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CHAPTER 3: ACTIVITY CODES

MTUS is one of a number of efforts developing harmonised activity codes for cross-time and cross-national analysis of people's daily activities and use of time. Alexander Szalai (1972) developed the first such typology of 90 codes, which continued to influence code frames of other time use studies for many subsequent decades. The Szalai project concentrated on the paid and unpaid activities of the working-aged population, and also reflects the leisure and domestic technologies of its time (with concern to distinguish newspaper from book reading, radio listening from listening to records, and hand-written from telephone communication). The United Nations Statistics Division International Classification of Activities for Time-Use Statistics (ICATUS), draws on a similar concern with measuring total paid and unpaid work outputs, with aims to illuminating the total economic contributions of women - particularly in the global South, and the calculation of standard national accounts, and satellite national accounts that measure productive activities outside the paid production boundary. Most applications of the ICATUS in time use surveys reflect international-agency supported efforts to collect data to measure propensity for and actual progress of development in less industrialised countries.

Eurostat has developed the most comprehensive list of harmonised activity codes for the Harmonised European Time Use Surveys (HETUS) project, which includes a four-levels of progressively more detailed codes, which allow for national-level measurements at the fourth and most detailed level. More recently, the United Nations Economic Commission for Europe (2013) led a time use task force, which developed standards for comparable reporting of time use statistics for policy analysis. These guidelines specify a limited set of categories as the minimum set of activity categories required for policy-relevant time use analysis.

The reason the UNECE guidelines offer this short list of minimum required activities is an inherent tension in the field of time use research. Time-diary surveys which collect the more detailed activity and context information offer a vast range of research and policy analysis applications; however, even though per range of policy-relevant uses from the individual survey, time use surveys offer particularly good value for money, detailed time diary surveys nonetheless require substantial time and financial cost inputs to administer. The more detailed the diary, the greater the respondent burden. From the early periods of collection, time diary surveys have spanned a range from those collecting substantial detail of activities and those which collect minimal details to address a specific purpose, and minimise the costs of administering and completing the survey.

Some countries only collect one form of time diary, but in many, diaries of a range of detail have been collected at different points in time.

From the outset, Gershuny encountered the challenge of reconciling the limited and detailed coding frames into a single harmonised activity list. Some of the first surveys he harmonised with the Szalai surveys included a 1961 UK and 1964 Danish survey, both of which included substantially fewer activity categories that the Szalai surveys. To limit research only to the detailed coding frames means accepting a more limited range of countries and of time points within countries, which in turn limits the scope of cross-national analysis. From the outset, Gershuny aspired to include as large a field of surveys as the very limited staff resources his teams could devote to the MTUS project.

The early versions of the MTUS included a 41 activity code list based largely on the Szalai activities, but also including some activities of particular relevance at the time in the UK (going to the pub, going to social clubs). In parallel to the 41 categories Gershuny ideally wished he could create, he also developed a 22 category activity list into which nearly all surveys he harmonised could be directly coded. MTUS no longer uses the 22 category list, though details of this category list are set out in Chapter 2.

Since Kimberly Fisher joined the MTUS team in 1999, the MTUS procedures have refined to work with the narrative properties of time diaries and maximise the activity and context information from the diary as a complete narrative, rather than concentrating on parts in isolation. Fisher's concern for data quality and archiving information not only to preserve historical records of developments in the time use research field but also to inform the improvement of future time use survey collection have both expanded the range of uses to which the MTUS can be applied, but also increased the time required to include any individual survey. In order to add more recent surveys and surveys from more countries, the MTUS project has lacked resources needed to upgrade all older surveys each time improvements are introduced to the dataset. As a result, the MTUS expands through a dual process of backwards upgrading of some surveys already included and the acquisition of new data, though a backlog of older conversions will remain for some time.

To meet the divergent interests of the MTUS project team and users, MTUS now offers a simple, core version of the file, which combines the not yet upgraded surveys, some surveys to which the MTUS team at present lacks resources to convert in detail, and a simplified version of those surveys to which considerable efforts at data cleaning and enhancement to create the episode and detailed aggregate files have been invested. The 25 (plus four) activity categories in the core file directly collapse from the current 69 activity category typology (and also represent the categories possible to create from a larger range of surveys).

3.1 Using MTUS activity codes

We now detail all three MTUS activity category typologies. This user guide should be read in conjunction with the Coding Procedures Document, which offers a detailed breakdown of the components of each of the activity codes, and with the survey-specific README documents for each survey the user wishes to include in research. The README files offer maps of original survey codes into the MTUS codes.

