

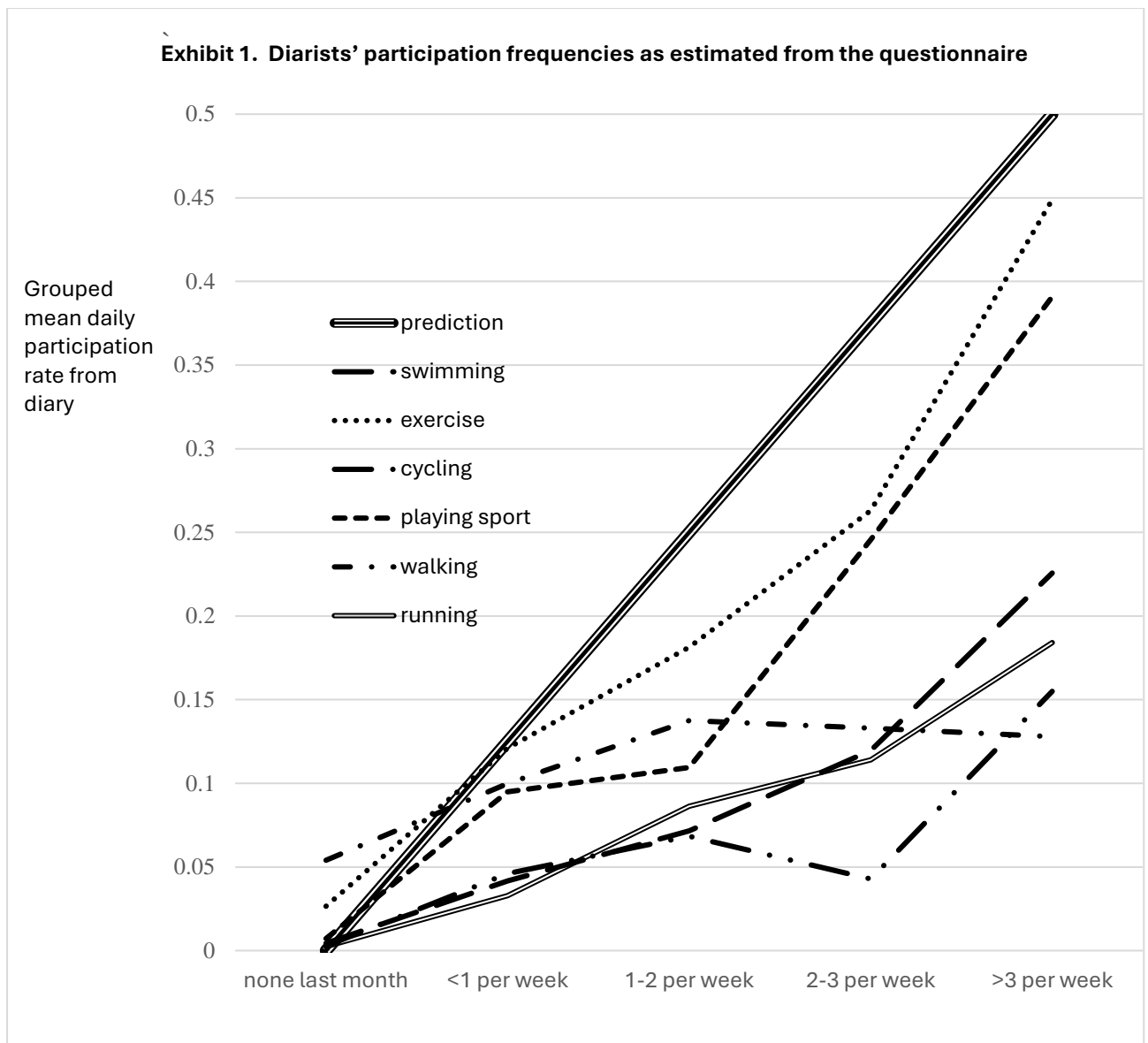
## The need for time-use diary (TUD) data

There's to my mind an overwhelmingly strong case for making time-use data collection a centrepiece of any system of social and economic statistics. It makes important contributions to (at least) seven areas of public policy:

