Nonresponse Bias in the American Time Use Survey

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Abstract

The American Time Use Survey (ATUS) is the first continuous, Federally-funded survey designed to measure how people spend their time. The ATUS sample is drawn from households completing their final month of interviews for the Current Population Survey (CPS). Because the CPS records contain a wealth of demographic information about respondents, this design enables us to look directly at nonresponse without having to rely on techniques such as data matching or the use of reluctant respondents to model nonrespondents. Our paper focuses on nonresponse rates and nonresponse bias. First, we describe nonresponse rates by demographic characteristics, and then we use logistic analysis to examine correlates of nonresponse, including demographic and interviewer characteristics. A propensity score model is utilized to examine differences in time-use patterns and to assess the extent of nonresponse bias.

Introduction

The American Time Use Survey (ATUS) is the first continuous, Federally-funded survey designed to measure people's daily activities, including where they spend their time, what they spend their time doing, and with whom they spend their time. The ATUS is a one-time telephone interview with three main components: (1) questions updating the designated person's (DP)[1] employment status, industry and occupation, and earnings information from the CPS, (2) a 24-hour time diary, and (3) additional information on secondary childcare, paid work, volunteering, and travel away from home. The ATUS sample is drawn from households that have completed the entire CPS interview rotation of eight interviews over a 16-month period. Once a CPS household is selected, one household member is randomly selected to participate in the ATUS interview. Substitution or proxy response is not allowed. The selected DP must be 15 years old or older and may or may not have been the CPS reference person. Each DP is also required to report on a pre-assigned reporting day of the week—such as Tuesday, reporting about Monday. The specific day of the week assigned to each DP does not change, and there is no substitution of this day. The interviewing period for a case is up to eight weeks on the assigned day to secure an ATUS interview.

Design

The ATUS is a computer assisted telephone survey conducted by the U.S. Census Bureau for the U.S. Bureau of Labor Statistics. Production began in January 2003. In 2003, approximately 3,000 participants were selected each month, and the average ATUS response rate was 57 percent.[2]

Key estimates of interest are the time-use patterns of the general population. All activities are classified into a three-tiered, hierarchical system, with 17 major, or first-tier, categories, each having two additional sub-levels of detail. The 17 first-tier categories include: personal care; household activities; caring for and helping household members; caring for and helping non-household members; work and work-related activities; education; consumer purchases; professional and personal care services; household services; government services and civic obligations; eating and drinking; socializing, relaxing, and leisure; sports, exercise, and recreation; religious activities; volunteering; telephone calls; and travel.

Analysis

The difference between respondents and nonrespondents on key estimates of interest is usually unknown. Therefore, nonresponse bias

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[1] A designated person is the household member selected for ATUS.

[2] The response rate was calculated using the AAPOR Response Rate #2.

typically must be examined using indirect measures that assume certain types of respondents can serve as accurate proxies for nonrespondents. However, since the ATUS draws its sample from respondents who have completed their final CPS interview, a direct comparison between respondents and nonrespondents on the ATUS is possible for variables measured in the CPS, but not for time use variables.[3] This paper focuses on nonresponse rates and nonresponse bias. First, we investigate nonresponse rates by demographic and economic characteristics, including sex, age, race, ethnicity, education level, marital status, employment status, and family income.

Next, we use logistic analysis to examine correlates of nonresponse, including both refusals and noncontacts. The ATUS nonresponse model was based on the characteristics of both refusals and noncontacts in the CPS and contains nine predictor variables and five interaction variables based on models developed by Dixon and Tucker (2000). In the Dixon and Tucker study, variables were selected based on a theory of nonresponse (Groves and Couper, 1998) and effects found in previous studies. The independent predictors include: age, race, ethnicity, presence of children under 6 years old in the household, marital status, household size, number of relatives in the household other than spouse, school enrollment, and number of attempted interview contacts. The interactions include age by relative present in the household, ethnicity by household size, presence of child under 6 by household size, household size by school enrollment, and presence of relatives by race.

