

Weights

It is essential that researchers first consider the number of unweighted cases available in any analysis to ensure that they are not making claim of results based on a small number of cases. It is also essential that any reported results are based on weighted analysis. The weights perform two functions. First, the weights correct for imbalances between the population distribution and the diarist sample distribution. Where possible, we have used the original sample weights, but in the earlier surveys where reliable weights were not available, we have produced weights that balance the distribution of the age and sex groups in relation to the Census or CPS distribution. In the case of the 1975-76 survey, our weights additionally account for attrition. Second, the weights correct for distribution of the days of the week. The 2003-2012 ATUS collected half of diaries on weekdays and half on weekends. In all studies, diarists did not respond in equal numbers on each day of the week. As daily activity patterns do differ by the day – with the contrast between activities on Fridays, Saturdays, and Sundays being most distinct, it is important to rebalance the distribution of activities on the different days of the week.

We have produced a weight for all surveys we call RECWGHT. This weight accounts for population/sample distribution by age group and sex, provides an even distribution of the days of the week (and corrects for the oversample of parents in the 1999-2001 element of the 1998-01 combined survey) for good quality diaries – that is those cases where:

- the diarist has provided three essential pieces of background information:
 - age
 - sex
 - day of the week on which diary completed
- the diarist has returned a quality diary, meaning that:
 - the diary has 90 minutes or less missing main activity time after imputation (that is they have accounted for majority of the day).
 - the diary has 7 or more episodes
 - the diary includes some time recorded in at least 2 of 4 basic activities as a primary or secondary activity (or in the case of travel, marked through location of means of transport) in which one would expect a diarists to have engaged on any given day. We did note that some people providing child care to multiple children or to an infant as well as some diarists performing adult care did not record travel and also missed a second or third basic activity. If these diaries from carers otherwise meet other quality criteria, we counted these diaries as good diaries (as it may be possible the diarists ate while feeding the care recipient for example but did not record her or his own eating), but we also have flagged these cases. If diarists were missing two basic domains and spent most of the day at home and recorded at least 12 episodes, or recorded at least 15 episodes, we also counted the diaries as good diaries provided that these diaries met the other quality criteria. The four basic activity domains most people perform on most days are:
 - sleep or rest: AHTUS codes 3 (sleep), 4 (imputed sleep), 5 (nap or rest), 78 (relax, time out, do nothing)

- eat or drink: AHTUS codes 8 (meals, food/drink breaks at work), 9 (other meals and snacks), 56 (out in a restaurant, café or bar), 20 (food preparation/cooking), 21 (set table, wash/put away dishes)
- personal care: AHTUS codes 1 (personal care), 2 (imputed personal or household care), 6 (wash or dress), 7 (personal medical care), 28 (purchase personal services), 29 (purchase medical care services)
- travel or exercise: AHTUS codes 60 (sports and exercise), 62 (walking), 63 (cycling), 64 (outdoor recreation), 65 (sports with child), 66 (hunt, fish, boating), 67 (gardening), 90 (imputed travel), 91 (personal or adult care travel), 92 (travel during paid work), 93 (commute to and from work), 94 (education-related travel), 95 (consumption travel), 96 (child care travel), 97 (travel for volunteering or worship), 98 (other travel)

Diarists who did not provide basic background information do not allow the estimation of the distribution of the sample. Diarists who provide a bad diary doubly disrupt time use estimates by inflating the time recorded in activities which they did mention and undercounting time in basic activities which they did not mention. In our RECWGHT, all cases with missing basic information or bad diaries are 0-weighted, and thus are excluded from analysis. Nonetheless, these bad diaries remain in the files. We also include the original survey weights in the harmonised files, as in some cases these bad cases have original weights. Thus, users who so wish have the ability to examine the low quality cases.