In the summary aggregate and core MTUS files, each row represents a 24-hour time diary. The aggregate file includes variables for the total minutes in each of the 69 categories, and separately in each of the 41 categories. The core file includes variables for the total minutes in each of the 25 categories. The total time spent across the 69, 41 and 25 categories sums to 1440 minutes, the total minutes in a 24-hour day.

Users should note that in the Harmonised Aggregate File (HAF), those summary time use variables which cannot be coded for a particular survey are set to -9 to allow users to distinguish true 0s (that is cases where the diarist did not report any time in the activity) from 0s arising where a survey did not separately collect instances of the activity category. Users will need to exclude the -9 missing cases as missing data before they sum MAIN1 to MAIN69, AV1 to AV41 (otherwise they will produce total time that is less than 1440 for many surveys).

In the Harmonised Core File (HCF), a number greater than 0 means the diarist reported time in that activity. Values of 0 in the time user variables in the core file can either mean that the diarist did not report time in that activity or that this category cannot be created for this survey. Users should look through Appendix 3 and the individual survey documentation when interpreting their results.

The default value for all time use variables that can be created is 0 in the aggregate and the core files. People do not undertake every activity which they regularly perform every day. A 0 value is a meaningful report. The diary reflects just 24 hours of activity of each individual. In drawing large-scale random national samples, time diaries reflect the most common behaviour patterns of different groups across a population. Time use surveys reflect the total amount of unpaid work, voluntary work, exercise, travel, care, cultural participation, and the like that takes place on any given day at different times of the year. Time diaries can be used in conjunction with longer-term participation questions to analyse the behaviour of individuals over longer time periods, and area of significant development in the time use research field (for instance see Gershuny 2012,

UNECE 2013). At this time, the MTUS does not include longer term participation questions. Nevertheless, the MTUS is set up to readily facilitate matching MTUS variables back to original surveys to add additional information. MTUS uses the original identifiers, renamed. The documentation for each survey includes the code to make the MTUS conversion, which users can adapt to add variables to MTUS files.

The person-level and household variables as well as the weights are in the aggregate and core files, as most analysis will occur at the level where each row case is a diary. The episode level file only contains diary information, sex, age and the indentifiers.To map diaries from spouses together, or the diaries from children and their parents together at the episode level (in surveys that collected diaries from more than one person per household), the user will need to map the spouse indentifier (partid) or the parent identifiers (parntid1/2) from the HAF to the HEF file.

The full-diary processing procedures MTUS follows mean that MTUS files map details that might be reported in a number of columns in the time diary in all relevant places in the MTUS codes. Many original surveys do not do this. As a result, the activity reports in the MTUS version of the original surveys may appear to differ from results users might obtain from original surveys. For example, an activity like exercising by riding a bicycle might be recorded as exercise by cycling in the activity code, or just as exercise in the activity code and by bicycle in the location and mode of transport codes. In the MTUS files, this instance would be coded as

activity = exercise by cycling (main=44)
location = travelling (eloc=8)
mode of transport = bicycle (mtrav=4)

The creation of MTUS files also involves a considerable amount of data cleaning and processing, particularly in the case of older surveys, which were produced in the days when the technology for handling large data files was more cumbersome and survey teams tolerated larger volumes of errors and inconsistencies than now is the case. The MTUS team spends up to 5 weeks per survey harmonised into the episode format looking up original information and running algorithms to correct many of the original file errors and inconsistencies (for instance correcting time and episode inconsistencies arising from original data entry people entering time diary pages out of sequence). At the margins, some research results will differ using MTUS versions as opposed to unadjusted original versions of some datasets.

Some research purposes may require a rework of the categories using a different elements of the diary in the episode and aggregate files. If, for instance, a researcher wishes to explore the risk of exposure to insect bites, categories of exposure risk may relate to a combination of time of day, season of the year,

location or activities, and sequencing of events (such as whether the diarist engaged in an activity such as personal care that might have enabled them to mitigate the risk of insect bites if they had brought an insect home on their clothing). Similarly, if the researcher has an interest in physical activity, the mode of transport, the duration of activities, and combinations of activities will inform the possible level of intensity of physically active time. No code frame will ideally suit all research purposes. Users are advised to be very familiar with the coding of activities in order to avoid misinterpretations of results.

3.2 MTUS 69 activity and 25 activity typologies

Table 3.1 summarises the 69 category main activity category list. In the aggregate file, time in each category as a main activity is summed in a separate variable column. In this aggregate file, the variable column MAIN11 contains the total minutes in reported travel as a part of paid work. In the episode file, we use the same 69 categories for both the main activity variable called "main" and the secondary activity. In the variable columns MAIN (69 category main activity) and SEC (secondary activity), the value 11 means that in this episode, the reported activity is time in travel as a part of paid work. These 69 categories constitute an exhaustive activity list.