Using the predicted values from the model described above and in Table 2, a nonresponse propensity score model is then used to categorize actual respondents as respondents, synthetic "refusals" and synthetic "noncontacts"; these groups are categorized in the same proportions as the real refusals and noncontacts in the ATUS. Specifically, CPS variables are used to predict who among the actual respondents looked the most like nonrespondents (refusals and noncontacts) This enabled the examination of differences in time-use patterns among these groups to assess the extent of nonresponse bias. While we cannot know the nonrespondents' true time-use estimates, we can estimate the bias due to nonresponse by contrasting the time-use

estimates for those responders who were most similar to the nonrespondents based on propensity scores (Dixon 2004). A similar analysis is repeated for noncontacts.

Results

Table 1 shows the distribution of outcomes in ATUS by demographic and economic characteristics. The table shows that race is the strongest predictor of refusals among ATUS participants. Participants who identified as "Other" race (not White or Black) were 21 percent more likely than Whites to refuse rather than complete an interview[4]. Sex, education, ethnicity, marital status, and employment were all weak refusal predictors. Both age and income, while showing little variability among groups, showed a monotonic increase in nonresponse as they increased. Table 1 also shows that race was the best predictor of noncontact among ATUS participants. In the ATUS, most noncontacts are due to unanswered callbacks. Participants who identified as "Other" race are about 12 percent more likely than Whites to be noncontacts. Similar to refusals, education, and marital status are weak noncontact predictors. Family income is also a weak noncontact predictor. Participants who are not in the labor force, however, show a lower noncontact rate than either employed or unemployed participants. The table also shows that men have a slightly higher noncontact rate than women. Finally, while there are no clear age patterns in noncontacts for those under age 55, persons selected for ATUS who were over the age of 55 were easier to contact than those younger than the age of 55.

Refusal model

Using logistic regression, the refusal model includes nine independent variables as predictors and five interaction terms and has a rescaled R-square of 0.1034. The statistically significant predictors are age, race, marital status, and the interaction of race by relatives present in the household. Specifically, White respondents are less likely to refuse, while married and older respondents are more likely to refuse. The significant interaction shows that White

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[3] In 2003, the CPS response rate was 93 percent.

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[4] Other race is primarily comprised of Asian (59%), White-American Indian (15%), and American Indian, Alaskan Native (13%).

respondents with relatives present (living in the household) are more likely to refuse.

Each respondent is assigned a "refusal propensity score," which is then used to create the same proportion of "refusers" that existed in the sample. Then, those respondents most like the refusers are compared to those who are most unlike the refusers. This was done with a logistic model (Table 2) by using the predicted values to classify those who responded to the ATUS into two groups, those most like refusers and those least like refusers. This provided an indication of the direction and magnitude of bias in the time-use estimates.

In Table 5, the bias is shown as a simple comparison between the mean time reported for respondents and the overall mean, which includes both respondents and "refusals." As Table 5 shows, the refusal bias is small for most time-use categories relative to the amount of time spent on the activity. Refusals spent more time than non-refusals doing personal care; religious activities; and socializing, relaxing, and leisure activities. Persons who refused spent less time than non-refusals doing household activities and eating. Those differences were statistically significant, except for socializing, relaxing and leisure, which approached significance. None of the other differences were significant. The bias for personal care is a small percentage of the time spent on an activity; it was only 6 minutes out of almost 12.4 hours. This bias estimate is the amount of time the overall estimate is affected by nonresponse. There is a 35-minute difference between "refusals" and "respondents." This means that if the proportion of refusals increases, the amount of bias in the final estimate would also be expected to increase beyond the current 6 minutes estimate. The other time-use variables show smaller differences in minutes— for example, the bias for socializing was 4 minutes out of 4.8 hours. These differences are significant in part because the large sample size (20,720 cases) provides high statistical power. Overall, refusal bias does not affect most time-use activity categories, although it is a small problem for some.

