New Frontiers for Time Use Research (NFTUR)

The resource programme

(1) New data collection methods

We have been experimenting with various new diary collection modes; our task over the next two years is to bring together and evaluate the various recent CTUR-collected datasets, in order to develop robust new methods which can both replace the traditional PAPI approach, and also still maintain a maximum of continuity in historic time-use estimation. Among these are: the *Five Cities study*: 1200 whole-day timed GPS tracks & "tomorrow" diary; the *Understanding Society* internet-based diary sample US Innovation panel; the *Millennium Cohort* age 14 internet/phone & accelerometer split experiment; the *Nine Country* internet diary (13,000 days, 4 regime-type samples); and *CAPTURE24:* 132/190 days worn cameras, accelerometers & HETUS diaries.

We propose two different sorts of activity:

- small-scale experiments with combinations of internet and smartphone devices with GPS, motion and perhaps heart-rate sensing, with partner institutions in Belgium and Australia (fieldwork funded separately), collaborating a pilot study in conjunction with the ONS.
- secondary analysis of the CTUR experimental data to establish mode effects and develop calibration procedures for combination of new collection methods with UK heritage studies.

We will compare estimates of time use from the CTUR experimental datasets with the 2014-15 UK HETUS study and also the trends emerging from the UK light-diary series (1995-2005 plus planned ONS 2019) with trends from the HETUS 2000-1 and 2014-15 survey.

(2) MTUS extension

The MTUS currently consists of the *simple (or "core") files*, with aggregate durations in 69 types of daily activity; the *sequence files* providing primary and secondary activities, location and co-presence information for each 10-minute period through the diary day. Most of these files are supplied to external users by CTUR; we are also partners with the Universities of Maryland and Minnesota, in the IPUMS-Time-Use programme (MTUSX). We propose:

- 10-12 new national survey additions to MTUS including new Eastern European, Indian, Pakistani, Chinese, Korean and (we hope) Japanese data.
- Coding 6 new national surveys into the MTUSX system (separate funding—see justification of resources).
- New MTUS documentation systems; converting and extending the current documentation for MTUS surveys into a fully searchable, together with survey metadata.
- Adding new context files (including improved individual and household incomes) and survey level macro variables (eg GNP and regional unemployment rates).
- Producing new file types supplementing the relationship id variables in the demographic files: for children aged 8-15, and for spouse pairs.
- Extra MTUS diffusion activities related to new files, file-types and updates.

The research programme

(3) Accounts of economic circumstances and well-being.

Exhaustive national accounts (NA) place values comprehensively on *all* of a population's activities. We propose to use time-diary evidence to produce two quite different sorts of NA. Conventional NA "extensions" value just production (costing unpaid work by comparison with equivalent paid work). But a parallel line of argument from focusses on valuing *consumption* (using the costs of purchased equivalents to leisure activities—uber for car trips, cafes for meals, hostels for sleep etc). By a fundamental NA definition, these two sorts of estimates must have identical totals. All daily activities can be classed (via the 3rd-person '*could* you pay for it?' criterion) as either production or consumption. So fully extended national accounts are exhaustive in the sense of covering all 24 hours, twice! CTUR recently estimated current UK and USA extended accounts by production. We now

propose to use the entire UK heritage of time-use datasets (from 1961 to 2015) to produce consistent extended-GNP estimates, via the production-consumption route to compare with the trends in conventional GNP over the same period.

There is, however, a parallel, more radical, line of development, that will start during the initial 18-month period, estimating "process benefits" (Juster et al 1985) or "national utility" (NU: Kahneman et al 2004, Gershuny 2013), by multiplying time in each diary event by the enjoyment level recorded for that activity in the diary, to derive daily mean enjoyment or utility levels. NU and GNP are both produced from exactly the same time-use evidence, but will have different patterns of distribution across populations. Diary datasets with enjoyment levels registered for each diary event are now available for the recent UK, France and Italy HETUS studies, and for a wider group of countries from CTUR's Nine-Country project. We will prepare National Utility estimates from these, and compare them with conventional and extended National Income measures from the same countries.

(4) Work, self-employment and unemployment.