1. **Tracking innovative economic processes.** Technical change moves work both into and out of the money economy ("labour externalisation vs internalisation"); both paid and unpaid work appear in time accounts.
2. **Estimating extended economic output.** TUD's provide a basis for quantifying and valuing non-money output, so this can be included alongside conventional GNP
3. **Measuring subjective wellbeing.** TUDs allow estimates of contributions of successive episodes of experience to instantaneous enjoyment (Kahneman et al 2004, Krueger et al 2009).
4. **Estimating health consequences of daily activities.** For example exercise levels (metabolic equivalents—METs) can also be estimated from diary data (Tudor-Locke et al 2009), infection risks of daily activity patterns may be inferred by combining TUD evidence of activity, location and co-presence (Gershuny et al 2021).
5. **Human capital formation.** Embodied capitals are accumulated in through activity (Bourdieu 1985). TUDs used to estimate rates and processes of accumulation of human capabilities.
6. **Distributional (in)equalities across the population.** The TUD's comprehensive coverage allows analysis of (particularly gender) differentials in unpaid work and consumption.
7. **Predicting environmental sustainability.** Populations' activity patterns have "footprints" in the form of energy and other material requirements, and in terms of pollution and other consequences. TUDs are potentially inputs to scenario modelling of alternative futures.

There are various methods for collecting time-use data. Questionnaire items (How much time do you spend doing...? How often do you...?) These have problems: generally people don't know the answers to them. And not knowing, they tend to invent answers that correspond to what they think may show their daily activities in a good light: "desirability bias": drinking is underestimated, purposive exercise is over-estimated. There's substantial literature on this misreporting of time and participation rates—both from research methods specialists and public health, providers who use these sorts of data.

Here (Exhibit 1)s one example from a random sample of single day diaries we collected in 2015: we asked people how frequently they engaged in various activities over the last 4 weeks, then plotted the answers against the occurrence of those activities in the randomly sampled days. Of course we'd expect that, for example, those who answered "twice per month" should report participating in around 7% of days, while those who report "once per week" should actually report this on 14% of days—corresponding to the 45-degree line in Fig 1 (from a paper in **Sociological Methodology** 2021 by members of the Centre for Time Use Research) . As we see in these exercise-related questions—in all the cases the actual participation rates plotted on the y-axis lie well below the predicted values from the so-called "stylised" questionnaire-based answers. The generality of the results reported in this literature suggest that for "desirable" activities, questionnaire answers produce something like double the level of activity reported in diaries.