Number of excluded diaries by dataset

	Missing >90 minutes	Fewer than 7 episodes	Missing 2 or more basic acts	Total excluded diaries
1965-66	0	1	1	2 (0.1%)
1975-76 – main*	25	29	55	89 (1.9%)
1975-76 – spouse*	13	22	44	105 (4.2%)
1985 – main	63	4	10	73 (2.5%)
1985 – youth	16	4	2	19 (4.5%)
1992-94 (age 18+)	0	153	159	312 (4.2%)
1992-94 (child)	0	18	40	58 (3.1%)
1994-95	0	23	37	43 (3.6%)
1998-99; 2000-01	0	23	6	25 (1.1%)
2003-12 – adult	3,102	1,644	792	5,074 (3.9%)
2003-12 – age 15-17	108	56	22	173 (2.7%)

*We have retained cases where demographic information exists for a spouse who did not complete a diary to allow users to examine non-response, but we zero-weighted these cases. The figures in this table do not include the non-responding spouses, this table only covers cases of returned diaries.

We also constructed two additional weights. The 1992-94 and the 2003-2012 surveys sampled all contiguous states, and the 2003-2012 ATUS additionally included Hawaii and Alaska in the sample. The earlier surveys did not cover some of the smaller and more rural states nor did they include Hawaii and Alaska. As there is some possibility that these differences in the sample base may affect some results, we computed an additional weight, XTIMEWT. This cross-time weight is the same as the RECWGHT for the 1965-66, 1975-76 and 1985 surveys, but excluded the diarists from the additional states in 1992-94 and 2003-2012. The ATUS original weights inflated the size of the sample to the size of the CPS population. We deflated the ATUS weights to reflect the actual sample size, but as the inflated weights are useful for some purposes, we produced an additional weight, INFLTWT, which retains the inflation factor for the ATUS (but still excluded

those diaries excluded by RECWGHT by 0-weighting low quality diaries and diaries missing age, sex or day of the week the diary was completed). We also computed the inflation factor for the earlier surveys to reflect the CPS distribution for the relevant year. As INFLTWT is based on RECWGHT, this weight retains those states found only in the most recent surveys.

Number of excluded cases by dataset

	Low quality diary, valid age, sex, diary day	Good diary, missing age, sex or diary day	Low quality diary & age, sex or diary day missing	% of cases excluded
1965-66	2	28	0	30 (1.6%)
1975-76 – main*	88	13	1	102 (2.2%)
1975-76 – spouse*	61	4	2	67 (2.7%)
1985 – main	63	146	10	219 (7.5%)
1985 – youth	19	0	0	19 (4.5%)
1992-94 – adult	292	153	20	465 (6.2%)
1992-94 – age0-17	58	4	0	62 (3.3%)
1994-95	38	23	5	66 (5.5%)
1998-99; 2000-01^	18	435 (81)^	7	460 (19.6%) / 106 (4.5%)
2003-12 – adult	5,074	0	0	5074 (3.9%)
2003-12 – age 15-17	173	0	0	173 (2.7%)

* We have retained cases where demographic information exists for a spouse who did not complete a diary to allow users to examine non-response, but we zero-weighted these cases. The figures in this table do not include the non-responding spouses, this table only covers cases of returned diaries.

^ Cases that remain missing age, sex or diary day after including the imputed ages released by the survey team are in () in the good diary middle column and after the / in the final column.

Total number of diaries

	Total original number of diaries	Number of good diaries (unweighted but for which weights are available)	Number of diaries (weighted with recwght)
1965-66	2,021	1,991	2,021
1975-76 – main	4,584	4,482	4,584
1975-76 – spouse	2,504	2,437	2,504
1985 – main	2,921	2,702	2,921
1985 – youth	418	399	418
1992-94 – adult	7,514	7,049	7,514
1992-94 – age 0-17	1,872	1,810	1,872
1994-95	1,199	1,133	1,199
1998-99; 2000-01	2,351	1,891 (2,245 with imputed age)	2,351
2003-12 – adult	130,610	125,536	130,610
2003-12 – age 15-17	6,350	6,177	6,350