Preliminary Report:

Project: Preparing a Harmonised US Heritage Time-Use Datafile

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Preparing a Harmonised US Heritage Time-Use Datafile

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Outline of the Report

This interim report sets out the sampling and data requirements for the studies to be used in the US historical comparator files for the American Time Use Study. It provides a summary quality profile, outlining the design, achieved characteristics and content of the studies. And it sets out proposals and plans for the second stage of this project.

[1] We gratefully acknowledge contributions to the project from John Robinson, University of Maryland, and Anne Gauthier, University of Calgary.

Preparing a Harmonised US Heritage Time-Use Datafile

1. Desiderata and priorities for selection of candidate studies

There are three distinct sets of desiderata for the selection and prioritisation of studies for the US heritage time use data file: general sampling requirements; data requirements for comparisons with the Current Population Survey from which the ATUS sample is drawn; and specific data requirements for the construction of household production extensions to the National Accounts. In this report we consider in particular issues of methodology and sub-group response rates.

1.1 Requirements for sampling

National Accounts are national, and for cover an entire year. This implies that heritage diary samples to be included in the comparison data-file should:

- Represent the whole (adult) population of the US—samples should be capable of being re-weighted to represent an equal probability sample of individuals.
- Provide appropriate coverage of the whole year—samples should be capable of being re-weighted to give equal representation of seasons and days of week.

Of these two requirements, we view the former as being of the higher importance. There is some question about the degree of seasonal variation in time use in the US (which will be investigated empirically in the course of this project—see Section 5 below), but it is likely that the latter requirement may be relaxed without overwhelming damage to the project.

1.2 Requirements for comparison with the ATUS

These include:

- Detailed activity codings (ideally three digit classifications to enable two digit compatibility with ATUS)
- Detailed secondary activity and co-presence data for comparison with ATUS secondary caring data
- Calibration/reliability/consistency study to investigate consequences of the specific “caring” question in ATUS.

It will become clear, in what follows, that the first two of these requirements are met to a considerable degree by some at least of the available heritage files. However, there are at present no plans in place for the empirical assessment of the extent of potential instrument effects. We will have to make some conjectures about the relationship between the results emerging from the traditional designs of diary instrument that are discussed in the body of this paper, and those from the innovative ATUS instrument. But it would be better if we had some empirical evidence of this, and in what follows we will avoid speculation on the subject wherever possible.

It may be appropriate, initially at least, and prior to some serious reliability and consistency investigations, to focus on studies reasonably widely spaced in historical terms (ie with gaps of 10 years or more) on the assumption that instrument effects are relatively small and constant, while historical changes in behaviour are cumulative over time, and therefore grow to dominate the instrument effects.

1.3 Specific data requirements for household production extension to national accounts

In addition to the above general requirements, there are some further data requirements specific to the use of the heritage data in the calculation of household extension accounts:

- Activity sequence data, for identification of childcare episodes (especially those occurring simultaneously with other non-child-related activities), and for counting the occurrence of consumption events such as meals, are required for the construction of "output-based" extension accounts.
- Questionnaire measures of weekly labour income, normal weekly hours of work, employment status, occupation, education, are required as a basis for wage and shadow wage calculations, that may be used in "input-based" extension accounts.
- Questionnaire indicators of household equipment, housing quality, household income, are a requisite for inferences about the quality of household production.

2. Brief quality profile of studies

2.1 Sampling characteristics

This section considers the degrees of convergence and variation among the general aims, sampling procedures, and survey design for the time use studies which come closest to meeting the desiderata set out in Section 1. The requirement for national coverage (1,1), in particular, severely restricts the field of consideration. It means that we must focus on Americans' Use of Time 1965-1966, Time Use in Economic and Social Accounts, 1975-1976, Americans' Use of Time 1985, Americans' Use of Time 1992-1994 (EPA). Table 2.1.1 summarises the aims of of the major four national-scale US heritage studies (we await access to the fifth, from 1995, from the university of Maryland, details of which will be added to a later version of this paper). Given arguments in 1.2 above, we consider that studies collected post 1995 are for the moment too recent to be considered for inclusion.

It is clear that similar themes motivated the collection of the four comparator studies, though several have unique characteristics (the 1975 study had a longitudinal element, following the same sample at four points over a year; the 1985 study tested diary collection methods—though only the mail-back portion of the data remain accessible in a clean and complete form). These additional characteristics, however, do not detract from the prospects for harmonisation.

Only the 1965-66 study, which applied the methodology of the Szalai Multinational Time Use Study project, explicitly excludes families where all employed members work as farmers. As the 1985 study focussed on urban populations, this study in practice entails a similar exclusion. Though the proportion of American families dependent solely on income from agriculture in the US was low by international standards, the absence of members these families from these two studies does pose some problems of principle for the construction of national accounts, as does the age cap for the 1965 study.

Table 2.1.1: Study aims, target populations, and sample restrictions

Survey years	Organising Aims and Considerations	Target Population	Sampling Restrictions
1965-1966	Comparability with the Multinational Time Use Study collected in 12 countries (in which Jackson, Michigan represented the USA)	The national working age population of the USA (excluding families where all members worked as farmers)	Only people aged 18 to 65, in households with at least one member working for at least 10 hours; one person per household (Hawaii and Alaska also excluded)
1975-1976	Determine how a representative sample changed their use of time over a year	The national adult population	People aged 18 or older and one person plus spouse if present per household
1985	Determine how people used their time and to compare diaries collected by post-out/post-back, phone, and face-to-face interview (clean data available only for the phone element)	The national urban population past secondary school age not living in institutions	People aged 18 or older living in urban private households with phones in the continental USA (Hawaii and Alaska excluded), and one person per household
1992-1994	The study aimed to determine how people around the nation used their time	The national population living in private residences	1 person of any age living in sampled private households with phones in the continental USA
2003-2004	This study has gathered the first continuous set of time use data – though initially to be released annually, this format may allow the publication of quarterly or monthly time use statistics	The civilian noninstitutional population in the U.S aged 15 and older	One person aged 15+ per household. Interviews were conducted over the phone, but households for whom Census does not have a phone number were sent letters asking them to call a toll-free number

Table 2.1.2 shows that response rates for these studies range from around two-thirds to nearly three-quarters of the contacted sample, though response rates steadily declined from 1965-66 through 1995. While the direct impact of the declining responses rates on the capacity for this data to be harmonised is difficult to precisely quantify, this issue should be noted in the use of the final file for analysis.

Difficulties do arise, however, once we consider other aspects of the target population sample inclusion and exclusion procedures (see Tables 2.1.1 and 2.1.2). All studies initially sampled households (drawn from location/address sample frames, phone numbers, or households selected for the Current Population Survey), then all studies except the 1975-76 project collected a diary from only one person per household. The 1975-76 study also collected diaries from spouses where relevant, though (because of

differences in the design of the spouse diary) only the data from the main sample member will be included in the harmonised file. The interview of a single adult per household, common to all the sample designs, means a higher selection probability for members of smaller households. This can be straightforwardly compensated for by reweighting.