The 95% confidence interval is useful for gauging the potential bias adjusting for what we do not know about nonresponse. For personal care, the best estimate showed that the ATUS underestimated time spent on personal care by 6 minutes. The 95% interval can be used for an estimate of the likely range of bias adjusting for what we do not know about nonresponse. That would give the largest potential bias as the lower

95% interval: -9.7 minutes. If the model of nonresponse was less predictive, the interval would be wider. This may be useful for deciding if the bias is of practical importance.

Noncontact

The noncontact model uses the same variables as the refusal model to permit easier comparison between models (Table 3.) Were different variables used, the relative importance of the different variables would not be seen. This is because the variables left out of the model would get a nonsignificant weight in the model and would not affect the propensity scores. The noncontact model has a rescaled R-square of 0.1662. The best predictors of noncontact bias are race, age, and number of attempted contacts. Specifically, white and older designated persons were less likely to be noncontacts and households with more attempted contacts were more likely to be noncontacts. This may seem obvious, but it helps estimate the likelihood of contact for those who were eventually contacted.

As Table 6 shows, the noncontact bias is small, although it tends to be larger than the comparable refusal bias. Time devoted to personal care is higher for noncontacts than contacts, 12 minutes out of over 12 hours, while time spent in household activities is 10 minutes less out of almost 2 hours. Time spent on education and religious activities is also higher for noncontacts, but eating is lower. None of the other differences between "noncontact" and "responder" are significant. While noncontact bias is larger than refusal bias for some comparisons (e.g., 12 minutes compared to 6 minutes for personal care from Tables 6 and 5 respectively), it is still not a large problem in the ATUS relative to the time spent in the different categories.

Overall Nonresponse

Table 7, using the total nonresponse model, shows the aggregate effect of all nonresponse on the time-use categories. The pattern is the same for noncontacts and refusals in both direction and significance, and shows a blending of the effects of refusal and noncontact. The magnitude of the bias usually falls between the estimates from refusal and noncontact. This suggests that all other forms of nonresponse are not affecting the results appreciably.

Discussion

By focusing on both nonresponse rates and nonresponse bias, we are able to gain a more complete picture of the demographics of nonresponse in the American Time Use Survey and what effects nonresponse might have on the survey's estimates. Nonresponse rates and nonresponse bias are analyzed separately for refusals and noncontacts, because there is evidence that these two nonresponse types operate through different mechanisms and involve different types of respondents (Groves 1989). The ability to model bias due to nonresponse depends on how similar actual nonrespondents are to those classified as nonrespondents by the model. A similar method gave reliable results in estimating refusal bias in the CPS for estimates of labor force status (Dixon 2004). That study, however, had a match with the Census 2000 as a gold standard, while this study has no standard of comparison. The relative importance of the variables used in the refusal model in this study was different from the CPS refusal model developed by Dixon and Tucker (2000), so the refusal reasons or the characteristics of those who refuse are likely to be different. Since the sample is drawn from those who cooperated in the eighth panel of the CPS, this probably contributed to the differences with the earlier study.

Many of the findings resulting from the analysis of nonresponse rates are not particularly surprising. The Other race category was an important indicator in both the refusal and the noncontact groups. While this finding in and of itself is not particularly unexpected, it does show a clear group the ATUS needs to better capture. Age also becomes an important indicator for both groups as both refusal and noncontact rates increase as age increases. There is also a slight increase in the refusal rate as income increases; however, this may be due to fact that lower income groups have more participants whose eligibility could not be determined. If more was known about the eligibility of the lower income cases, then this difference may disappear. For noncontacts, both sex and employment status are also important indicators; however, neither has a very large variance among categories.

Similar to the nonresponse rate findings, the refusal and noncontact regression models also found race and age to be important response indicators. Specifically, the models found that both White and older respondents are less likely to refuse but more likely to be noncontacts. The refusal model also shows that married respondents and White respondents with relatives in the household are disproportionately likely to refuse.

