactions (Srinivasan and Bhat, 2006).
3. Individuals may be willing to travel farther and pursue activities for longer durations when the activity/travel is being pursued jointly with family or friends. Further, the joint activity-travel could be restricted to certain periods of the day. For example, Kemperman et al. 2006 identify three “peak periods” for social activity participation using data from The Netherlands. The timing and durations of trips and stops have substantial implications for determining the impacts of mobile-source (i.e., from vehicles) emissions on air quality.
4. When individuals participate in activities jointly with non-household members, they may also undertake travel to pick-up and drop-off their companions. Such additional travel cannot be effectively captured by individual-level models.

5. Social activities are perhaps not as flexible as they have been treated traditionally (Kemperman et al, 2006). For example, some of the joint leisure activities pursued with non-household members could be at the residence of friends or family. Consequently, the destination choice for such social travel may have limited sensitivity to the transportation system characteristics (see also Carrasco et al., 2006).
6. The increasing adoption of ICTs (Information and Communication Technologies like the cell phones, internet, and e-mail) by individuals can have strong impacts on the social life-styles of people and hence on activities and travel pursued jointly with family and non-family members (Carrasco and Miller, 2006).
7. The gaining prominence of modeling travel during weekends and for special-events further reinforces the critical need for explicitly accommodating joint activity and travel patterns in travel models.

The recent years have seen increasing efforts in the field of transportation engineering on studying inter-personal interactions in activity-travel patterns. These studies may be broadly classified into two categories. The first category of studies adopts econometric modeling methods to relate joint activity-travel choices with characteristics of the decision makers (see Srinivasan and Bhat, 2006 and the studies referred to therein for additional details). Most of these studies use data from conventional travel surveys but almost none of them have examined individual's interactions with non household members. The second category of studies is largely focused on the concept of "social networks" and seeks to explore the nature and extent of individuals' social interactions (See for example, Arentze and Timmermans, 2006 and the studies referred to therein for additional details). Thus, this latter group of studies is not restricted to analyzing within-household interactions.

Despite this increasing interest in the recent years, our empirical knowledge on individuals' interactions with non household members is limited. Arguably, one of the primary reasons for this limitation is the lack of data on individuals' non-household companions in activity and travel participation. For example, the conventional household-travel surveys (which form the basis of activity-travel modeling) typically do not collect this data. An exception is the recent CentreSIM travel survey (Goulias and Kim, 2005) which included an open-ended question, "with whom was this activity episode undertaken" to collect data on the types of companions with whom each activity was undertaken. Data were collected from approximately 1400 individuals. The first analysis results indicate that approximately one-third of activity/travel episodes and daily time is spent alone and a significant fraction of joint episodes are pursued with non household members (both relatives and non relatives).

In light of the discussions above, the broad goal of this study is to contribute to the empirical understanding of activities and travel pursued by individuals jointly with household and non-household members. Towards that end, there are two major tasks in this study. First, an exploratory analysis is undertaken to determine the extent to which each activity type is pursued jointly. Further this analysis also aims to illustrate the differences in the companion type choices (household versus non household members) across the activity types. The next task is focused on leisure activities. The motivation for this specific focus is that, among all activity types, the desire for companionship for leisure is likely to be the highest. Specifically, models are developed to examine the impacts of demographic characteristics, day of the week, and activity episode durations on the choice of companion type.

The rest of this paper is organized as follows. Section 2 describes the data used in this analysis. The empirical results are presented and discussed in Section 3. Finally, Section 4 concludes the paper by providing an overall summary and highlights the insights from this study.

## **2. Data Description**

This research study uses data from the American Time Use Survey. This survey conducted by the Census Bureau under contract with the Bureau of Labor Statistics, collects detailed individual-level daily time use information. The sample is drawn from a subset of households responding to the Current Population Survey (CPS) interviews. One individual aged 15 years or older is selected from each household for the survey. Data collection began in January 2003. Currently, the data samples collected in the years 2003 (412611 activity episodes from 20,000 individuals) and 2004 (279042 activity episodes from 13973 individuals) are available. Additional details on this survey and the data can be obtained from the ATUS website, <http://www.bls.gov/tus/home.htm>.

The ATUS data is attractive for our analysis for several reasons. First, the available data sample is very large (34,693 persons surveyed over 2 years) and represents the nation as a whole as opposed to any specific geographic area. Second, the survey explicitly obtained information on all persons (both household and non household members) accompanying the respondent for each activity episode. The companions were classified using the scheme presented in Table 1. Third, the survey used a very disaggregate three-tier activity classification scheme thereby facilitating the analysis joint activity participation at a fine resolution of activity types.