Table 3.1 also shows the mapping of the 69 categories to the 25 core file categories. The second column of table 3.1 shows the variable name for each of these 25 variables, followed by a number in (). This number reflects the order in which the diaries appear in the data file. These numbers are not used in the MTUS core file. Instead, a variable like sleep contains the total minutes recorded in the activity.

The 25 categories also constitute and exhaustive list. Time summed across the 25 categories totals 1440 minutes.

MTUS does not overwrite any entries made by the diarist. If a diarist reports an activity, such as child care, while travelling with a child (as reflected by a change of location and a mode of transport), MTUS team leave the report as made. In certain circumstances where the diarist has not recorded a main activity, the MTUS team does use other information in the diary to fill in the partial information that the diarists' reports of their days make available. As explained in Section 1.7 of this document and the MTUS Coding Procedures document, codes constructed by the CTUR team using diary information have separate codes (1, 3, 41, and 62). These four codes are assigned using information in the diary, and not using analysis of diaries produced by other people.

Table 3.1: Harmonised activity codes (69 and 25 category typologies)

Activity codes 69	core file variable	Description
1	Selfcare (3)	imputed personal or household care
2	Sleep (1)	sleep and naps
3	Sleep (1)	imputed sleep
4	Selfcare (3)	wash, dress, care for self
5	Eatdrink (2)	meals at work or school
6	Eatdrink (2)	meals or snacks in other places
7	Paidwork (4)	paid work - main job (not at home)
8	Paidwork (4)	paid work at home (main, second or other job)
9	Paidwork (4)	second or other job not at home
10	Paidwork (4)	unpaid work to generate household income
11	Paidwork (4)	travel as a part of work
12	Paidwork (4)	work breaks
13	Paidwork (4)	other time at workplace
14	Paidwork (4)	look for work
15	Educatn (5)	regular schooling, education
16	Educatn (5)	Homework
17	Educatn (5)	leisure course or other education or training
18	Foodprep (6)	food preparation, cooking
19	Foodprep (6)	set table, wash/put away dishes
20	Cleanetc (7)	Cleaning
21	Cleanetc (7)	laundry, ironing, clothing repair
22	Maintain (8)	home/vehicle maintenance/improvement, collect fuel
23	Cleanetc (7)	other domestic work
24	Shopserv (9)	purchase goods
25	Shopserv (9)	consume personal care services
26	Shopserv (9)	consume other services
27	Petcare (11)	pet care (other than walk dog)
28	Pkidcare (13)	physical or medical child care
29	Ikidcare (14)	teach child a skill, help with homework
30	Ikidcare (14)	read to, talk or play with child
31	Pkidcare (13)	supervise, accompany, other child care
32	Eldcare (12)	adult care
33	Volorgwk (16)	voluntary work, civic or organisational activity
34	Religion (15)	worship and religious activity
35	Goout (23)	general out-of-home leisure
36	Goout (23)	attend sporting event
37	Goout (23)	cinema, theatre, opera, concert
38	Goout (23)	other public event, venue
39	Goout (23)	restaurant, café, bar, pub

40	Goout (23)	party, reception, social event, gambling
41	Goout (23)	imputed time away from home
42	Sportex (19)	general sport or exercise
43	Sportex (19)	Walking
44	Sportex (19)	Cycling
45	Goout (23)	other out-of-doors recreation
46	Garden (10)	gardening/forage (pick mushrooms), hunt/fish
47	Petcare (11)	walk dogs
48	Leisure (24)	receive or visit friends
49	Leisure (24)	conversation (in person, phone)
50	Leisure (24)	games (social or solitary), other in-home social
51	Leisure (24)	general indoor leisure
52	Leisure (24)	artistic or musical activity
53	Leisure (24)	written correspondence
54	Leisure (24)	knit, crafts or hobbies
55	Leisure (24)	relax, think, do nothing
56	Read (21)	Read
57	TVradio (20)	listen to music, ipod, CD, audio book
58	TVradio (20)	listen to radio
59	TVradio (20)	watch TV, DVD, including web streamed content
60	Compint (22)	play computer games
61	Compint (22)	send e-mail, surf internet, programming, computing
62	Travel (18)	no activity, recorded travel mode or change of location
63	Commute (17)	travel to or from work
64	Commute (17)	education-related travel
65	Travel (18)	travel for voluntary/civic/religious activity
66	Travel (18)	child/adult care-related travel
67	Travel (18)	travel for shopping, personal or household care
68	Travel (18)	travelling for other purposes
69	Missing (25)	no recorded activity

3.3 MTUS original 41 activity typology

Table 3.2 details the original MTUS activity categories. The 69 activity code list both updates and amends some shortcomings of that original classification. Some of the 41 codes grouped categories where few minutes of time were recorded, but the nature of these activities differs markedly (particularly in paid work time and odd jobs, the latter of which spans adult care, pet care, DIY and

household management). Retaining these categories enable users to directly test some of the early publications using the older versions of the MTUS.