Nonresponse bias, as measured by the propensity models, appears to be small relative to respondents' time use. Personal care shows the most bias for both refusals and noncontacts; however, it is still relatively small and is most likely due to the large portion of time most respondents spend in this category.

Limitations and Future Work

There are several limitations to the current research. First, the assumption that the propensity model represents nonresponse needs to be examined with other models. Second, many of the time-use categories had non-normal distributions and would have been better analyzed using a model that did not assume a normal distribution. Furthermore, due to the wide confidence intervals associated with small proportions, the bias model for time categories with small incidence of participation, like volunteering, did not provide as good a fit as in categories with larger proportions of participants (such as sleeping). Future studies should focus on better evaluations for categories with smaller participation proportions. The current study adjusted for the fit of the nonresponse propensity models to provide some measure of the bias adjusting for nonresponse. If the models fit more poorly, the intervals would have been wider. Other estimates adjusting for the variability of each of the time use categories would also give wider confidence intervals.

While the differences due to nonresponse in mean times for activities are of interest, the trade-offs between activities is also of interest. The differences in the relationships between the time-use categories (elasticities) for respondents and nonrespondents could show potential bias for many models. For example, if a researcher is studying what time-use categories are affected by the presence of a young child in the family and nonrespondents have different trade-offs with "caring for a household member" the results could be biased even if the overall means were not different. This study explained the bias for each time-use category. Future studies should focus on the relationship among the biases. To better assess this type of possible bias, subgroups of interest, such as those living in households with young children, should also be modeled separately.

References

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Dixon, J. and Tucker, C., Modeling Household and Interviewer Nonresponse Rates from Household and Regional Characteristics, Paper presented at the International Workshop on Household Survey Nonresponse, Budapest, September, 2000. http://www.fcsm.gov/committees/ihsng/buda5.pdf

Groves, R. and Couper, M., Nonresponse in Household Interview Surveys, 1998, New York: Wiley.

Table 1: ATUS Outcomes by Selected Demographic and Economic Characteristics

		Complete	Refusal	Noncontact	Other	Unknown Eligibility	Total
Sex	Male	54.7%	19.3%	8.2%	7.9%	9.9%	16545
	Female	57.5%	19.3%	6.6%	6.8%	9.9%	20308
Race	White	66.6%	15.7%	4.9%	5.5%	7.4%	25976
	Black	53.2%	16.0%	8.1%	6.9%	15.9%	4568
	Other	15.7%	36.7%	16.7%	15.1%	15.8%	6309
Age	15-24	52.4%	16.6%	8.6%	7.4%	15.0%	4839
	25-54	55.7%	19.1%	8.8%	6.1%	10.4%	21555
	55-64	63.3%	19.8%	5.0%	5.3%	6.2%	4365
	65 +	56.2%	22.0%	2.8%	12.9%	6.1%	6094
Education	Less than HS	49.2%	18.9%	5.6%	11.7%	14.6%	7383
	High School	52.4%	20.8%	7.9%	8.0%	10.9%	11055
	College	58.2%	19.1%	8.3%	5.7%	8.8%	9500
	Greater than Grad	64.7%	18.1%	6.9%	4.5%	5.8%	8915
Hispanic	Hispanic	51.1%	14.0%	7.3%	11.1%	16.5%	4501
	Non-Hispanic	56.9%	20.1%	7.3%	6.8%	9.0%	32352
Marital Status	Married, Spouse Present	60.0%	20.8%	6.0%	6.9%	6.3%	18334
	Married, Spouse Absent	45.1%	16.7%	9.5%	11.5%	17.3%	497
	Widowed	53.8%	22.1%	3.8%	12.4%	7.9%	3074
	Divorced	55.7%	17.7%	8.6%	5.5%	12.5%	4508
	Separated	46.5%	16.1%	11.5%	5.8%	20.1%	1101
	Never Married	51.6%	16.8%	9.9%	7.2%	14.6%	9339
Employment Status	Employed	57.4%	18.7%	8.9%	5.6%	9.5%	22758
	Unemployed	52.9%	16.2%	8.1%	6.0%	16.8%	1241
	Not in Labor Force	54.5%	20.8%	4.4%	10.4%	9.9%	12854
Family Income	Less than 39,999	50.5%	16.5%	6.6%	9.7%	16.8%	6944
	40,000- 74,999	58.1%	16.9%	8.2%	6.7%	10.1%	11159
	Greater than 75,000	64.9%	18.6%	6.9%	5.5%	4.2%	12716
Total		20720	7119	2693	2684	3637	36853