It is also necessary to point out here that an issue with using ATUS for analyzing joint activity participation decisions is the absence of time-use information for the respondents' companion(s). ATUS collects time-use data only for one person per household. Therefore, the complete activity participation decisions of even the respondents' own household members are unknown. Consequently, it is not possible to capture the impact of the time constraints of *all* the individuals on the joint time-investment decisions. However, it is possible to examine the impacts of other important factors such as individual and household socio-economic characteristics, day-of-the-week and seasonal factors.

### **3. Empirical Analysis**

This section of the paper presents an empirical analysis of the choice of companion types for activities and travel. Section 4.1 examines all in-home, out-of-home, and travel activities. The objective of this section is to primarily quantify the extent of joint activities and travel. Section 4.2 is focused on the companion type choices for out-of-home leisure activities. Specifically, MNL models are presented for the determination of the companion types for three types of leisure activities.

#### **3.1 Overall Aggregate Analysis**

Table 2 presents descriptives on the total number of episodes of each activity type in the sample and the percentage of joint activities of each type. The statistics are presented separately for weekdays and weekend days. It is important to note that 50% of the ATUS sample corresponds to a weekend day (25% each for Saturday and Sunday) and the remaining 50% corresponds to a weekday (10% for each week day).

The results indicate that, during weekdays, 32.4% of all in-home episodes are joint whereas 35.3% of all the weekend in-home episodes are joint. Among the in-home activity types, episodes for care-giving and socializing are by definition always pursued jointly. On the other hand, sleep, personal care, and work/school episodes are defined to be solo episodes. Among the remaining in-home activity types, eating and drinking and watching television are the ones that are most likely to be pursued jointly with other individuals. In the context of in-home episodes, it is necessary to note that the survey question on the companion type was "Who accompanied you in this activity / Who was in the room with you?" This implies that the above estimates of joint episodes could be biased high as it is very much possible for other household members to be present in the same room as the respondent even when he/she is pursuing the in-home activity independently.

The out-of-home activity episodes are significantly more likely to be joint compared to in-home episodes. Specifically, 47.6% of all weekday episodes and 71% of all weekend episodes are joint. Within the class of out-of-home activities, serve-passenger and socializing are by definition taken to be joint and work and school activities are defined to be necessarily solo. Among the remaining out-of-home activity types, eating and drinking, leisure, and religious/civic/volunteer episodes are the ones that are most likely to be pursued jointly with other individuals. Finally, the reader will also note that the fractions of total episodes that are joint are higher during the weekends for every out-of-home activity type.

42% of weekday travel episodes and 62% of weekend travel episodes are undertaken together with other persons. Again, the percentages of joint travel are higher by each mode during the weekend compared to the weekday. Finally, travel episodes undertaken as a passenger are by definition taken to be joint.

Table 3 presents descriptives on the companion types for joint activity episodes. Specifically, this table presents the percentages of joint episodes of each type that are pursued with only household members, with only non household members, and with both household and non household members. As in Table 2, the results are presented separately for weekdays and weekend days. Note that the numbers sum to 100% across the three columns within each of the two main columns. Further, the activity types that are taken to be solo by definition are not included in this table.

On examining the joint in-home episodes, we find that the companions are predominantly household members. The percentage of episodes undertaken with only household members decrease from weekdays to weekend days whereas the percentage of episodes undertaken with only non-household members and with both household and non household members increase from weekdays and weekend days. Overall, this indicates that non-household members are more likely to be companions in in-home activities during the weekend days. Within the class of in-home activity types, socializing and miscellaneous episodes are the ones that are most likely to include non-household companions.

The results for out-of-home episodes indicate that joint episodes are most likely to be pursued along with only non-household members, especially during the weekdays. The percentage of episodes pursued with both household and non household members is higher during the weekend than the weekday. Finally, we also observe that about 45% ( $= 31.53 + 13.4$ ) of the weekday and 56.5% ( $= 32.75 + 23.68$ ) of weekend episodes joint episodes include household members. This suggests that, unlike in-home episodes, household members are more likely to companions for out-of-home joint episodes during the weekends. Within the class of out-of-home activity types, shopping episodes are most likely to be pursued with only household members. On the other hand, socializing, leisure, and eating and drinking are more likely to be undertaken with non-household companions.