Table 3.2: Original harmonised activity codes (41 category typology)

Activity codes 69 core file variable		Description
1	Paidwork (4)	paid work
2	Paidwork (4)	paid work at home
3	Paidwork (4)	paid work, second job
4	Educatn (5)	school, classes
5	Commute (17)	travel to/from work or education
6	Foodprep (6)	cook, wash up
7	Cleanetc (7)	housework
8	Maintain (8)	odd jobs, including maintenance or home and car, household management, pet care & adult care
9	Garden (10)	gardening
10	Shopserv (9)	shopping
11	Pkidcare (13)	childcare
12	Travel (18)	domestic travel
13	Selfcare (3)	dress/personal care
14	Shopserv (9)	consume personal services
15	Eatdrink (2)	meals and snacks
16	Sleep (1)	sleep
17	Travel (18)	free time travel
18	Goout (23)	excursions
19	Sportex (19)	active sports participation
20	Goout (23)	passive sports participation
21	Sportex (19)	walking
22	Religion (15)	religious activities
23	Volorgwk (16)	civic and voluntary activities
24	Goout (23)	cinema or theatre
25	Goout (23)	dances or parties
26	Goout (23)	social clubs
27	Goout (23)	pubs
28	Goout (23)	restaurants
29	Leisure (24)	visit friends at their homes
30	TVradio (20)	listen to radio
31	TVradio (20)	watch television or video
32	TVradio (20)	listen to records, tapes, CDs
33	Educatn (5)	study, homework
34	Read (21)	read books
35	Read (21)	read papers, magazines

36	Leisure (24)	relax, do nothing
37	Leisure (24)	conversation
38	Leisure (24)	entertain friends at home
39	Leisure (24)	knit, sew
40	Leisure (24)	other leisure
41	Missing (25)	unclassified or missing
-	Petcare (11)	not possible to create from original MTUS codes
-	Eldcare (12)	not possible to create from original MTUS codes
-	Ikidcare (14)	not possible to create from original MTUS codes
-	Compint (22)	not possible to create from original MTUS codes

Table 3.3 maps the older 41 categories into the 69 category list, and highlights points at which the two code frames differ. The old and new categories do include some differences, and the more detailed list does not simply collapse back to the older less detailed list. That this is the case is a strength, as there are instances where by mapping the two categories together, users can further break down some code into further details.

Table 3.3: Map of the 41 category to the 69 category MTUS codes

AV	MAIN	Notes on changes and similarities
AV1	**Main5** Main7 Main10 Main12 Main13	eating at work, work breaks, other time at the workplace separated out from paid work. Main7 covers most activity included in AV1
AV2	Main8 Main14	paid work at home separated from job search activities
AV3	Main9	second job – equivalent categories
AV4	**Main5** Main15 Main17	eating at school, and leisure classes separated out from main education. Main14 covers most time that was in AV4
AV5	Main11 Main63 Main64	travel to/from work, travel as a part of paid work, education-related travel separated out from work-related travel
AV6	Main18 Main19	food preparation and cooking separated from setting and clearing table/wash dishes home brewing, wine making moved from leisure to food preparation in new code
AV7	Main20 Main21	cleaning separated from laundry/clothing care
AV8	Main22 Main23 Main27	home/vehicle maintenance, other domestic work, pet care, adult care separated out from old odd jobs category. Also, informal assistance to people outside the household moved to