A more difficult problem arises in relation to possession of telephones. The 1965-66 study and first period of collection of the 1975-76 study involved interview visits to homes, which allowed the inclusion of all households. The follow-up sampling of households in the 1975-76 study, and all subsequent studies have taken place over the telephone. Households not possessing a telephone are excluded, except in the case of the 2003 ATUS, which draws its sample from the address and area based CPS sample, and which sends letters asking people to call a toll-free number from a friend's phone or a pay phone to participate in the study. As the population lacking a home telephone is small and has declined with time, this imbalance should have a minimal impact on the harmonisation of the data – particularly for direct comparisons of the 1975-76 and 2003 data (see also a brief discussion of this issue in Section 3.2). Nevertheless, those households possessing more than one telephone line have a higher chance of selection than other households in the studies drawing the sample through random-digit dialling, and cross-time harmonisation of this sample variation is perhaps more problematic than the absence of households not possessing a telephone.

Other sampling variations (see Tables 2.1.1 and 2.1.2) are not easily harmonised. A number of the studies exclude residents of Hawaii and Alaska, though the most recent data includes people from all states. Five of the six studies start the diary collection from people in their mid to late teens. The 1992-94 study, however, includes proxy diaries from parents of new-born infants to the age of 9, and diaries collected directly from people aged 10 and above. The 1965-66 study, unlike the other data sets, imposed an age cap, excluding people aged 66 and above. As the daily patterns of the young and the elderly can differ markedly from the daily patterns of working and parenting age people, the age variations pose two levels of problems. On the analytic level, researchers can only meaningfully compare the time use of people in similar age bands if the aim of the research is to compare trends across time, which would mean excluding the youngest diarists from the 1992-94 data and the oldest diarists from all studies after 1965-66. Excluding sampled diarists on age grounds created complications with the weights designed to correct for imbalances between the sample and the target populations.

Table 2.1.3 considers the time periods captured by each study. The 1975, 1985, 1992-4 and 2003 studies collected data over the course of a whole year, allowing seasonal variations in behaviour to be detected. The 1965-66 data, however, collected the majority of data between 15 November and 15 December 1965, with some additional interviews conducted between 1 March and 25 April 1966 to boost the sample numbers. The oldest data thus includes significant potential seasonal biases.

Table 2.1.2: Sample designs and response rates

Survey years	Sample Frame	How Sample Drawn	Response Rate
1965-1966	67 primary sampling units, including 12 from the largest metropolitan areas, 32 other large metropolitan areas, and 23 rural to small population urban areas	Multi-stage clustered area sampling of clusters containing around 4 addresses	72.5%
1975-1976		Initially, one individual was sampled per household, though in the follow-up waves, spouses were sampled for individuals that lived in couples	72.0% replied to the first wave; 44.9% responded to all four periods of data collection
1985	Lists of principally urban area codes and potential phone numbers	Random-digit dialling, with only private residences pursued for an interview	67% replied to the phone survey
1992-1994	Potential phone numbers within lists area codes	Random-digit dialling, only private residences pursued for interview. The person who would next have a birthday completed the diary. Where households included children aged <18, in 60% of cases, a child with the next birthday, and in 40% of cases an adult with the next birthday kept the diary (with parents providing proxy diaries for children aged <10)	63%
2003-2004	Current Population Survey (CPS) participants in their final interview month	One randomly selected member of a randomly selected sub-sample of the CPS	Overall 58% of the sub- sample (33% of non-phone hholds)

All studies except the 1975 attempted to collect similar proportions of data on all days of the week (but as we shall see in the next section, all the achieved samples actually show some imbalances in distributions of the days of the week). The redistribution of the diaries from each day of the week is easily accomplished by re-weighting.

From the 1975 study onwards, these all collected diaries about people's activities during the 24 hour day prior to the interview day. In 1965, in contrast, only 10% of the diaries were collected using the "yesterday" approach, while the other 90% were collected on the day that the activities took place. Previous time use methodological comparisons have found that yesterday and on the same day approaches produce diaries of similar quality, though on the same day diaries include a higher number of activities, and capture more short-duration activities. The issue of greater concern (see Table 2.1.4) is that techniques for highlighting and correcting errors (such as missing sleep or missing travel) have improved markedly with time, and the more recent data may well prove of higher quality as a result.

Table 2.1.3: Relevant points in time from the sample designs			
Survey years	**Fieldwork Period**	**Sampling of Days of the Week**	**When Activities Were Recorded**
1965-1966	15 Nov-15 Dec 1965; 1 Mar-25 Apr 1966	2/7ths of diaries were stamped for collection on a weekend day; 5/7ths were stamped for collection on a weekday	10% interviews conducted on yesterday's activities, 90% of diaries left behind for completion on diary day
1975-1976	Oct-Dec 1975; Jan-Mar 1976; Apr-Jun 1976; Jul-Sep 1976	The study aimed to collect one diary on a Sunday, one on a Saturday, and two on different weekdays from each sample member.	Diaries covered the previous 24 hour day
1985	Jan-Dec 1985	Phone calls were attempted on all days of the week	Diaries covered the previous 24 hour day
1992-1994	Sep 1992 – Oct 1994	Phone calls were attempted on all days of the week.	Diaries covered the previous 24 hour day
2003-2004	Jan-Dec 2004	10% of respondents on each weekday and 25% on each weekend day.	Diaries covered the previous 24 hour day

As Table 2.1.4 shows, all studies collected diaries covering one 24-hour period per collection period. Only the 1965 study included information on whether other household members were present and could potentially influence the activity reporting of the diarists. One these levels, the diaries from each study are easily harmonised.

Table 2.1.4: Number of diaries and the influence of other people during the diary completion process			
Survey years	**Number of Diaries per Respondent**	**Level of Interviewer Participation**	**Others Present During the Interview?**
1965-1966	1 diary	Interviewers identified the households, conducted interviews face to face, left behind the diary, but returned to collect the diary, check the quality and query incomplete sections or inconsistencies with the respondent	Interviewer present in 10% of diaries, survey instrument recorded presence of family members during pre-diary interview
1975-1976	4 diaries (1 diary from each season)	Interviewers helped diarists to complete the diaries. The first interview was conducted face-to-face, while the subsequent three interviews were collected over the telephone	
1985	2+ diary	Interviewers onitially contacted respondents over the phone, and had rudimentary notes to spot inconsistencies and to clarify these problems with respondents as they recorded the diary. Respondents were also invited to complete and mail back further diaries.	
1992-1994	1 diary	Interviewers only contacted respondents over the phone, and had rudimentary notes to spot inconsistencies and to clarify these problems with respondents as they recorded the diary	No information on presence of other household members in the data
2003-2004	1 diary	Interviewers make contact over the phone. CAPI program includes a checking routines to spot missing eating, interruptions to long duration activities, and other problems for the interviewer to question as they collect the data	

2.2 Achieved sample characteristics as compared to Current Population Survey

The achieved sample from a probability sampling procedure can be straightforwardly re-weighted after fieldwork to correspond either to known characteristics of the population structure, or to those of another sample. The new American Time Use Survey (ATUS) is based on that part of the Current Population Survey (CPS) sample surviving after 8 waves of data collection. The CPS itself has been in the field for a long span of years, and the micro-data for its early years, including all the dates of all the candidate contributors to the harmonised heritage time use file, is still available for analysis. One straightforward potential approach to working with the historical file is therefore to reweight the heritage time diary samples by aspects of the population structure as indicated by the CPS sample.