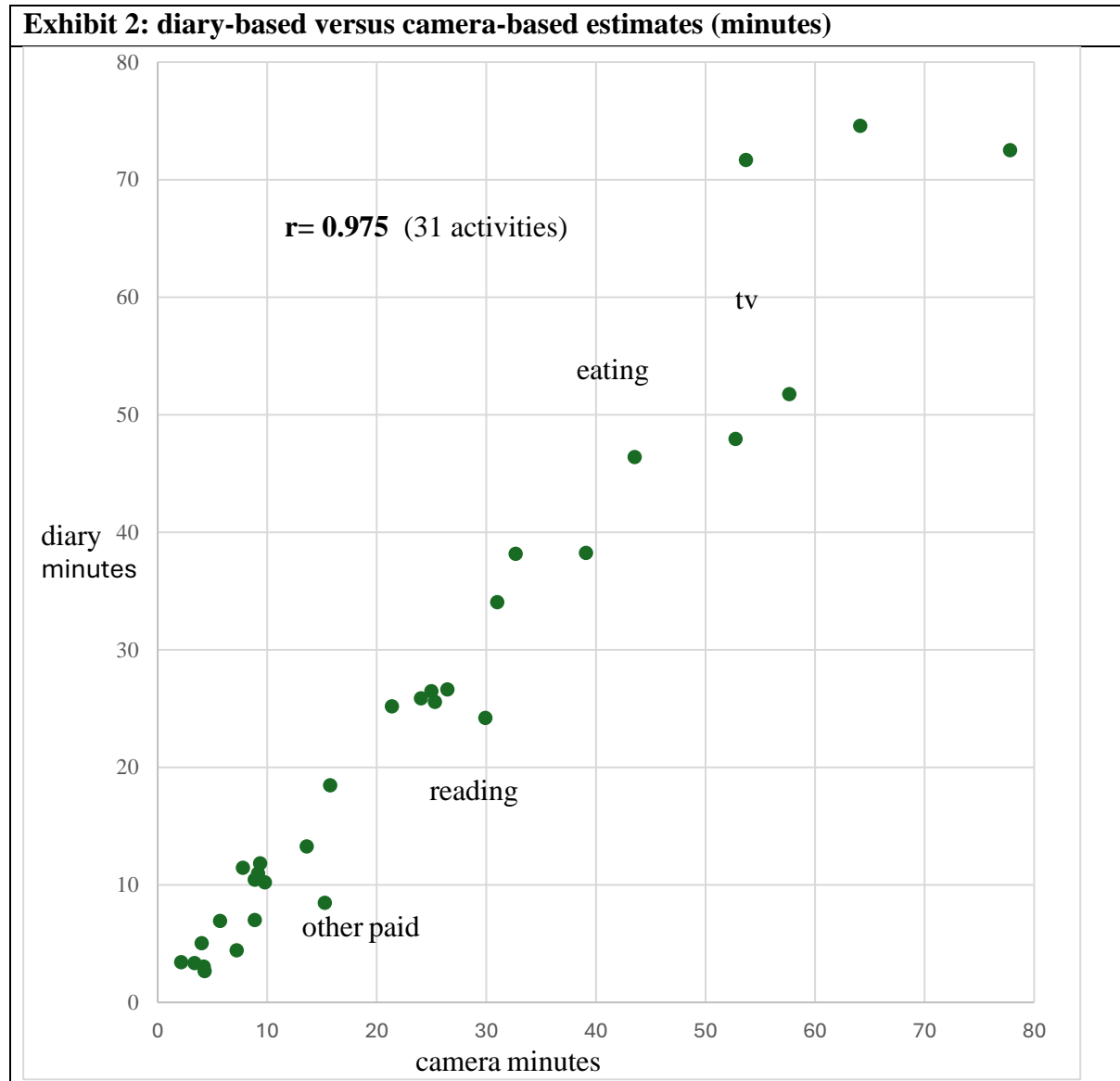


### Why should we believe the diaries?

First: There are a priori grounds for this. In most cases there's no particular reason that people should actually know how much time they devote to a set of activity categories invented by social statisticians. But, contrastingly, there's a sort of natural training programme in recalling recent sequences of daily events! Parents ask children, "what did you do today?" wives ask husbands and vice versa—and it's a small step from this to the sort of "woke up at 7.15, then bathed, at 7.30 had breakfast while reading the newspaper and left for work at 8am" -type of account, which constitutes the day diary.

Secondly, we can test this empirically by monitoring behaviour sequences through the day, and comparing the results with independently collected yesterday diaries. For example Exhibit 2 compares a set of 130 "yesterday diaries" with the independently coded results from the body cameras worn by the diary respondents on the previous day. The same **Sociological Methodology** paper shows not just the correspondence of mean time use estimates from the diaries and cameras (and also

accelerometers)—but also strong associations between the same individual’s diary and camera sequences).



The now well-settled conclusion is that diaries provide the best methodology for collecting general purpose time-use evidence.

Time-use diary samples have a long history. I’ll focus here on rich country developments—but in parallel to what follows is a very substantial Third World approach focussed on subsistence labour, share-cropping and the like, culminating in the ICATUS activity classification.)

In the 1910s US and UK, time-diary samples were collected for specific social groups—the best documented is a 1913 Fabian study “Round about a Pound a week” drawing on a small sample of London working class women by Maud Pember Reeves. In the 1920s, a Russian study (Strumilin 1927) was collected as a contribution to Lenin’s New Economic Policy. The US the Department of Agriculture organised a of sample of farm, town and eventually elite college women—remarkably,

around 7000 days of diary records survive for modern analysis. Through the 1930s to the 1950s we find a number of national scale studies collected at first by radio broadcasters (the BBC starting in 1938) and then commercial television channels (presumably as the basis for advertising sales). In the mid-1960s UNESCO funded the first multinational comparative study led by the Hungarian sociologist Sandor Szalai including 12 countries. This established a basic design—diary instruments with four independently timed fields for, respectively, , primary and secondary activities, location and copresence—which provided a model for many studies over the following three decades. From the mid-1990 Eurostat established the Harmonised European Time Use Study (HETUS) which extended the Szalai design, some countries adding an IT device-use field and an instantaneous enjoyment field to the original four. The HETUS guidelines (most recent revision 2018) is widely considered to represent the leading methodology and is used by the majority of countries in the European Union.