	Main32	the voluntary activity category (Main33 rather than AV8), and help to another person that involves child or adult care moved from Av8 to the respective child care or adult care code in the Main scheme.
AV9	Main46	gardening – mostly equivalent categories, except that foraging (ie collecting mushrooms) was formerly in walking category – AV21, and hunting & fishing was formerly in AV19 – sport
AV10	Main24 Main26	shopping for goods separated from using services – ie bank, post office
AV11	Main28 Main29 Main30 Main31	physical/medical child care, teach or help with homework, read to and play with child, and supervise or other childcare distinguished. Also note that AV11 only covers child care of household children, childcare as help had been coded in AV8. In the new code, all child care, whether for a household child or as help to someone else is coded in the Main28 to 32 codes
AV12	Main66 Main67	child and adult care-related travel separated from shopping and services travel
AV13	Main1 Main4	imputed personal and household care added to personal care
AV14	Main25	personal services – equivalent category
AV15	Main6	meals & snacks – equivalent categories
AV16	Main2 Main3	recorded sleep and naps, imputed sleep
AV17	*Main62* Main65 Main68	no activity but mode of travel reported, voluntary and civic activity travel distinguished from leisure travel
AV18	Main35 Main38 Main45	general out of home leisure, attending event, other outdoor recreation distinguished
AV19	Main42 Main44	cycling distinguished from other exercise and sport
AV20	Main36	attend sporting event – equivalent code
AV21	Main43 Main47	dog walking (which sometimes was lumped with AV8) separated from other walking
AV22	Main34	religious activities – equivalent categories
AV23	Main33	voluntary/civic/organisational – note a change; the old MTUS coded only formal volunteering for an organisation in AV23, Main33 covers both formal organisational volunteering and informal unpaid assistance to a person outside the household – the informal volunteering had been coded in AV8.
AV24	Main37	cinema, theatre, concert – equivalent activities
AV25 AV26	Main40 Main41	social clubs grouped with dances, receptions, parties; other social and imputed events away from home added that

		previously would have been in missing time
AV27 AV28	Main39	restaurants, bars, pubs combined
AV29 AV38	Main48 Main50	receive and visit friends combined – distinguishable by location code, imputed in-home social code also added to these categories
AV30	Main58	listen to radio – equivalent categories
AV31	Main59	watch TV/DVD – equivalent categories
AV32	Main57	listen to CDs, music – equivalent categories
AV33	Main16	study, homework – equivalent categories
AV34 AV35	Main56	reading books combined with other reading
AV36	Main55	relax – equivalent categories
AV37	Main49	conversation – equivalent categories
AV39 AV40	Main51 Main52 Main53 Main54 Main60 Main61	knitting, sewing combined with crafts and hobbies; but playing games/in home social with family, general indoor leisure, artistic and musical activity; casual writing by hand; computer games, and email/internet/chat room distinguished home brewing, wine making moved from leisure to food preparation in new code
AV41	Main69	missing any account distinguished from missing time where the activity is away from home

3.4 Context and episode variables

Some of the MTUS activity codes imply the presence of others, the use of computers, a mode of transport or a location. The MTUS core and aggregate files include one explicit context variable: SPPART (total minutes spent over the 24 hour diary with the spouse or partner for those diarists who are in a couple). For surveys where who else is present or time with the spouse or partner is not available, we set this variable to -9. If the diarist is not married and does not have a cohabiting partner, we code this variable as -7.

The MTUS episode file includes a wider range of context information as well as the main activity. The use of these other context variables is more complex, and appropriate use depends on the questions researchers ask using the data. For this reason, these variables are offered in the episode file alone. The episode file also includes sex and age, as well as the diary variables and identifier variables. Users should treat this file as a database from which to extract variables to then match back into the aggregate file for analysis. **This section now considers the additional variables which appear only in the episode file.**

CDAY: Calendar day diary kept

The sole diary variable not in the other versions is **CDAY**. This variable takes a value between 1 and 31 where the information has been released, or -9 if the information is not available. This variable appears here partly to allow matching of additional information relevant to specific days (weather conditions, sunrise and sunset on the diary day, whether the diary took place before or after a major event), and partly to allow testing of potential minor variations in activities across months (for instance closer or further away from when most people get paid).

TIME: Duration of activity in minutes

We calculate this variable by subtracting START from END. Many surveys include a variable for the duration of the episode in minutes, though some files include errors in the variable, and in some cases, described in more detail in relation to the activity variables below, the CTUR team modified the definition of an episode. Consequently, while people converting original surveys into MTUS format should double check their calculation for time against the duration variable in the original file and carefully check any inconsistencies, the variable time should be the variable calculated by the converter of the survey.

CLOCKST: Start time on 24-hour clock

This variable represents the time on the 24-hour clock when the episode started. We report this variable as a 4-digit number. The digit(s) prior to the decimal represent the hour; the two digits following the decimal represent the minute.

6.35	(thirty five minute past 6AM)
18.05	(five minutes past 6PM)

We represent midnight as 0.00.

START: Start minute

END: End minute

There are two ways to represent time in the diary episode file: time as reported on the 24-hour clock, and time in terms of the number of minutes which have elapsed since the start of the diary observation period. A 24-hour file contains 1440 minutes - except on those days where an adjustment of an extra minute is added to the day to adjust for minor variations in the actual rotation speed of the Earth around the sun (though users should note that very few diaries are collected on such days, partly as few of such days appear in the sampled periods

and partly as few participants have been willing to keep a time diary on New Year's Eve when such adjustments are added.) The addition or absence of the additional 60 seconds makes little difference to population behaviour patterns, so this dataset makes no attempt to account for these adjustments.