Table 2a: Refusal model

```
                      Model Fit Statistics
                                        Intercept
                            Intercept      and
              Criterion       Only      Covariates
              AIC          31656.770     29656.976
              SC           31665.004     29780.489
              -2 Log L     31654.770     29626.976


      R-Square     0.0703    Max-rescaled R-Square    0.1034


      Test              Chi-Square     DF      Pr > ChiSq

      Likelihood Ratio   2027.7941     14        <.0001
      Score              2184.7938     14        <.0001
      Wald               2016.8753     14        <.0001


              Analysis of Maximum Likelihood Estimates

                                 Standard        Wald
      Parameter      DF   Estimate   Error   Chi-Square   Pr > ChiSq

      Intercept       1   -0.7755    0.1019    57.9064      <.0001
      Age             1    0.00816   0.00160   26.0754      <.0001
      Hispanic        1    0.1272    0.1081     1.3848      0.2393
      Child under 6   1   -0.0949    0.1316     0.5196      0.4710
      Married         1    0.2665    0.0421    40.1539      <.0001
      HH size         1    0.0193    0.0178     1.1799      0.2774
      Relatives       1    0.5092    0.1159    19.2920      <.0001
      Education       1   -0.1057    0.1854     0.3253      0.5684
      White           1   -1.1085    0.0594   348.5235      <.0001
      Age x Relative  1   -0.00702   0.00198   12.5960      0.0004
      Hisp x HH size  1   -0.0493    0.0307     2.5812      0.1081
      Child x HH siz  1   -0.0154    0.0318     0.2360      0.6271
      HH size x educ  1    0.00671   0.0461     0.0212      0.8842
      Relt x White    1   -0.3626    0.0696    27.1178      <.0001
      Contacts        1    0.0383    0.0257     2.2200      0.1362
```

Table 2b: Refusal propensity ranges.

Variable	Mean	Std_Dev
low95ref	0.2540512	0.1262548
predref	0.2728305	0.1317361
up95ref	0.2925162	0.1372694

Propref	N Obs	Variable	Mean	Std Dev
Responders	20720	low95ref	0.2192307	0.1017325
.	.	predref	0.2354835	0.1058825
.	.	up95ref	0.2526683	0.1101362
Refusers	7119	low95ref	0.2950032	0.1403706
.	.	predref	0.3146206	0.1459077
.	.	up95ref	0.3349181	0.1514399

Table 3a: Noncontact model

```
                      Model Fit Statistics

                                          Intercept
                              Intercept      and
              Criterion         Only      Covariates

              AIC            16717.917    14670.808
              SC             16725.978    14791.725
              -2 Log L       16715.917    14640.808


       R-Square     0.0848    Max-rescaled R-Square    0.1662

       Test                Chi-Square      DF      Pr > ChiSq

       Likelihood Ratio     2075.1088      14       <.0001
       Score                2396.8507      14       <.0001
       Wald                 1963.7552      14       <.0001


            Analysis of Maximum Likelihood Estimates
                                Standard       Wald
       Parameter     DF   Estimate    Error   Chi-Square   Pr > ChiSq

       Intercept      1    0.6746    0.1360     24.6151      <.0001
       Age            1   -0.0333    0.00248   180.6206      <.0001
       Hispanic       1    0.2596    0.1465      3.1399      0.0764
       Child under 6  1    0.00233   0.1798      0.0002      0.9897
       Married        1    0.1273    0.0615      4.2852      0.0384
       HH size        1   -0.0405    0.0271      2.2392      0.1345
       Relative       1   -0.6540    0.1549     17.8185      <.0001
       Education      1    0.2488    0.2241      1.2327      0.2669
       White          1   -1.5158    0.0793    365.2298      <.0001
       Age x Relative 1    0.00974   0.00316     9.5102      0.0020
       Hisp x HH size 1   -0.00250   0.0417      0.0036      0.9522
       Child x HH siz 1   -0.0153    0.0450      0.1155      0.7340
       HH size x Educ 1   -0.2002    0.0638      9.8327      0.0017
       Relt x White   1   -0.2388    0.0958      6.2165      0.0127
       Contacts       1    0.2597    0.0308     70.8684      <.0001
```