Finally, results from Table 3 also indicate that about 60% of all joint travel is undertaken with only household members as companions. Joint travel during the weekdays is more likely to be pursued with only non-household members than joint travel during the weekends. This result is consistent with the findings for the companion types for out-of-home activity episodes.

In summary, the results from Tables 2 and 3 highlight that joint activity/travel constitutes a very significant proportion of the overall activity-travel patterns of individuals. In the next section of the paper, we focus our attention specifically on certain leisure activities (socializing, passive leisure, and active leisure) for further analysis. However, the summary statistics discussed here suggest that detailed analysis of all other non-leisure activity types is also warranted.

### **3.2 Analysis of Out-of-Home Leisure Activities**

This section of the empirical analysis focuses on individuals' companion type choices for three types of out-of-home leisure activities, socializing (visiting friends, attending a party), passive leisure (attending movies, sports events), and active leisure (participation in sports or exercising). The choice alternatives and the sample shares for each of these three activity types are presented in Table 4. Socializing activities are taken to be joint by definition. The same shares indicate that these activity episodes are very less likely to be pursued with only household members. Further social episodes appear to be equally likely to be undertaken with family members, non family members, and with a mixed composition. Passive leisure episodes are most likely to be pursued alone or with non-household other members (often colleagues). Active leisure episodes are most likely to be pursued independently. When undertaken jointly with other individuals, the companions are most likely to be household members or friends. Finally, the reader will also note that the last two alternatives have been combined into a single category for the Passive and Active Leisure episodes. Thus, each model has six alternatives each in the universal choice set.

#### **3.2.1 Companion Type Model for Socializing Activities**

The MNL model for the companion type choice for socializing activities is presented in Table 5. The "household members only" alternative is chosen as the reference category. This alternative and the "household and non household family members" alternative are not available for individuals in single-person households. All other alternatives are available for all individuals.

The empirical results indicate that short-duration episodes are more likely to be undertaken with non household other members (often colleagues) where as long duration episodes are undertaken with a mixed composition of companions involving household and non household family members and others. Perhaps the long duration episodes are parties. Weekday episodes are more likely to be pursued with non-household members.

As would be expected, younger individuals are more likely to undertake social activities with friends as indicated by the negative coefficient on the age variable. Men are found to prefer non family members to family members (either household or non household) as companions for social activities. Caucasians (whites) are found to have a lower propensity to undertake social activities with non household family members compared to individuals of other ethnicity.

Employed persons have a higher propensity to choose non household other members as companions for social activities. This is intuitive given that these companions are often co-workers. Students are more likely to socialize with friends and less likely to undertake joint social activities with household and non household family.

Married individuals are found to be more likely to undertake social activities with only household members (see the negative coefficients for all other alternatives). Further, we also observe that the negative coefficients are the strongest for the three alternatives which do not include household members. This indicates that social activities are undertaken by married individuals together with their spouse. Finally, the absence of children in the household favors socializing with non household members.

### **3.2.2 Companion Type Model for Passive Leisure Activities**

The MNL model for the companion type choice for passive leisure activities is presented in Table 6. The “solo” alternative is chosen as the reference category. The “household members only” alternative is not available for individuals in single-person households. All other alternatives are available for all individuals.

The empirical results indicate that passive leisure episodes of longer durations are more likely to be pursued jointly than solo. Further, among the joint episodes, the shorter duration episodes are more likely to be pursued with non household other members as companions. Weekday episodes are most likely to be undertaken with non household other members (co-workers). Otherwise, weekday episodes are more likely to be solo than joint. We also observe that friends are more likely to be companions than household members or family members for weekday passive leisure activities.

Younger individuals are more likely to undertake passive leisure with non household members. Men are found to undertake passive leisure activities independently or with non household, non family members as companions. Caucasians (whites) are found to have a lower propensity to undertake solo activities compared to individuals of other ethnicity.

Employed persons have a higher propensity to choose non household other members as companions for passive leisure activities. This is intuitive given that these companions are often co-workers. These persons also prefer independent leisure to joint leisure with non co-workers as companions. Students are more likely to pursue leisure with friends and colleagues and less likely to do so with non household family members.

Married individuals are found not to prefer pursuing joint leisure with only friends or non household family members. Solo episodes are favored over joint episodes with non household no family companions. However, joint episodes including household members as companions are preferred to solo episodes. Finally, the absence of children in the household favors pursuit of passive leisure with only non household friends and family. When children are present in the household, household members are the most favored companions for leisure.