**Exhibit 3: Hierarchical account of child-related activity** (Minutes/day, UK Adults, ELiDDI 2023)

primary & secondary activity & all other child (<12) -related

	primary alone	secondary childcare	child co-presence	row total
computing	27	0	3	30
sleep, rest, personal care	481	5	78	564
eat, drink	60	2	11	72
paid work @ workplace	121	0	6	128
paid work @ home	52	1	5	59
unpaid work & education	107	4	16	126
shopping @ shops	20	1	2	22
shopping @ home	6	0	1	6
out-home leisure	113	3	6	122
home leisure	175	3	29	207
all travel	52	2	8	62
childcare	30	10		39
missing	3	0	1	3
column total	1246	31	166	1440

**Why collect multiple independently timed diary fields?**

It is worth briefly explaining the prime importance of collecting multiple independently timed diary fields. This relates to the contribution of a general-purpose time use study to the wide range of different applications with which I started this talk. Consider just one application: to the estimation of the extent and value of childcare.

Exhibit 3 (data from a 2023 HETUS-type UK national sample) provides a complex hierarchical summary of all child-care-related activity. The ‘primary activity column shows the total minutes in 12 summary activities (aggregated from the original 120 activity types in this study) where neither the secondary activity diary record nor the “others present” diary record have any mention of children. Of the 1246 minutes in this column, just 30 involve childcare. If the diary only collects primary activity, this category, by default, becomes the headline estimate of childcare.

The “secondary childcare” column provides the total minutes declared by diarists as childcare which happened simultaneously with each of the primary activities. Thus, in addition to the 481 minutes spent in sleep etc with no mention of children, there is an additional 5 minutes spent (presumably) resting while *also* undertaking some childcare activity, 2 minutes of secondary childcare while *also*

eating and drinking, and so on. Note that there's 10 minutes engaged in a second or further childcare task while also undertaking some other primary childcare-type activity. The 31-minute total of secondary childcare time more than doubles the headline childcare total.

The third substantive column gives the total time in each primary or secondary activity that declares a child to be co-present. Thus, in addition to the 486 minutes of primary or secondary "sleep, rest, personal care" with no child-copresence, is an *additional* 78 minutes devoted to these activities while children are declared to be co-present. These in total add a further 166 minutes to the child-related total.

I would certainly not propose that the three yellow-shaded cells in Exhibit 3 should be summed to report a 227-minute total of childcare. Childcare as a secondary activity is certainly quite different to the primary sole activity childcare shown in the first column. The economic value of a minute of secondary childcare is probably only a fraction of that of primary sole childcare. And certainly the two and three-quarter hours of child-co-presence in the third column has a quite different nature. But this other child-related activity is nevertheless of great social and economic importance: it represents parents' consciousness of their custodial responsibility for their children. If parents did not feel this responsibility, the society would need some alternative means of ensuring the children's security.

If the multiple fields were not recorded separately, these additional amounts of childcare beyond the primary would simply be invisible. Certainly it would be *possible* to decide that childcare is the main interest and instruct the diarists to over-write non-childcare primary activities with secondary childcare or child copresence wherever they occur. But then this would cease to be a general time use survey and become instead a childcare survey...which would mean in turn we could not use it to investigate, say, the use of IT equipment in shopping or healthcare, or the occurrence of snacking while watching television, or the changing physical location of paid work—or any of the other multitude of potential applications of this data.

### **Why are time use surveys not used more frequently by National Statistical Institutes?**

Simply: the traditional own-words pen-and-paper surveys are hugely costly—largely because of the cost of coding up the diarists' entries into a standard classification system.

But no longer. We can now collect diaries online. For example, the Extended Light Diary Digital Instrument (ELiDDI) the source of Exhibit 3, deploys nested drop-down menus to fill the diary fields, with respondents clicking on the relevant categories, and clicking again to indicate the start and end points of particular states, with, where needed, multiply nested menus to allow as much detail in the classifications as may be needed to provide, for example the 120 activity categories required for compliance with the current HETUS guidelines.

(NOW SHOW Diary\_example\_v2. mp4 – takes 2 minutes.)