Table 3b: Noncontact propensity range

Variable	Mean	Std Dev
Lower 95 percent interval	0.1228655	0.1091999
Predicted Noncontact	0.1388230	0.1207160
Upper 95 percent interval	0.1564075	0.1327775

Propnc	N_Obs	Variable	Mean	Std_Dev
Responders	20720	Lower 95% confidence interval	0.0906917	0.0843834
		Predicted noncontact	0.1028223	0.0933943
		Upper 95% confidence interval	0.1163958	0.1030035
Noncontacts	2694	Lower 95% conficence interval	0.1866529	0.1256690
		Predicted noncontact	0.2091771	0.1381896
		Upper 95% confidence interval	0.2334480	0.1510609

```
Table 4a: Total Nonresponse model
                    Model Fit Statistics

                                       Intercept
                          Intercept       and
           Criterion        Only       Covariates

           AIC            53825.208     49010.205
           SC             53833.777     49138.752
           -2 Log L       53823.208     48980.205


       R-Square     0.1169    Max-rescaled R-Square    0.1561


            Testing Global Null Hypothesis: BETA=0

         Test              Chi-Square      DF     Pr > ChiSq

         Likelihood Ratio   4843.0026      14       <.0001
         Score              4673.7658      14       <.0001
         Wald               4270.8730      14       <.0001

            Analysis of Maximum Likelihood Estimates

                                  Standard      Wald
         Parameter    DF   Estimate   Error   Chi-Square   Pr > ChiSq

         Intercept     1    1.0022   0.0729    188.9874      <.0001
         Age           1   -0.00736  0.00112    42.9315      <.0001
         Hispanic      1    0.5042   0.0707     50.9190      <.0001
         Child under 6 1    0.0602   0.0931      0.4177      0.5181
         Married       1   -0.1055   0.0304     12.0423      0.0005
         HH Size       1    0.0270   0.0132      4.1976      0.0405
         Relatives     1   -0.1749   0.0824      4.4990      0.0339
         Education     1    0.2681   0.1243      4.6510      0.0310
         White         1   -1.2097   0.0447    734.0633      <.0001
         Age x Relative1   0.00543   0.00141    14.8033      0.0001
         Hisp x HH size1  -0.0346   0.0198      3.0367      0.0814
         Child x HH siz1  -0.0203   0.0226      0.8131      0.3672
         HH size x educ1  -0.1018   0.0318     10.2483      0.0014
         Relt x White  1   -0.2946   0.0533     30.5635      <.0001
         Contacts      1    0.3765   0.0194    376.5615      <.0001
```

Table 4b: Nonresponse propensity range

Variable	Mean	Std Dev
Lower 95% interval	0.4511125	0.1713789
Predicted nonresponse	0.4679129	0.1731837
Upper 95% interval	0.4846913	0.1747184

Nonresponse	N_Obs	Variable	Mean	Std_Dev
Responders	20720	Lower 95% interval	0.3953137	0.1413351
		Predicted noncontact	0.4113080	0.1434233
		Upper 95% interval	0.4274390	0.1453923
Non-Responders	18221	Lower 95% interval	0.5145640	0.1802472
		Predicted noncontact	0.5322811	0.1814432
		Upper 95% interval	0.5497956	0.1823101