'Work at the margins'—hybrid work and zero-hour contracts, gig economy jobs, self-employment on short hours, has continued to grow in the UK. Whilst the contractual and earnings arrangements of these activities is discussed in the sociological and economic literatures, much less is known about the temporal *scheduling* of these jobs within daily routines. Previous time-use research in this area has established typologies of working-time arrangements for the workforce as a whole.

This project will use the HETUS work schedules (continuous 15-minute-interval diary information on paid work throughout randomly sampled seven-day periods) focussing on those who *do not* work standard hours, using these materials to provide accurate estimates of how much time is worked outside 'social hours' and how this non-social work time is distributed through the night and day. In collaboration with colleagues at the University of Brussels, Tampere, and Barcelona, the study aims at comparing the prevalence of typical and atypical work schedules across the EU in Finland, Belgium, the UK and Spain. It will include a comparison of average working time but also of work sequences through the day and the week. The goal is to provide a harmonised and robust analysis of working time patterns across Europe (especially relevant as the EU Working Time Directive is currently being re-examined by the EU Commission).

(5) C*hildren's time-use and life-outcomes*

Children's time-use influences educational, health, and well-being outcomes. We may have concerns about recent changes in children's daily activities—for example, that they spend too much time in screen-based activities, not enough in physical activities. Yet there has been a dearth of research on change in children's daily activities using the appropriate nationally representative time-use data. CTUR has begun to address this gap, showing how children's daily time use has changed over the last several decades and revealing the extent to which the use of technology such as smartphones has become a part of their daily lives.

While this research does confirm some prior expectations about change in children's daily life, it also raises some puzzles. For example, children's time in key activities such as study and sport has hardly changed since 2000, while screen-based activities increased substantially. Does children's time in screen-based activities have no adverse impact on these key activities? What is the social context of children's time use (eg time spent with parents)? How does it relate to changes in *parents'* use of technology? This strand of research will:

- examine the relationship between screen-time and children's time in other activities;
- analyse change in the time children spend with their parents with a focus on the influence of maternal employment and socio-economic status; and
- identify correlations between children's and parent's daily activities, in activities such as sport and time spent using technology.

In situating changes in children's time use alongside parents, the research provides a basis on which to consider possible policies for promoting healthier lifestyles in families and positive outcomes for children from a family-centred perspective.

This work intersects with a large-scale ERC-funded CTUR project led at UCL by Almudena Sevilla linking representative 24-hour diary survey data of parents and children with comprehensive information on child outcomes from administrative data, to explore inter-connections between family members and the child's acquisition of human capital via timing, sequencing, co-presence, multi-tasking, and parental enjoyment.

(6) Gender and work/life balance

Inequalities surrounding gender have come to the fore recently, particularly in respect of the gender pay gap. Following on from our cross-national, cross-time flagship analyses of gendered trends in time use and their implications for human capital formation (Sullivan, Gershuny and Robinson 2018), we plan to bring a sequential dimension to the analysis of work-family balance by combining time use diary data and the 7-day work schedule of the HETUS protocol. These work-schedules enable the comparison of how couples schedule and divide their paid work time across the week and weekends with their scheduling and division of domestic work and care on their diary days, introducing a more finely-grained level of detail into the way in which different couples have divided their domestic work and care time over historical time and across different national contexts.

For example, to what extent do couples substitute for each other's domestic work and care when the other partner is busy with paid work? And do couple members employed for long hours during the week compensate in their domestic work or care time at the weekends? How do they schedule this division of time with their partners? And throughout, how do these parameters vary across countries, and across time? Combining this with the enjoyment field collected in certain diary studies (recent UK, Italy and France HETUS samples) we can also then interrogate how specific work-family balance combinations are associated with each partner's wellbeing.

(7) Eating and exercise

People's attitudes towards *food consumption* is an issue that underlies research on inequalities in eating behaviours. We will be able to show *how* eating is related to social inequalities by analysing how the different classes eat – that is for how long, how often, and in what social and spatial settings they eat. Eating behaviours – their timing, frequency and context - through the day clearly matter not only for individual nutritional health, but also for the quality of social and, in particular, family relations. Class-related values and priorities regarding home and family life have been shown to either promote healthy eating patterns or the opposite—sometimes demotivating individuals from eating regular meals, especially in a situation of time shortage. Class differences in eating behaviours, both its timing, social context and enjoyment, also have an important health-related component, contributing to our understanding of why obesity rates are higher among particular social groups. Our research in this area will focus on historical and cross-national variation in these forms of social differentiation.