All the surveys included in the MTUS cover an observation period of 24 hours (1440 minutes), and all surveys begin at a point on the 24-hour clock where the majority of the observed population was asleep. There is considerable variability about the start-time on the 24-hour clock, both in the sense that the start time of the diaries varies from midnight to 6:00, and that the time when the diarists in different surveys (as well as in the same survey in the case of countries that span multiple time zones) start their diary in relation to Greenwich Mean Time. As people lead their lives in 24-hour cycles, we harmonise the concept of time in Version 6 by reporting the start and end minutes of the episode in the 1440 minute observation period. The first episode in all diaries has a start value of 1, and the last episode in all diaries has an end value of 1440.

EPNUM: Episode number

This variable is the identifier of the episode. The first episode has a value of 1.

Episode(n+1) = epnum(n)+1.

This episode number should be generated after the activity and ancillary variables have been created. As the next page explains, some elements of the MTUS processing can produce different numbers of episodes compared to the original data. The MTUS variable EPNUM needs to reflect the number of episodes in the MTUS version of the file, while also retaining any changes in the activity or context codes in the original file.

MAIN: Main activity (69 category list)

AV: Main activity (41 category list)

These variables mirror the MAIN1 to MAIN69 and AV1 to AV41 variables in Harmonised Aggregate File (HAF). MAIN covers the main activity codes in the 69 category list of categories. AV covers the main activity codes in the original 41 category list of categories. A code of "33" in MAIN means the diarist performed voluntary work or a civic activity in that time slot (and this time would be summed in MAIN33 for the diary day). The labels of the values in the AV and MAIN activity lists appear in the previous two sections.

In cases where only one activity has been recorded, but we can identify missing travel records (the diarist starts in one place and ends up in another place with no recorded travel), we code the secondary activity as imputed travel. For cases

where we identify missing eating or drinking (the diarist records working with food (food preparation or set/clear table) but never reports eating or drinking, or the diarist records social activity at an event where other household members classify the activity as eating, if there is no secondary eating, we add eating as a secondary activity.

As already noted in the first section on the preparation of the data on page 2, CTUR has a number of conventions for filling in other instances where the diarist fills in some elements of the diary but not others yet has provided sufficient information to reveal the sequence of her or his activities in the gap. These cases of filling in information may result in additional episodes appearing in MTUS versions of the data that were not apparent in the original release of the data.

Some surveys collected activities in half-hour time slots. Such long observation periods will include multiple episodes on occasion. In particular, short travel episodes can be left out of the half hour slots. In the case of missing short travel in these 30-minute time slot surveys, as well as in cases where the diarist coded one activity as the main activity and travel as the secondary activity, we code 20 minutes of the 30 minute slot as the main activity, and 10 minutes as travel. The placement of the 10 minutes of travel depends on the sequence in which the time slot occurs. If a diarist has been working at the office for 7 hours, then has a time slot with missing or secondary travel where the main activity is recorded as paid work, then in the next episode is doing activities at home, we code the first 20 minutes of the episode that includes travel and the last 10 minutes as secondary travel. In contrast, if after seven hours of paid work, the diarist then records an episode of eating at a restaurant with secondary travel, and the next time slot is a continuation of eating out, then we code the first ten minutes of the time slot with the short travel episode imbedded as travel and the second 20 minutes as eating out in the restaurant.

This procedure increases the number of episodes in the MTUS version of the data as compared to the original data. For this reason, the episode number and start and stop minute of episodes need to be calculated after the activity and ancillary variables have been constructed.

SEC: Secondary activity (69 category list)

Simultaneous activities do not sum to 1440, nor should the user attempt to do so. While people may undertake more than one activity at the same time (such as driving while listening to the radio), the surveys harmonised here have highly variant instructions about the degree of detail respondents should try to capture in the recording of secondary activities. Also, the degree of commitment implied by different combinations of activities is not the same. Consider the difference

between watching the waves while sunbathing on a beach, watching the children while making dinner, and looking after an adult with dementia while watching television. The first activity combines forms of leisure, the second combines care and domestic work and the third combines care and leisure. In many research contexts, the first of these combinations might be treated as a single activity. The same is not the case for the second two examples.

Researchers using time use data should consider the nature of their analytic needs in deciding whether and how to include secondary activities. In some cases, some combinations of simultaneous activities will count as new activities added to the instances of singular or focussed activity, and the total time spent in the day across this expanded and customised list of activities should total 1440 minutes. Which secondary activity combinations are relevant will vary by the focus of the research. We code the secondary activities using the 69 category list also used to code main activities.