The purpose of this section is to compare various characteristics of the unweighted samples achieved in the heritage time-use studies (shown in the right-hand panels of tables 2.2.1 to 2.2.6) with those of the CPS for equivalent years (shown in the left-hand panel sections of the tables). To this end we have constructed harmonised versions of the CPS Demographic Files (which provide estimates for characteristics of all household members of households in the CPS sample during March of the relevant years).

Age and sex

The whole age range is covered in Table 2.2.1. 1965 not represented in this first table because of the age restrictions on the 1965 survey. Readers may note that the sample numbers for the 1985 vary from those quoted in other sources: this reflects the requirement for secondary activity measures (particularly relating to childcare), which in turn requires a return to the original activity sequence format of the diary data. We have only succeeded in reconstructing a proportion of this material from the (mail-back portion of) the 1985 materials.

Table 2.2.1: Age and sex distributions (whole samples age >=18)

		Current Population Survey (weighted)				Unweighted diary studies			
		1965	1975	1985	1995	1965	1975	1985	1992→4
	Column %	men							
18-19		5	5.6	4.5	3.6	--	1.7	3.6	3.1
20-29		18.5	24.2	24.5	19.1	--	23.9	24.2	21.0
30-39		19.4	18.1	22.6	23.6	--	22.5	24.9	22.6
40-49		20.5	16.3	15.3	20.2	--	15.8	15.4	18.7
50-59		16.6	15.8	13.4	13.3	--	12.8	13.8	14.3
60-69		11.4	11.7	11.3	10.3	--	16.9	11.0	11.2
70-79		6.7	6.2	6.3	7.2	--	4.5	5.4	6.6
80+		1.9	2.1	2.2	2.7	--	1.7	1.7	2.6
	N	22825	40943	54353	50641	--	1611	1231	3310
	Sum %	47.0	46.7	46.8	46.9	--	40.3	46.0	44.8
		women							
18-19		4.3	5.4	4.1	3.4	--	2.3	3.9	2.0
20-29		18.4	22.9	23.0	18.4	--	21.4	22.4	17.1
30-39		18.5	17.1	21.4	22.4	--	20.2	23.2	20.7
40-49		20.2	15.9	14.5	19.1	--	11.5	16.3	18.2
50-59		15.9	15.6	13.0	12.9	--	13.1	13.7	14.1
60-69		12.2	12.4	11.8	10.4	--	17.8	10.6	13.1
70-79		7.7	7.8	8.3	8.7	--	9.5	8.0	10.3
80+		2.6	3.0	3.8	4.7	--	4.0	2.0	4.4
	N	25783	46755	61716	57254	--	2385	1446	4082
	Sum %	53.0	53.3	53.2	53.1	--	59.7	54.0	55.2

Table 2.2.2 shows similar results for a restricted age distribution, allowing us to include the 1965 study in the comparison.

Table 2.2.2: Age and sex distributions (sample members aged 18—65)

		Current Population Survey (weighted)				Unweighted diary studies			
		1965	1975	1985	1995	1965	1975	1985	1992→4
	Column %	men							
18-19		5.7	6.3	5.1	4.1	1.2	2.0	4.0	3.6
20-29		21.1	27.6	28.0	22.2	25.6	27.9	27.1	24.2
30-39		22.3	20.6	25.8	27.3	22.0	26.2	27.8	26.0
40-49		23.5	18.7	17.4	23.4	25.2	18.5	17.2	21.5
50-59		19.0	18.1	15.3	15.4	18.1	15.0	15.5	16.5
60-65		8.3	8.6	8.4	7.5	7.9	10.4	8.4	8.3
	N	19921	35829	47565	43657	896	1381	1099	2873
	Sum %	47.6	47.5	47.9	48.0	44.9	42.1	46.9	46.8
		women							
18-19		5.1	6.4	4.9	4.1	2.6	2.9	4.6	2.5
20-29		21.7	27.0	27.5	22.3	25.4	26.9	26.0	21.4
30-39		21.8	20.2	25.6	27.1	23.8	25.3	26.9	25.8
40-49		23.7	18.8	17.4	23.2	24.0	14.5	18.9	22.6
50-59		18.7	18.4	15.6	15.6	17.7	16.5	15.9	17.6
60-65		9.0	9.3	9.1	7.7	6.6	13.9	7.8	10.1
	N	21917	39608	51704	47229	1098	1902	1246	3272
	Sum %	52.4	52.5	52.1	52.0	55.1	57.9	53.1	53.2

The most central issue we must consider, concerns the question of whether the achieved time diary samples give an adequate basis for the re-weighting procedure. We may note that the 1965 and 1975 unweighted time use studies under-represent the youngest age group, as compared to the CPS, and somewhat over-represent people in their 20s. We must remember that:

1 The below-20 group are more likely than average to live in larger (2+ person) households while the 20-29 group are less likely than average to do so
2 The address-based sample combined with the Kish-selection of a single interviewee per household means that respondents must be re-weighted by the reciprocal of the household size to yield the equivalent of the equal probability individual sample from the CPS demographic file

Given these considerations, and excepting the over-representation of women, the unweighted age-by-sex sample distributions from the diary studies do not appear to exhibit any excessive sample biases.

Employment status

Employment status measures are notoriously difficult to compare. There are various different problems:

- Employment status is an amalgamation of a number of different positional components within the labour market: employed/self-employed, full/part-time, employed/temporarily laid-off, unemployed/non-employed, and each of these categories is subject to wide definitional variations.
- Employment status classifications often also include various associated statuses strictly outside the labour market such as student, housewife, disabled, retired, which are also subject to definitional variation.
- These categories frequently overlap (eg respondent *both* employed *and* full time student) and procedures for resolving the resulting ambiguities are also subject to variation.
- The subjective meanings of these various categories change over time, with the result that even consistently phrased "self-report" questions may be inappropriate for historical comparison (eg non-employed young adult women who might once have classified themselves as housewives may now consider themselves to be in unemployment).
- The placement and ordering of questions can have a crucial effect on self-report answers (eg "Are you currently employed" receives substantially higher positive responses if it placed subsequently to "How many hours per week do you normally work?").

The various time use studies under consideration have a range of different styles and organisations of questions about employment status. (There is indeed some variation even within the studies: the four waves of data collection for the 1975 study deploy three substantially different question sequences to establish current employment status.)