Table 5: Refusal Bias (mean time in minutes)

	Respondents	Refusal	ALL	Bias	Lower 95%	Upper 95%
Personal Care	738	773	744	-6	-9.7	-1.9
Household Act	124	85	117	+7	+3.6	+9.4
Caring hh Mem	27	28	27		-1.7	+1.3
Caring nhh Mem	12	12	12		-1.1	+1.0
Work	169	163	168	+1	-4.1	+6.0
Education	19	31	21	-2	-3.8	+0.1

Consumer Purch	28	23	27	+1	-0.2	+2.0
Prof. care	5	6	5		-0.7	+0.4
HH service	1	1	1		-0.2	+0.4
Gov service	0	0	0		-0.1	+0.1
Eating	69	54	67	+2	+1.5	+3.7
Socializing	288	310	292	-4	-7.7	+0.5
Sports	23	16	22	+1	-0.3	+2.4
Religious	10	21	12	-2	-2.7	-0.9
Volunteer	8	8	8		-0.9	+0.9
Telephone	7	10	7		-1.0	-0.0
Travel	77	77	77		-1.6	+1.8
Other	9	9	9		-0.7	+0.8

Table 6: Noncontact Bias

	Respondents	Noncontact	All	Bias	Lower 95%	Upper 95%
Personal Care	732	780	744	-12	-15.5	- 7.6
Household Act	127	85	117	+10	+ 7.2	+13.2
Caring hh Mem	28	24	27	+ 1	- 0.6	+ 2.4
Caring nhh Mem	12	12	12		- 1.2	+ 1.0
Work	165	177	168	- 3	- 8.0	- 2.9
Education	18	31	21	- 3	- 4.9	- 1.3
Consumer Purc	28	25	27	+ 1	- 0.5	+ 1.8
Prof. care	5	5	5		- 0.6	+ 0.4
HH service	1	1	1		- 0.2	+ 0.4
Gov service	0	0	0		- 0.1	+ 0.1
Eating	70	56	67	+ 3	+ 2.4	+ 4.6
Socializing	290	297	292	- 2	- 6.0	+ 2.4
Sports	23	19	22	+ 1	- 0.6	+ 2.1
Religious	11	16	12	- 1	- 2.3	- 0.5
Volunteer	9	7	8	+ 1	- 0.6	+ 1.3
Telephone	7	9	7		- 1.1	- 0.0
Travel	76	80	77	- 1	- 2.6	+ 0.8

Table 7: Nonresponse Bias

	Respondents	Nonresponse	All	Bias	-95%	+95%
Personal Care	734	775	744	-9.7	-13.7	- 5.7
Household	125	91	117	+8.1	+ 5.1	+11.1
Caring hh Member	27	26	27	+0.2	- 1.3	+ 1.7
Caring nhh Member	12	12	12	-0.1	- 1.1	+ 1.0
Work	168	168	168	+0.0	- 5.1	+ 5.2
Education	19	27	21	-2.0	- 3.8	- 0.1
Consumer Purc	28	25	27	+0.8	- 0.3	+ 2.0
Prof. care	5	5	5	-0.1	- 0.6	+ 0.4
HH service	1	1	1	+0.1	- 0.2	+ 0.4
Govt Service	0	0	0	-0.1	- 0.1	+ 0.1
Eating	70	56	67	+3.2	+ 2.1	+ 4.3
Socializing	288	302	292	-3.1	- 7.3	+ 1.1
Sports	23	18	22	+1.1	- 0.2	+ 2.5
Religious	10	18	12	-1.8	- 2.7	- 0.9
Volunteer	9	7	8	+0.3	- 0.6	+ 1.3
Telephone	7	9	7	-0.5	- 1.0	+ 0.1
Travel	77	79	77	-0.5	- 2.2	+ 1.3
Other	9	8	9	+0.3	- 0.5	+ 1.1