In some diary surveys, diarists were able to report more than one secondary activity. Where this occurs (UK 1987), we split the episode into sub-episodes that total to the same length of the original episode, one new episode for each reported secondary activity. In these cases, we coded the main activity and context information as applying across all elements of the split episode, except where there is a clear transition to travel. Users can identify these cases as these sub episodes have the same value for the variable clockst, while all unsplit episodes have different values for clockst (the start time of the episode on the clock).

INOUT: Inside or outside

ELOC: Location

Table 3.4: Location codes

Location variables	Description
INOUT = -8	location unknown
INOUT = 1	Inside
INOUT = 2	outside
INOUT = 3	travelling
ELOC = -8	location unknown
ELOC = 1	at own home
ELOC = 2	at another's home
ELOC = 3	at workplace
ELOC = 4	at school
ELOC = 5	at services or shops
ELOC = 6	at restaurant, café, bar, pub

ELOC = 7	at place of worship
ELOC = 8	travelling
ELOC = 9	other locations

Table 3.4 details the location codes. We draw these location codes both from separate location variables and from imbedded information in the original activity codes. Users should note that the degree of specification about whether an activity in inside or outside is highly variable by survey, and caution should be used with this variable for cross-country and cross-time analysis. During this process, we have checked any inconsistencies between the original location codes and the imbedded activity codes, and we comment on such cases in the conversion programmes for each survey. Where some location codes we aim to identify are collapsed into a general "other" code, where possible we use the activity codes to break down "other" locations. As examples, if there is no code for school, but the activity is formal schooling and takes place away from home, we code the location as school. Similarly, if the activity is attend religious service and the location is other not at home, we code this activity as at a place of worship. If the diarist was travelling (including on foot and by bicycle), ELOC has the value of 8.

ICT: Used information communication technology during activity

We include a marker of whether the diarist used one or more ICTs during the activity. In some recent surveys, the diary included a column marking whether the diarist used ICTs. If such a column is available, then we use this column to create this 0/1 marker variable. In many cases, however, we can only identify this information from the activity code list. The HETUS surveys, for example, separately coded playing social games from playing social computer games, and doing household accounts and banking on the computer/over the internet from doing household accounts and banking on paper. In cases where the identification of ICT use is available in more than one format (a dedicated column as well as in activity codes), we use all forms of available information to create this marker. As is the case with the mode of transport, where the diarist may not write down the word "commute" in the activity column if they have written "drove car to work" in the location column, some diarists similarly might write "internet banking" as their activity but not bother to tick the used a computer box. Nevertheless, such an identification of the activity does give use sufficient information to know that the diarist used ICTs during this episode.

ICT values	Description
ICT = 0	no/not known if computer, mobile, web used
ICT = 1	computer, mobile phone, web used

MTRAV: Mode of transport

Most surveys that collect mode of transport gather this information in a separate column, but in some cases the mode of transport is recorded in the activity codes. Again, we use any available information in the data to code MTRAV (categories shown in Table 3.5). For those cases where we identify unrecorded travel, we record the mode of transport as travel by unspecified means.

Table 3.5: Mode of transportation codes

MTRAV values	Description
MTRAV = -8	activity missing
MTRAV = -7	not travelling
MTRAV = 1	travel in car/truck, on motorcycle (inc. taxi)
MTRAV = 2	travel on public transport
MTRAV = 3	walk / on foot
MTRAV = 4	cycle, other physically active transport
MTRAV = 5	travel by other/unspecified transport

Where the original survey records an activity such as walking for pleasure, jogging or hiking and no mode of transport is recorded, we code MTRAV as walk / on foot. Where the activity is coded as a sport that also involves physical active travel (cycling, riding a horse etc.) and no mode of transport is recorded, we code MTRAV cycle or other active transport.

ALONE: Alone or with strangers

CHILD: Child aged <18 present

SPPART: Spouse or partner present

OAD: Other adult present

Collection of the who else is present data varies more across the surveys than other information harmonised into the MTUS. Creating a useful single "who else was present" variable for a majority of surveys is almost impossible. Instead, we opted to make four flags. As with the other ancillary information, these flag variables are based on a combination of who else is present column information as well as activity codes (and any other relevant information in the diary). Some diary surveys have code frames that mark the presence of others in certain activities. A code for "physical care of children" implies that at least one child is present to receive this care. "Watch TV alone" similarly would indicate that other people are not present.