For these reasons, and in the context of comparisons of the diary samples with the CPS, we deploy a radically restricted work status classification, organised as follows;

1 All those giving a nonzero answer to the question "How many hours per week do you normally work?" were classified as "working".
2 If respondents described themselves as "student" or "full-time student" this answer was given precedence over the work-hours response.
3 All other statuses were classified as "not in work".

Table 2.2.3 Working status (whole samples aged 18+)

	Current Population Survey				Unweighted diary studies			
Column %	1965	1975	1985	1995	1965	1975	1985	1992→4
	men							
in work	78.7	70.6	67.9	68.7	--	75.0	71.1	74.3
student	3.6	5.8	5.5	4.3	--	1.3	7.0	3.2
not in work, <60	6.0	9.9	11.5	11.8	--	6.3	10.0	8.1
not in work,60+	11.8	13.7	15.1	15.1	--	17.4	11.9	14.4
N	22476	40297	53631	50641	--	1611	1287	2862
Sum %	46.6	46.3	46.5	46.9	--	40.3	46.3	44.7
	women							
in work	37.4	38.5	45.6	53.8	--	42.9	52.5	58.7
student	2.3	4.4	4.7	4.3	--	0.9	6.5	2.7
not in work, <60	41.4	37.0	28.7	21.6	--	29.2	25.1	15.8
not in work,60+	18.8	20.0	21.0	20.3	--	27.0	15.9	22.8
N	25783	46755	61716	57254	--	2385	1492	3538
Sum %	53.4	53.7	53.5	53.1	--	59.7	53.7	55.3

Table 2.2.3 provides working status comparisons for the whole age range but excluding the 1965 survey, while Table 2.2.4 provides similar for the 18-65 range.

Table 2.2.4 Working status (Sample members aged 18-65)

	Current Population Survey				Unweighted diary studies			
	1965	1975	1985	1995	1965	1975	1985	1992→4
Column %	men							
in work	86.7	78.4	76.1	77.3	96.0	86.3	71.1	82.6
student	4.1	6.6	6.3	5.0	1.2	1.5	7.0	3.7
not in work, <60	6.9	11.3	13.2	13.7	1.8	7.3	10.0	9.4
not in work,60+	2.3	3.7	4.5	3.9	1	4.9	11.9	4.4
N	19572	35183	46843	43657	894	1380	1287	2490
Sum %	47.2	47.0	47.5	48.0	44.9	42.0	46.3	46.6
	women							
in work	42.4	44.4	53.4	63.7	48.0	52.1	52.5	70.3
student	2.7	5.2	5.6	5.2	0.8	1.2	6.5	3.3
not in work, <60	48.7	43.7	34.3	26.2	48.3	36.6	25.1	19.6
not in work,60+	6.2	6.6	6.7	5.0	2.9	10.1	15.9	6.8
N	21917	39608	51704	47229	1096	1902	1492	2850
Sum %	52.8	53.0	52.5	52.0	55.1	58	53.7	53.4

We see again, in the under-representation of students in the time use samples as compared to the CPS, the likely consequence of non-correction for household size (though it could also reflect differential response rates). It is also likely that the same issue leads to the under-representation of non-working women below the age of 60,

who are also disproportionately likely to be members of larger households, and to the over-representation of older non-employed people in Table 2.2.4.

Table 2.2.5 Educational attainment (sample members aged 18+)

	Current Population Survey				Unweighted diary studies			
Column %	1965	1975	1985	1995	1965	1975	1985	1992→4
EDATTAIN	men							
0-8 GRADE	28.7	17.8	11.7	8.5	--	14.2	7.1	2.8
SOME HIGH SCHOOL	17.6	14.0	11.3	11.2	--	14.9	9.7	7.0
HIGH SCHOOL GRAD	29.2	33.0	35.2	31.9	--	31.8	40.0	32.6
SOME COLLEGE	12.4	17.9	20.0	25.0	--	25.2	17.1	42.8
COLLEGE,GRAD +	12.1	17.4	21.9	23.5	--	13.9	26.1	14.9
N	22825	40943	54353	50641	--	1376	1274	2834
Sum %	47.0	46.7	46.8	57254	--	42.2	46.2	44.6
	women							
0-8 GRADE	26.0	16.9	11.4	8.4	--	13.1	6.3	3.2
SOME HIGH SCHOOL	19.1	16.0	12.5	11.2	--	14.5	9.8	8.7
HIGH SCHOOL GRAD	36.4	40.3	40.3	34.7	--	46.9	45.5	36.2
SOME COLLEGE	11.2	15.9	20.2	27.0	--	21.0	18.7	39.8
COLLEGE,GRAD +	7.3	10.9	15.6	18.7	--	4.5	19.7	12.1
N	25783	46755	61716	57254	--	1886	1485	3515
Sum %	53.0	53.3	53.2	53.1	--	57.8	53.8	55.4

The 1965 sampling procedure involved a filter to exclude cases with non-working heads-of-household, so the over-representation of workers is unsurprising. The reason for the apparent over-representation of employed people in the 1975 diary sample is not clear and will be investigated further.

Educational level

Measuring educational status is in principle much less problematical. Nevertheless the tables we have produced do suggest some divergence between the CPS and the diary studies. We again present separate tables for the whole adult sample (Table 2.2.5) and restricted 18-65 sample (Table 2.2.6).

Table 2.2.6 Educational attainment (sample members age 18-65)

	Current Population Survey				Unweighted diary studies			
	1965	1975	1985	1995	1965	1975	1985	1992→4
Column %	men							
0-8 GRADE	23.8	13.2	8.3	5.5	15.0	18.8	5.0	1.7
SOME HIGH SCHOOL	18.5	13.9	10.3	9.2	20.6	14.7	8.7	6.5
HIGH SCHOOL GRAD	31.1	34.6	36.0	34.6	33.4	30.4	41.0	32.9
SOME COLLEGE	13.0	19.3	21.4	29.5	14.8	23.3	17.6	44.6
COLLEGE,GRAD +	13.5	19.1	23.9	25.1	16.2	12.7	27.7	14.4
N	19252	34686	46359	42708	889	1603	1091	2462
Sum %	47.5	47.5	47.9	48.0	44.9	40.4	46.8	46.6
	women							
0-8 GRADE	20.5	11.8	7.3	5.5	11.4	19.7	3.6	1.5
SOME HIGH SCHOOL	19.9	15.9	11.5	9.2	19.8	16.2	8.9	6.8
HIGH SCHOOL GRAD	39.8	43.3	41.9	34.6	44.5	40.0	46.8	36.0
SOME COLLEGE	11.6	16.8	21.8	29.5	14.1	19.4	19.6	42.9
COLLEGE,GRAD +	8.2	12.2	17.5	21.1	10.2	4.7	21.0	12.8
N	21297	38316	50425	46216	1093	2363	1238	2826
Sum %	52.5	52.5	52.1	52.0	55.1	59.6	53.2	53.4

The overall historical trends, of reduction in proportions of the sample with below-high-school-graduation qualifications, and the substantial increase in the proportion with at least some college-level education is reassuringly consistent. However:

1 The irregularity in the trends in the diary data for "some college" and "college graduate+" categories suggests that some miscoding may have taken place, probably at Essex: this will be investigated and corrected in the next phase of the project.
2 Even allowing for this, and for the imbalances resulting from under-representation of members of larger household, it does appear that the proportion in the two highest educational attainment categories in the diaries are consistently and substantially larger than in the CPS (this probably reflects differential response rates).