### **3.2.3 Companion Type Model for Active Leisure Activities**

The MNL model for the companion type choice for active leisure activities is presented in Table 7. The “solo” alternative is chosen as the reference category. The “household members only” alternative is not available for individuals in single-person households. All other alternatives are available for all individuals.

The empirical results indicate that active leisure episodes of longer durations are more likely to be pursued jointly than solo. Weekday episodes are most likely to be undertaken solo or with non household other members (co-workers). We also observe that friends are more likely to be companions than household members or family members for weekday active leisure activities.

Younger individuals are more likely to undertake active leisure jointly. As in the case of passive leisure, men are also found to undertake active leisure activities independently or with non household, non family members as companions. Caucasians (whites) are found to have a lower propensity to undertake active leisure solo and with colleagues compared to individuals of other ethnicity.

Employed persons have a higher propensity to choose either independent active leisure or jointly leisure with non household other members as companions. Students are more likely to pursue leisure with friends and colleagues.

Married individuals are found not to prefer pursuing joint leisure with only friends or non household family members. Solo episodes are favored over joint episodes with non household no family companions. However, joint episodes including household members as companions are preferred to solo episodes. Finally, the absence of children in the household favors pursuit of passive leisure with only non household friends and family. When children are present in the household, household members are the most favored companions for leisure.

#### **4. Summary and Conclusions**

Development of behaviorally oriented travel-demand models requires an understanding of the joint time investment decisions of individuals with household and non-household members. This is being increasingly recognized as one of the most critical and understudied issues in the activity-based travel-demand modeling field. This study contributes toward this goal by presenting an empirical analysis of companion types for different types of activity and travel episode types. Data from the 2003 and 2004 ATUS were used in this analysis.

Aggregate analysis indicates that a significant fraction of the daily activity-travel patterns of individuals are pursued jointly with other persons. Out-of-home and travel episodes are found to be more likely to be undertaken together with other persons than in-home episodes. Further, solo activities and travel is found to be less likely on weekend days compared to weekdays. On further examining the companion types for joint activity episodes, we find that household members are the most dominant companions for in-home activities and travel whereas non household persons are preferred companions for out-of-home episodes. Finally, we also observe that joint weekend out-of-home episodes are more likely to include household members as companions whereas joint weekday episodes are more likely to be undertaken with non household members.

Multinomial Logit models were also developed to determine the impacts of demographic characteristics, episode durations, and day of the week of the choice of companion types for leisure activities. The non-household companions were further classified into family, friends, and others for this analysis. Overall, the empirical results indicate similarities in the companion type choices for the three types of leisure activities (and in particular between active and passive leisure). Specifically, men prefer non-household non-family members as companions. Employed persons and students are more likely to pursue social activities with non-household other members (often co-workers) and friends respectively. This result indicates that increased opportunities to interact with non-household members (at school and work) favor joint pursuit of social activities with non family members as companions. Single individuals are more likely to spend leisure time with friends and other non household non family members. In contrast, married individuals are found to have a higher propensity to pursue leisure jointly with their spouse and possibly children. Weekdays favor solo leisure episodes or joint episodes with non household members. Weekend episodes, on the other hand, are more likely to be undertaken jointly with household members. Finally, we also find the duration of the activity episode is related to the choice of companion type.

The empirical analysis presented in this paper highlights that joint activity-travel episodes warrant a detailed scrutiny for enhancing travel-demand models. The MNL model results indicate significant impacts of socio-economic characteristics of individuals on companion type choices for leisure activities. The impacts of transportation system characteristics and land use patterns on these choices are not examined for want of data. This is identified as an avenue for further research. Further, it is also recommended that future travel surveys seek to explicitly identify individuals' companions (both household and non household members) in activity and travel participation.

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Table 1. Companion-Type Classification Scheme Adopted in ATUS

<b>Household Members</b>
Spouse (Husband/Wife)
Unmarried Partner
Own Household Child
Grandchild
Parent (Father/Mother)
Brother/Sister
Other Related Person (Aunt, Cousin, Nephew)
Foster Child
Housemate/Roommate
Roomer/Boarder
Other Non Relative
<b>Non Household Members</b>
Own Non Household Child
Parents or Parents-in-Law (Not living in Household)
Other Non Household Family Members (age < 18)
Other Non Household Family Members (age >= 18)
Friends
Co-workers/ Colleagues /Clients
Neighbors /Acquaintances
Other Non Household Children (age < 18)
Other Non Household Adults (age >= 18)