The concept “alone” does not necessarily mean that no other person was within sight of the diarist. If given the option of “alone” in a who else is present matrix, some diarists will select “alone” when on public transport at rush hour, while eating out in a restaurant or shopping for essential goods. In such cases, the diarist most likely is around other people, and the “alone” designation means that the diarist is not engaging with these other people, though the diarist may well moderate her or his behaviour on account of the presence of these other people. The “alone” flag marks cases where the diarist had an option on the survey instrument to indicate that he or she was alone and selected this option.

Most surveys do not ask diarists to count the exact number of other people present. The American Time Use Study includes the most detailed code frame for the presence of others, and even this list allows an unspecified number of certain categories of people to be covered by a single value. Users need to be aware that the presence of children or other adults will not necessarily allow them to identify which children or other adults were present, only that children or other adults were present.

In the case of the presence of children, the MTUS does not distinguish household children from non-household children, or the diarists’ own children from other children. Some original surveys do make such distinctions. In the MTUS case, the flag that a child was present simply means at least one person aged <18 was with the diarist.

Where the diarist is in a couple and the “who else is present” column allows us to distinguish if the spouse or partner was present, we mark this in the spouse column. Some surveys do not distinguish the presence of the spouse from the presence of other household adults. In these cases, we code the presence of the spouse for those cases where we can make this determination. In households comprised only of a couple or of a couple and children, the presence of another household adult necessarily means the presence of the spouse. We comment on this matter in the individual survey documentation and readme files. For such surveys, the presence of the spouse cannot be identified where the household includes more than one couple or a couple and other adults.

The OAD variable covers the presence of any other adult – this includes the presence of the spouse/partner. SPPART and OAD are not mutually exclusive as this allows us to make a maximally relevant code for the surveys harmonised into the MTUS. Users can make more detailed distinctions with some original datasets, though not with others.

Table 3.6: Who else was present codes

Who else present variables	Description
ALONE = 0	others reported present
ALONE = 1	no others reported present
CHILD = 0	child not reported present
CHILD = 1	with child
SPPART = 0	spouse/partner not reported present
SPPART = 1	with spouse/partner
OAD = 0	other adults not reported present
OAD = 1	with other adults

3.5 Cross-survey comparability

The extent to which it was possible to create the harmonised codes is partly a function of the number of codes originally used in each survey. Table 3.7 provides further information on these codes.

Table 3.7: Information on the codes of activities used in each survey (prior to harmonization)

Country	Year	Number of codes	Range
Australia	1974	94	0 to 99
	1987	57	010 to 980
	1992	281	000 to 999
	1997	215	0 to 999
	2006	224	1 to 999
Austria	1992	202	100 to 900
Canada	1971	100	00 to 99
	1981	272	001 to 990
	1986	99	01 to 99
	1992	167	001 to 990
	1998	178	001 to 999
Denmark	1964	22	1 to 41
	1987	39	1 to 39
	2001	166	0 to 999
Finland	1979	100	1 to 99
	1987	100	1 to 100
	2000	265	0 to 9990
France	1985	200	1 to 199
	1999	145	111 to 911

Country	Year	Number of codes	Range
Germany	1992	231	11 to 999
	2001-02	271	000 to 999
Israel	1991-92	90	1 to 90
Italy	1989	150	1001 to 6009
	2002-03	176	001 to 999
Netherlands	1975-95*	354	000 to 999
	2000-05	274	000 to 999
Norway	1971	97	1 to 99
	1981	97	1 to 99
	1990	123	700 to 1310
	2000	265	0 to 9990
Slovenia	2000	265	0 to 9990
South Africa	2000	100	010 to 990
Spain	1992-93	192	100 to 999
	1997-98 Basque	192	100 to 999
	2002-03 Basque	229	100 to 999
	2002-03 national	198	000 to 9900
	2008-09 Basque	229	100 to 999
	2009-10 national	118	0 to 999
Sweden	1991	108	110 to 6121
	2000	150	0 to 999
UK	1961	106	001 to 193
	1974-75	73	1 to 99
	1983-84	185	101 to 9999
	1987	193	101 to 9999
	1995	31	1 to 31
	2000-01	268	0 to 9990
	2005	41	1 to 99
USA	1965	100	00 to 99
	1975	175	000 to 999
	1985	88	0 to 99
	1992-94	91	1 to 99
	1994-95	93	1 to 99
	1998-01	92 in 1998-99 / 98 in 1999-01	1 to 99
	2003-2012	91/564	1 to 98/3 tiers (some changes over time, over 400 codes

Notes:

* Based on the merged 1975 to 1995 file provided by the Netherlands. This merged file contains identical codes across the 5 surveys. The codes for each individual survey may have differed prior to this harmonization.