The implication is that there may be a degree of response bias towards better educated respondents in the diary samples.

Mix of days

Diary studies are normally designed to achieve an equal distribution of observations across days-of-the-week, with an eye to maximising sampling efficiency. However, response refusal mechanisms may operate differentially through the week producing uneven distributions that might in turn lead to estimation biases. The 1965, 1985, and 1992-4 survey show relatively small departures from equal distributions. These presumably reflect the "yesterday" design (sometimes, depending on the sampling requirements, a "day before yesterday" design) combined with the constraints on weekend interviewing.

Table 2.2.7 Distribution of days by sex and survey

	1965		1975		1985		1992→4	
	men	women	men	women	men	women	men	women
MONDAY	15.7	13.0	10.3	9.8	14.3	13.6	15.0	16.1
TUESDAY	15.2	16.2	9.4	10.8	14	15.1	16.3	14.7
WEDNESDAY	15.2	14.2	9.1	8.7	15.2	16.2	14.3	15.0
THURSDAY	13.1	14.4	8.1	9.3	13.2	13.0	13.2	12.5
FRIDAY	13.1	14.1	14.0	12.3	14.8	15.0	9.0	8.5
SATURDAY	12.3	14.0	23.8	23.9	15.8	15.5	13.7	13.4
SUNDAY	15.3	14.0	25.3	25.3	12.8	11.6	18.4	19.7
N	908	1112	1953	2595	1325	1532	3310	4082
Sum %	45.0	55.0	42.9	57.1	46.4	53.6	44.8	55.2

The much more extreme bias towards the weekend in the 1975 sample reflects the panel design, in which each respondent was intended to keep at least one weekday diary, one Saturday diary and one Sunday diary (the four seasonal waves mean that some respondents completed more than one of some type of diary). We return to consider this issue in Section 3 below.

Coverage across the year

Table 2.2.8 sets out the distribution of diary days by season, using a seasonal classification determined by the start dates of the 4 waves of interviews in the 1975 survey.

Table 2.2.8 Distribution of interviews by season

	1975		1985		1992→4	
	men	women	men	women	men	women
Fall (Oct. to Dec.)	34.1	32.7	27	26.2	20.3	21.7
Winter (Jan to March)	24.7	24.8	30.3	30.2	26.6	25.7
Spring (April to June)	21.4	21.6	37.7	38.1	25.4	24.6
Summer (July to Sept.)	19.8	20.9	4.9	5.5	27.6	28.0
N	1953	2595	1325	1532	3310	4082
Sum %	42.9	57.1	46.4	53.6	44.8	55.2

Two distinct problematical issues arise from this table.

The first is the imbalance in seasons of interviewing evident in the 1975 survey. This is straightforwardly a result of the sample attrition processes inevitably consequent on the panel design of the 1975 survey, and we return to consider this issue in Section 3 below.

The second is the very small number of diaries available for the summer months in the 1985 survey. Now, the main reason for our concern with the distribution of diary records across the year, is the intention to achieve an adequate representation of time use throughout the whole year, and we turn to consideration of this in the context of our discussion of appropriate strategies for weighting diaries in Section 4. But without prejudging this issue, we might observe that a weighting strategy which gave equal weight to each season, as classified in Table 2.2.8, would lead to an extreme of sampling inefficiency for 1985.

However, given that our interest is simply in an equal representation of parts of the year, there is no a priori reason that the same monthly groupings should be used for all surveys. (Though of course a grouping-together of months with substantially different time-use characteristics would reduce the precision of estimates: we return to this issue in Section 5). For the moment we might note that an alternative grouping of months such as that in Table 2.2.9 might be used as the basis for seasonal reweighting of the 1985 data (with the December to January diaries reweighted to represent 16.7%, February to May reweighted to 33.3% and so on) which would produce less extreme weighting values than those implied by Table 2.2.8.

Table 2.2.9
Alternative seasonal grouping

	1985	
	men	women
Dec, Jan	29.1	37.1
Feb to May	27.0	18.4
June, July	25.2	28.0
August to November	18.8	16.4
Column	1325	1532
Total	46.4	53.6

2.3 Availability and coding of variables

Data requirements for diaries

Table 2.3.1 tabulates the characteristics of the diary designs. Both the 1975 and 1985 datasets contain three-digit activity coding. The 1965 dataset contains two-digit activity codes, although a three-digit code frame is described in the codebook, suggesting that three digit coding was originally used. Subject to more detailed investigation, inspection of the code frames suggest that they are consistent across surveys. (We are awaiting confirmation of the characteristics of the 1992-4 event data—indicated by *italics* in table). The summary variables appear to be consistent across all the datasets. The 1965, 1975 and 1985 datasets contain both primary and secondary activities, however no co-presence data is held in the 1985 or 1992-4 datasets, although location is held. Activity sequences can be constructed for all the datasets.

Table 2.3.1 : Diary design by survey

Variable	1965	1975	1985	1992-4
Activity codes	2-digit	3-digit	3-digit	*3-digit*
Primary	Y	Y	Y	*Y*
Secondary	Y	Y	Y	*N*
Who with	Y (1st and 2nd person)	Y (1st and 2nd person)	N	*N*
Location	Y	Y	Y	*N*
Episodes	Y	Y	Y	*Y*
Time coding	Hours& Minutes	Hours& minutes	Hours& Minutes	*Hours& Minutes*

Activity coding

The activity code-frames consist of 9 major groups, tabled below. Within these groups over 200 more detailed codes are nested for the 1975 and 1985 datasets (see Appendix for detailed codeframe), and about 100 more detailed two-digit codes for the 1965 dataset. The activity codeframe for the ATUS 2004 is more detailed with over 500 individual codes and 17 major groups (see Table 2.3.3 and Appendix). The major groups differ most within the 'Obtaining goods and services' category which is split into 3 categories in the 2004 survey, with 'Entertainment and Social' split into 2 categories and 'Organisational activities' split into 3 categories. Telephone calls and Travel are identified as separate major groups in the 2004 category, while travel is incorporated as a separate code into the major groups with which the travel is associated in the 1975 and 1985 codeframes. The coding of travel is complex and will require some testing to ensure consistency over the surveys. It is probably desirable, both for consistency with the 2004 data and for substantive purposes, to code travel as a separate major group, with detailed codes for the purpose of the journey.