Table 2. Descriptives on Total and Joint Episodes by Activity Type and Day of the Week

	Weekday			Weekend		
	Total	Joint		Total	Joint	
		Freq	%		Freq	%
<b>In Home Activities</b>						
Sleep	37338	0	0.00	38770	0	0.00
Personal Care	26174	0	0.00	23144	0	0.00
Household Chores	45823	14111	30.79	44255	16332	36.90
Care-Giving	14490	14490	100.00	10812	10812	100.00
Work/School related	4406	0	0.00	3148	0	0.00
Eating and Drinking	23316	13721	58.85	23382	15394	65.84
Socializing	4775	4775	100.00	5059	5059	100.00
Television/Music	24741	11884	48.03	25577	13840	54.11
Other Leisure	19036	5310	27.89	18006	5748	31.92
Miscellaneous	6239	2536	40.65	5851	2667	45.58
Overall (In Home)	206338	66827	32.39	198004	69852	35.28
<b>Out of Home Activities</b>						
Household / Personal Services	6377	2802	43.94	4918	2894	58.85
Serve Passenger	6458	6458	100.00	3451	3451	100.00
Work/School	22467	0	0.00	5844	0	0.00
Shopping	11162	5045	45.20	13815	8539	61.81
Eating and Drinking	10718	7927	73.96	9407	8356	88.83
Socializing	4842	4842	100.00	7765	7765	100.00
Passive Leisure	5472	3661	66.90	5300	4298	81.09
Active Leisure	2857	1470	51.45	2715	1869	68.84
Religious, Civic, Volunteer	1911	1417	74.15	5230	4364	83.44
Miscellaneous	7066	4162	58.90	6053	4329	71.52
Overall (Out of Home)	79330	37784	47.63	64498	45865	71.11
<b>Travel Activities</b>						
Driver	57855	19612	33.90	46728	23847	51.03
Passenger	9395	9395	100.00	15622	15622	100.00
Walk or Bike	6018	1916	31.84	4623	2113	45.71
Public Transportation	2046	662	32.36	1196	616	51.51
Overall (Travel)	75314	31585	41.94	68169	42198	61.90

Table 3. Descriptives on Companion Type for Joint Episodes  
by Activity Type and Day of the Week

	Weekday			Weekend		
	Only HH	Only non HH	Both	Only HH	Only non HH	Both
<b>In Home Activities</b>						
Household Chores	85.98	9.23	4.79	83.61	9.97	6.42
Care-Giving	96.86	0.19	2.95	95.19	0.28	4.53
Eating and Drinking	87.81	5.75	6.44	83.60	6.15	10.26
Socializing	55.66	26.12	18.22	40.23	28.98	30.80
Television/Music	89.46	6.80	3.74	86.64	7.57	5.79
Other Leisure	88.21	8.47	3.31	86.10	8.99	4.91
Miscellaneous	48.11	39.59	12.30	49.49	33.97	16.54
Overall (In Home)	85.91	8.42	5.67	81.76	9.36	8.88
<b>Out of Home Activities</b>						
Household / Personal Services	34.05	54.89	11.06	33.17	46.37	20.46
Serve Passenger	58.67	25.29	16.04	30.80	41.47	27.73
Shopping	60.77	31.81	7.41	63.47	26.33	10.20
Eating and Drinking	16.72	72.75	10.53	27.93	44.03	28.04
Socializing	4.05	72.47	23.48	5.51	54.04	40.45
Passive Leisure	12.05	79.46	8.49	21.85	58.38	19.78
Active Leisure	26.39	65.17	8.44	32.48	51.52	16.00
Religious, Civic, Volunteer	14.89	68.03	17.08	39.69	41.04	19.27
Miscellaneous	37.05	46.28	16.67	35.50	42.13	22.36
Overall (Out of Home)	31.53	55.07	13.40	32.75	43.57	23.68
<b>Travel Activities</b>						
Driver	68.40	23.98	7.62	66.76	22.40	10.84
Passenger	50.22	41.27	8.52	54.42	32.54	13.05
Walk or Bike	49.53	44.00	6.47	58.16	29.20	12.64
Public Transportation	25.23	68.43	6.34	41.07	44.32	14.61
Overall (Travel)	60.94	31.26	7.79	61.39	26.81	11.80

Table 4. Sample Shares on Companion Type for the Three Types of Leisure Activities