Plainly, physical exercise is the complement to food consumption in the causation of what some refer to as an epidemic of obesity in the developed world. The public health literature establishes clear epidemiological and clinical associations between lack of exercise, or sedentary behaviours, and morbidity and mortality.

However, the measures of the incidence and duration of physical activity used in this work have serious shortcomings. We now propose two new strands of work on PA:

- Improving attributions of metabolic levels associated with time diary activities (METs). We will initially use CTUR's two specialised studies combining diary and simultaneous accelerometry measures, as a basis for updating the standard estimates of METs according to the evidence from survey samples. This secondary analysis over the next 18 months will be used as the basis for an application for a larger, more general, diary-plus-motion-sensor study.
- Analysing "active travel". After work, the second largest contribution to physical exercise across the population is the active (walking, cycling) component of travel for various purposes. We are joining with transport researchers in the UWA Business School to improve methods of estimating and promoting active travel.

(8) Sleep: trends and circumstances

Time use diaries reveal patterns of *sleep* across the population, and its correlates in terms of respondents' daytime activities and their material, social and economic circumstances. CTUR's cross-national and historical data collection has the potential to reveal historical changes and cross-national differences in patterns of sleep that are invisible to any other evidence-base.

We will now resume work attaching specific local weather and hours-of-daylight to each of the individual day-records in the surveys which combine records of the specific dates with sufficiently detailed location information (available in the more recent studies in our collection), to provide a basis for estimating the influence on activity choices and sequencing. This will also allow us to investigate a hypothesis that "24/7 society" changes (in shop and other services opening hours, as well as down-loadable audio and video materials) have led to a temporal desynchonization of sleep timing across the day and week.

(9) Daily/weekly rhythms: work and leisure

Historical trends in measures of free time indicate that average weekly free time in the majority of Western societies has increased somewhat over the longer term. However, less consideration has been paid to the *distributions* of free time, and of time poverty, as social inequality resulting principally from the interaction of work (remunerated and non-remunerated) and family characteristics.

A sustained deficit of acceptable rest and personal care has negative consequences for human wellbeing. The absence of disposable time inhibits workers' abilities to invest in human capital, build social networks, spend time with families and friend, and take part in cultural and political activities. Time poverty is related to income disparities in education, employment status, household characteristics etc. Low-paid workers face a more severe work– leisure trade-off. Because of their low earnings, they must often work long hours to generate enough income and are also more constrained in their ability to outsource housework and care services to the market. On the other hand, workers with high earnings may *also* choose to work long hours because being 'busy' is now a positive and privileged position occupied by high status individuals. CTUR Research in this area will focus on: Reconceptualizing the time poverty measure. studying the interaction of time- and income-poverty And the relation between time poverty and time stress.

(10) Work, ICT and wellbeing

With more data being collected on enjoyment and wellbeing as part of time diaries, it is now possible to directly measure eudaemonic wellbeing at work almost in real time. This is important since, until recently, job satisfaction was the only indicator allowing us to measure how happy people were with their jobs in large scale surveys. Whilst research is already taking place within CTUR on average daily enjoyment at work in the UK, the new study will explore determinants of *daily* variations of enjoyment at work across occupations. (A collaboration with T Chandola, Manchester)

Initial analysis has shown that there is no *simple* link between time using IT devices, and either time pressure or subjective wellbeing. But our diary-based enjoyment data shows that the subjective experience of time-use varies substantially by activity type (e.g. work shows up in the diary-based enjoyment accounts as less enjoyable than leisure). So we investigate *interactions*, the extent to which the use of mobile devices *moderates* the connection between different activities and the subjective experience of time use. This project addresses the following questions:

- Does using ICT when working make time more or less enjoyable?
- Does ICT use during leisure activities affect the subjective experience of this time?
- Is there a negative association between ICT, and time pressure and wellbeing indicators?

Attention will focus on possible interactions with gender and social class. The project uses data from UK HETUS 2015, the time-diary data from the Understanding Society Innovation Panel, and data from the Nine-Country Study, thereby providing cross-sectional, longitudinal, and cross-national perspectives on these questions.