Table 2.3.2 : Major groups within the activity codeframe (Heritage surveys)

Code	Activity
0	Paid Work
1	Household Activities
2	Child Care By Adults In Hh For Children In Hh
3	Obtaining Goods And Services
4	Personal Needs And Care
5	Education + Professional Training
6	Organisational Activities
7	Entertainment And Social
8	Active Sports
9	Passive Leisure

An important difference in activity coding is that care for non-HH members, including childcare for children outside the household, is coded in more detail in the 2004 survey. This is likely to include childcare by separated parents. In the heritage surveys childcare for children outside the household is likely to be coded under codes 278, 279, 299 (Other child care).

Table 2.3.3 : Major groups within the activity codeframe (ATUS 2004 survey)

Code	Activity
1	Personal Care
2	Household Activities
3	Caring For & Helping Household Members
4	Caring For & Helping Non HH Members
5	Work & Work-Related Activities
6	Education
7	Consumer Purchases
8	Professional & Personal Care Services
9	Household Services
10	Government Services & Civic Obligations

11	Eating and Drinking
12	Socializing, Relaxing, and Leisure
13	Sports, Exercise, and Recreation
14	Religious and Spiritual Activities
15	Volunteer Activities
16	Telephone Calls
17	Traveling

Co-presence

Data on co-presence was collected in 1965 and 1975 and coded as shown in Table 2.3.4 below. Data was collected on up to two co-present people. The 1965 codebook shows a separate coding for the 2nd person, however, this is not found in the data. There is no code for being with people not known to the respondent, i.e. when travelling, and this circumstance may have been coded either as 'alone' or 'other/na'. Use of the 1st co-presence variable, activity and location codes should make it possible to identify these cases and evaluate their importance. Also the proportion of copresence variables coded as "alone" is very high, and it seems probable that this should in fact be "not applicable".

Table 2.3.4 : Coding of co-presence 1965 and 1975

Code	Co-presence
0	Alone
1	Spouse Or Fiancee
2	Close Family
3	Other Resident Adults
4	Other Friends,Relations
5	Co-workers Etc
6	Organisation Members
7	Neighbours
8	Service Personnel
9	Others, Or Na/Ref

Location

The coding of the location of the episode is shown below in Tables 2.3.5a and b. The coding is more detailed in 1985, with 16 codes for home locations and more detailed codes for travel and 'other' locations. However, it is clear that the later categorisation can be condensed to make it consistent with that of the earlier surveys.

Table 2.3.5a : Coding of location 1965 and 1975

Code	Location
1	Respondent's Home
2	In Transit
3	At Work
4	Other's Home
5	Restuarant Or Bar
6	Indoor Leisure Place

7	Outdoor Leisure Place
8	Other
9	Na.Ref

Table 2.3.5b : Coding of location 1985

Code	Location		
0	Homeyard	20	Transit
1	Basement	21	Car
2	Bathroom	22	Oth Transit
3	Bedroom	30	Work
4	Dining Room	40	Friend's Home
5	Computer Room	50	Restaurant
6	Den	60	Indoor Leisure
7	Family Room	70	Outdoor Leisure
8	Rec Room	80	School
9	Garage	81	Church
10	Kitchen	82	Stores
11	Laundry	83	Bank,Off,Libr
12	Office	89	Other
13	Porch		
14	Hall		
19	Oth Home	99	Na-Refused

Context variables

Table 2.3.6 suggests some candidate variables for harmonisation from the heritage surveys. Variables from the ATUS 2004 variables list are also noted in the final column. Variables which are used directly in constructing household production are highlighted in blue, while variables which influence household production are highlighted in yellow. It can be seen that only the 1975 survey includes data on household goods and on household production, although the household production data is only held on Waves 3 and 4. Although not recorded in the table, the 1975 survey also includes information on the process benefits associated with household production (i.e. whether or not the respondent enjoys cooking, etc.). The 1975 survey is the only survey to hold full information on income. Although earnings can be imputed on surveys which hold detailed information on occupation, this data is not held on all the surveys currently being investigated at Essex. However all the surveys hold information on education, household income (banded, hence needs for reconciliation), number of adults in the household (with the exception of 1965) and economic activity of respondent (and other household members in 1975 and 1985).

Table 2.3.6 – Questionnaire variables by survey

Variable	1965	1975	1985	1995	2004
Survey					(from list)
Region	N	Y	Y	Y	Y
Urbanicity	Y	Y	Y		Y
Demographic					
Sex	Y	Y	Y	Y	Y
Age	Y	Y	Y	Y	Y
Health	N	Wave 2	N	N	Disability
Citizenship	N	Wave 4	N	N	Y
Ethnicity	N	W1&W4	N	Y	Y
Education	Y	Y	Y	Y	Y
Household					
Marital status	Y	Y	Y	N	Y
Family status	Y	Y	Y	N	Y
Household type	Y	Y	Y	N	Y
Number of adults	N	Y	Y	Y	Y
Number of children	Y	Y	Y*	N	Y
Age of children	Y*	Y	Y*	Y	Y
Housing					
Tenure	N	Y		N	Y
Housing assets	N	Y		Y*	Y
Household goods	N	Y			Y
Household production	N	W3&w4			
Neighbourhood	N	Y		N	Y (poverty)
Employment					
Economic activity	Y	Y	Y	Y	Y
Student	Y	Y	Y	Y	Y
Employment status	N	Y			Y
Occupation	N	Y		N	Y
Industry	N	Y		N	Y
Work hours	Y	Y	Y	Y	Y
Duration unemployed	N	Y		N	Y*
Income					
Earnings	N	Y		N	Y
Benefits	N	Y		N	
Dividends, etc.	N	Y		N	
Household income	Y	Y	Y	N	Y

* broader coding than other surveys

3. Special characteristics of the 1975 sample

This survey, almost uniquely amongst time diary studies, has a panel or repeated measures design. In fact the four 1975 waves of the first stage of a design repeated in 1981. Its construction was intended to reduce short-term intrapersonal variability by combining different days of the week and times of the year, producing a "synthetic week"—an appropriately weighted sum of the weekday, Saturday and Sunday totals of time devoted to various activities—which would allow analysis of change in time use, at the individual level, between 1975 and 1981. It is possible to reconstruct the synthetic weeks for 1975, both using the derived variables provided for this purpose within the survey, and (for testing purposes) from first principles, and the results of the two reconstructions correspond almost precisely. (The Essex reconstruction contains several more cases than the Michigan original).

It is clear that the synthetic week is a useful and interesting device for panel analysis. It is however of less obvious utility for the purposes of comparative cross-sectional analysis. It is quite different in concept to the ATUS and to all the other surveys considered here, and having carried out some initial experiments with this design, we have decided that it is not appropriate for present purposes.

For purposes of historical comparison a number of researchers have used just the first (Fall) wave of the 1975 study, on the perfectly tenable grounds that this constitutes a nationally representative survey in itself. Adding in the diary data on spouses (who would, on fairly simple assumptions, share half of the original respondents' weight factor) this would still be usable as a representative sample. And used in this way, researchers do not need to be concerned with the consequences of the very high rates of wave-to wave attrition (which is clearly illustrated in Table 2.2.8)

Our reasons for rejecting this approach include:

- It involves the loss of some 3000 usable diaries in the 1975 waves 2 to 4.
- Much of the non-diary questionnaire material in these 1975 waves is of great value (not the least in relation to valuing household production).
- This approach loses whole year coverage (though, as discussed below, it is not entirely evident that this is an overwhelmingly important issue).
- The spousal diary data, without "secondary activity" or "co-presence" fields, are inappropriate for comparison with ATUS (and for the construction of extended national accounts) since they do not allow us to make estimates of childcare activities occurring simultaneously with other primary activities.