	Socializing		Passive Leisure		Active Leisure	
	Freq	%	Freq	%	Freq	%
Solo	NA		2813	26.11	2233	40.08
Only household members	624	4.95	1380	12.81	995	17.86
Only non household family members	2049	16.25	854	7.93	197	3.54
Only non household friends	2580	20.46	1655	15.36	902	16.19
Only non household other	2305	18.28	2598	24.12	688	12.35
Both household and non household family members	2023	16.05	1472	13.67	557	10
Mixed composition	3026	24.00				
Total	12607	100.00	10772	100.00	5572	100.00

Table 5. Model for Companion Type Choice for Socializing Activities

	Non Household Family		Non Household Friends		Non Household Other		Household and Non Household Family		Other Mixed Composition	
	Beta	t-stat	Beta	t-stat	Beta	t-stat	Beta	t-stat	Beta	t-stat
Constant	1.559	11.847	1.754	12.666	1.457	11.229	1.563	12.087	1.730	14.473
Activity Episode Duration					-0.004	-10.508	0.002	6.434	0.001	5.890
Weekday	0.479	8.293	0.739	13.420	1.205	21.818				
Age			-0.005	-2.796						
Male	-0.146	-2.379	0.516	9.002	0.467	8.023	-0.140	-2.402		
White	-0.301	-4.702								
Employed					0.441	8.475				
Student			0.553	7.604			-0.345	-3.738		
Married	-1.592	-12.336	-2.296	-17.691	-1.917	-15.008	-0.565	-4.234	-0.576	-4.589
No Children in Household	1.231	18.161	0.877	12.244	0.495	7.586			0.170	2.996
Log likelihood (convergence)	-19263.24									
Log likelihood (constants only)	-20949.43									

Table 6. Model for Companion Type Choice for Passive Leisure Activities

	Household Members		Non Household Family		Non Household Friends		Non Household Other		Mixed Composition	
	Beta	t-stat	Beta	t-stat	Beta	t-stat	Beta	t-stat	Beta	t-stat
Constant	-1.108	-7.670	-0.194	-1.005	-0.288	-1.767	-0.294	-2.004	-0.007	-0.045
Activity Episode Duration	0.013	23.617	0.011	18.536	0.013	24.497	0.002	4.066	0.014	25.320
Weekday	-1.097	-14.038	-0.890	-10.322	-0.297	-4.220	0.292	4.840	-1.165	-15.323
Age			-0.018	-6.315	-0.026	-10.116	-0.013	-6.232	-0.022	-8.847
Male	-0.533	-7.800	-0.415	-5.413					-0.629	-9.778
White	0.360	3.299	0.192	1.792	0.362	4.049	0.141	2.012	0.369	3.696
Employed	-0.926	-10.598	-0.977	-10.348	-0.499	-6.211	0.478	5.952	-0.828	-9.965
Student			-0.342	-2.611	0.587	6.372	0.267	3.231		
Married	1.730	18.831	-0.262	-2.881	-1.026	-12.067			1.228	16.110
No Children in Household	-0.803	-10.183	0.477	4.719	0.280	3.457	-0.174	-2.852	-0.676	-8.088
Log likelihood (convergence)	-15404.93									
Log likelihood (constants only)	-18158.04									

Table 7. Model for Companion Type Choice for Active Leisure Activities

	Household Members		Non Household Family		Non Household Friends		Non Household Other		Mixed Composition	
	Beta	t-stat	Beta	t-stat	Beta	t-stat	Beta	t-stat	Beta	t-stat
Constant	-0.524	-2.617	-1.962	-5.686	-0.351	-1.666	-0.982	-5.894	-0.075	-0.330
Activity Episode Duration	0.006	9.291	0.010	12.009	0.011	18.172	0.010	14.958	0.010	15.154
Weekday	-0.998	-12.074	-0.870	-5.587	-0.246	-2.995			-1.048	-10.061
Age	-0.010	-2.823	-0.015	-3.511	-0.030	-9.584	-0.016	-4.814	-0.046	-11.199
Male	-0.538	-6.669	-0.589	-3.872					-0.534	-5.421
White	0.298	2.230	0.510	1.990	0.259	2.174			0.532	3.171
Employed	-0.396	-4.414	-0.550	-3.508	-0.353	-3.923			-0.293	-2.702
Student					0.454	3.672	0.451	3.423		
Married	1.388	11.003			-0.426	-4.492	-0.363	-3.574	0.848	7.050
No Children in Household	-0.731	-7.662					-0.226	-2.215	-0.511	-4.543
Log likelihood (convergence)	-7613.41									
Log likelihood (constants only)	-8561.43									