There is, however, a quite different way of using all four waves of the 1975 data set – as a pool of single days. There are two significant problems with this approach;

1 The days are not independently sampled. The effective size of the sample is substantially smaller than the total of pooled cases. This issue can however be effectively dealt with by a straightforward "design effect" adjustment.
2 The attrition process introduces a significant potential sampling bias to the later waves of data. This potential may be compensated for by the use of attrition weights.

Attrition weights for waves 2 to 4 of the 1975 sample

We adopt the standard procedure for the construction of attrition weights. We use a logistic regression procedure to predict sample members' response/non-response in subsequent waves from their characteristics (including time use patterns) as measured in the first wave. From the logistic regression, we derive a predicted probability of participation in each of the subsequent waves. The weight, for each diary respondent in waves 2 to 4, is then simply the inverse of the participation probability (ie respondents with characteristics that are under-represented in the subsequent waves, are up-weighted to correct for non-response).

One particular issue arises from the nature of the instruments used in this study (which was not initially evident from the documentation). The first wave of interviewing was carried out with personal "face-to-face" interviewers, while the subsequent waves deployed telephone interviewers—hence, except in a small number of cases, excluding non-telephone owners from the later-wave samples. This of course constitutes a considerable bias in itself. And there is no absolute way around this problem, since non-telephone owners *are* non-telephone owners. However we can approach the problem more indirectly, compensating as far as possible for the biases consequent on the loss of the *sorts of people who did not have telephones*—by modelling the propensity for telephone ownership in wave 1, and using the predicted value from this model, as, in turn, one of the predictors for subsequent non-response. (Fortunately the wave 1 data included information about household ownership of consumer durables, which we are able to use in the model predicting wave 1 telephone ownership, but do not use in the models of participation in subsequent waves.)

We have tested this attrition weighting procedure (results included in Section 4 below). It produces attrition models of moderate power (with Pseudo R^2 of around .12, and reasonably reassuring assignment tables) and the resulting weights do appear to return the later wave sample structures to something closer to that of wave 1. On this basis we conclude that the pooling of the four 1975 waves, with attrition weights, is the appropriate procedure for the purposes of this project.

4 Testing : Preliminary comparisons of time use across surveys

Table 4.1 provides the most preliminary of initial analyses of time allocation to "primary activities" from the four diary data sets discussed at length in this report. The cases in each survey are reweighted to provide the proper balance of days-per-week for each sex-and-10-year-age category, and also, for the 1975 and 1992-4 surveys, to give the same number of cases in each of four seasons as in Table 2.2.8. The overall N of cases is also adjusted conservatively (ie downwards), to ensure that the weighted Ns for the most under-represented groups correspond approximately to the original Ns. It uses a straightforward one-digit activity classification, constructed simply by truncating the 2- or 3-digit measures as provided within the individual surveys, and without any further recoding. Despite the fact that all of the activity codings for each of the studies are derived more-or-less directly from the 1965 Szalai activity list, we believe that there are some small systematic variations even at the

one-digit level. As a result, there will certainly be substantial inconsistencies in the cross-time comparisons, and the trends that emerge should therefore be treated sceptically.

Nevertheless the sample Ns, means, and simple standard errors provided by Table 4.1 give a reasonable illustration of the sorts of results we can expect from the harmonisation exercise. And indeed the trends we see—reduction in men's paid work with a small upturn in the 1990s, increase in women's paid work and dramatic decline in their unpaid work, roughly constant social activity, modestly increasing levels of exercise, regular growth in TV and video watching—are generally consistent with the published literature.

Table 4.1 Preliminary comparisons of single digit activity totals

Mins per day, ages 18-65, reweighted for day (and season in 1975 and 1992-4)

	1965		1975		1985		1992→4	
Men: Weighted N	893		1380		1100		2490	
Women: Weighted N	1096		1901		1242		2849	
	mean	se	mean	se	mean	se	mean	se
men								
Paid work, ass. travel	**430**	16	**368**	17	**298**	17	**325**	18
Household work	**43**	9	**62**	10	**88**	11	**74**	11
Childcare	**14**	6	**10**	6	**16**	7	**9**	7
Shops, ass. travel	**42**	8	**31**	8	**47**	9	**37**	9
Sleep, pers care	**611**	11	**658**	13	**643**	12	**614**	13
Education, training	**15**	8	**12**	8	**22**	10	**28**	11
Religious and other organizational activity	**17**	7	**14**	8	**14**	7	**14**	8
Social activities, entertainments	**74**	11	**66**	11	**65**	11	**71**	12
Sport, walks, exercise	**28**	8	**44**	10	**54**	10	**52**	11
TV, video, radio etc	**167**	11	**176**	12	**195**	12	**216**	13
women								
Paid work, ass. travel	**171**	16	**183**	16	**219**	16	**231**	17
Household work	**229**	12	**169**	12	**141**	12	**129**	12
Childcare	**54**	9	**39**	8	**31**	8	**26**	8
Shops, ass. travel	**62**	9	**51**	9	**59**	9	**62**	10
Sleep, pers care	**631**	11	**669**	13	**654**	12	**641**	12
Education, training	**17**	8	**11**	8	**18**	9	**21**	10
Religious and other organizational activity	**22**	8	**24**	8	**19**	8	**17**	8
Social activities, entertainments	**86**	11	**77**	11	**59**	10	**68**	11
Sport, walks, exercise	**26**	8	**41**	9	**42**	10	**40**	10
TV, video, radio etc	**142**	11	**178**	12	**200**	12	**205**	13

5. Plans for next stage of work

Our proposal is to proceed to the next stage of the project (see appendix) with, in the first instance, the four surveys discussed at length in this report, and possibly also the 1995 materials if these become available. The 1975 study emerges unequivocally as the highest priority, because it corresponds most closely to the desiderata set out in Section 1, and because of the large range of questionnaire materials that it adds to the diary evidence.

The next stage of work on this project involves five distinct sorts of activity:

1. Improving the standards of accessibility of the individual heritage files.
2. Producing sequences of cross-time harmonised activity and context variables
3. Developing weighting strategies appropriate for longitudinal comparison
4. Consideration of possibilities for cross-national comparison
5. Testing the suitability of the longitudinal harmonised dataset for national accounts purposes

5.1 Reworking and documentation of individual surveys

This first activity is a prerequisite for successful completion of the project as a whole. We will work on the 1965, 1975 1985, and the 1992-4 studies, and we hope that the 1995 US national study will be made available to us in due course. None of these studies has documentation that that conforms in all respects to best modern practices. The 1975 study in particular, while of the greatest possible value to this project, is currently provided in a highly intractable form, as a single rectangular OSIRIS file with 2.3K cases, and around 9K variables, with anonymous variable names and no value labels, and the four sets of diary records stored relatively inaccessibly as sequences within each "row" in the large file.

Our intention is:

- To produce an appropriate file structure, storing diary records as "repeating structure" "case=event" files, separately from the associated questionnaire information which will be stored as "case=respondent" files.
- To develop consistent Anglophone variable naming systems (replacing anonymous "v1, v2, v3…"-type systems and to apply these, where appropriate, consistently across the whole set of surveys.
- To provide all variables with appropriate explanatory labels.
- To provide all categorical variables with appropriate value labels.
- To develop explicit consistent and informative missing data conventions and to implement these for all variables.
- To provide for the heritage surveys, where appropriate, new variable indexes and thesauruses, and mappings of variables onto questionnaire items and vice versa.
- To provide machine readable metadata for each survey.
- And to construct cross survey concordance or variable occurrence indexes.

5.2 Production of cross-time harmonised US files

The considerable variety across the heritage files in the scope or range of issues covered by the questionnaires, the detail of the activity codings and the coverage of the population and of parts of the year, means that the historical comparator file will never be complete and comprehensive, since some historical studies will provide information that is not available in others. There will be questionnaire items in the comparator file for some years and not for others. And those surveys that have only 2-digit activity codings will necessarily provide lower levels of detailed in comparison with the ATUS than those historical studies which have 3-digit activity coding.

We will therefore provide, in principle, two different sorts of cross-time harmonised files:

- "complete" files, bringing together all the heritage surveys, but necessarily providing only the smaller number of variables that are available for all studies, and with less detailed activity codings, where the level of detail of the harmonised classification is determined by the evidence available in the least detailed heritage file.
- "detailed" files with measures drawn from a subset of the heritage files, and with more elaborate codings of activity patterns.

In practise, these various sorts of files are likely to be combined, and we will use standardised missing value codes to mark the absence of values for some years.

5.3 Weighting strategy

We will construct a system of weights to adjust the sample structure for various characteristics of the heritage surveys:

- Attrition weights (in the first instance for waves 2-4 of the 1975 heritage sample only – though presumably, once it becomes available, the ATUS will need analogous adjustments.)
- Day weights will be calculated, to ensuring that each decade age group for each sex has the correct distribution of days-of-the-week.
- We will consider the case for seasonal weightings. Conventional practise has it that seasonality does not have a strong influence on time allocation in the US. We will carry out some experiment and sensitivity testing to examine the arguments for and against.
- There is a clear case for adjustment of the achieved samples in the heritage studies to the same age-sex-working status, and perhaps educational attainment distributions as in the contemporary CPS sample data.
- It would also be appropriate to adjust the resulting structure to resemble, at a level of detail yet to be decided, contemporary population age and sex distributions as indicated by interpolations from the appropriate decennial Census evidence.

Our initial weighting systems will necessarily be somewhat exploratory in nature. It is likely that we will produce multiple alternative weighting factors as part of the preliminary programme.

5.4 Coordination with non-US comparator studies

We understand that international comparator materials are currently considered to be a low priority by this project's US sponsors. However, the existence of major national time use studies in various appropriate comparator nations (including Canada, Australia and Europe—where more than 20 national time use studies have been carried out since 2000—makes it not unlikely that future users will wish to carry out cross-national comparisons. It would under these circumstances seem imprudent to ignore at least the potential for such comparisons in the design of the harmonised classification schemes.

We propose to continue to prepare concordances, including activity classifications and key variables from these non-US studies, for use, alongside the US historical concordances, as guides for the construction of appropriate harmonised variables and categorisations.

5.5 Testing of various input and output methodologies for estimating extended national accounts.

We see the testing of our harmonised data files by using them as bases for the construction of National Accounts extensions to include household production, as an integral part of the development program. The work of developing these estimates will proceed in parallel with the development of the files themselves, and we expect that the requirements of the estimation procedures will influence the design of the harmonised files.

We propose to explore for these purposes an eclectic range of alternative approaches to national accounts extensions, including:

- "Input-based" methods, where the value of domestic production is based on various alternative valuations of labour inputs (shadow wage, specialist wage and housekeeper wage approaches) as measured from the diary.
- "Output-based" methods, where the valuation of domestic product is based on measures of number and extent of consumption episodes (eg meals, sleeps, periods of relaxation) estimated from diary evidence and valued by the prices of market near-equivalents.
- Other methodologies, including "process" measures, which estimate the direct utility derived from both consumption and production activities.

6 Comments and observations

We would like at this stage to bring to the attention of the sponsors two issues that have emerged with increasing importance in the course of our work so far.

6.1 Calibration studies

We are becoming increasingly aware of the need for calibration studies as means of increasing the effectiveness of the merging of the heritage studies to the new ATUS.

The highest priority would be a study running in parallel with the BLS, and using the BLS telephone sampling system, but deploying the same CATI instrument as that used in the Robinson-type studies in the 1980s and 1990s. At present we are entirely dependent on deductive reasoning for converting the heritage sample activity classification "primary activity+secondary+co-presence" into the ATUS "primary activity+caring+copresence" structure. Some clear concurrent empirical evidence of how these two schemes compare in practise would be of great benefit.

6.2 Cross-national comparisons

The ATUS in combination with the harmonised US heritage data is likely to be very widely used by, at least, the academic economics and sociology communities. These communities are also likely to move to a requirement for international comparisons. This would be greatly facilitated by some form of coordination with or contribution to the Multinational Time Use Study (MTUS) based at ISER, Essex University – the wider programme from which the team conducting this present study are drawn.

If the Glazer Foundation is to continue supporting work in this field of research, a financial contribution to the further development of the MTUS might be appropriate. Indeed, the original invitation to tender, to which the present group responded, had this as a major element in their bid, and they would like to return to this cross-national work once the US heritage file is in place.

Appendix: Next stages of the project.

The contract was signed during November 2003. Month 0, from the point of view of the contract deliverables, is therefore October 2003, and the next stages of the project are in the table that follows. We expect to receive feedback from this report by the end of the second week in March; in the meantime we will proceed with the activities set out in Section 5 above.

2	Harmonized Historical US file	A harmonized file of data from US time use surveys to include those agreed as a result of the consideration of Deliverable 1. This file will include the maximum amount of detail available taking into account only considerations for constructing the file of these surveys. The file will emphasize detailed activity coding.	end month 9, July 2004
2a	Documentation	Full and complete documentation of the harmonized file specified in deliverable 2 including descriptions of the variables included and a guide to their use. This will include methodological descriptions and indexes, in a hyperlinked electronic text similar to that currently available for the MTUS. It will be provided in MS Word format so that it can be transferred to a PDF file or HTML for dissemination.	end month 9, July 2004
3	Test Report on historical US file	Report of test calculations illustrating the analytical capabilities of the Historical US file.	end month 12, Oct 2004