Time use diary design for our times: general principles for online design

Oriel Sullivan, Jonathan Gershuny, Juana Lamote de Grignon-Perez

Centre for Time Use Research

University College London

Back to first principles: Outline

- What is time use diary data used for?
- What principles underpin the historical development of state-of-the-art pen and paper time use diaries?
- What suggestions have been made to simplify TUD collection?
- What suggestions have been made to digitalise TUD collection?
- Can we combine these features: principles, simplification and digitisation?

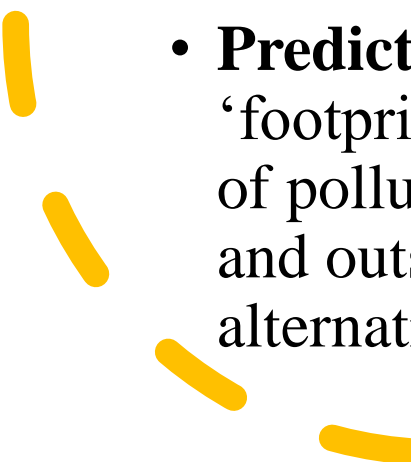# The need for full, general purpose, time use diary data

- Time use diary data is increasingly recognised as a crucial part of the tool-kit of researchers and analysts across a wide and growing range of research and policy-related applications

- Full, general purpose, time use diary data has been shown to make important contributions to (at least) five areas of public policy:

Policy applications I: direct measures

- **Estimating extended economic output and tracking economic processes.** Technological change moves work both into and out of the money economy; paid and unpaid and care work appear together in time diary accounts. Time use data therefore provides a basis for quantifying and valuing non-money output, to be included alongside conventional GNP (*nb SDG 5.4 'recognize and value unpaid care and domestic work'*)

- **Distributional (in)equalities and human capital formation.** The time-use diary's comprehensive coverage allows analysis of (particularly gender) differentials in all work and consumption time *(SDG 5.4 aims to achieve gender equality and empower women and girls by addressing the unequal distribution of unpaid care and domestic work)*

- **Estimates of the contribution of experienced time to instantaneous wellbeing.** Time use diary data including an affective field recording enjoyment allows estimation of this measure of social progress (Kahneman et al 2004, Krueger et al 2009, Stiglitz, Sen and Fitoussi 2009).

Policy applications II: the use of rates with TU data

- **Estimating health consequences of daily activities.** As well as direct information on sleep and eating frequency and duration, exercise levels (metabolic equivalents) can be applied to time-use data on activities; and infection risks of daily activity patterns may be estimated by combining evidence of activity, location and co-presence (Sullivan et al 2021).

- **Predicting environmental sustainability**. Populations' activity patterns have 'footprints' in the form of energy and other material requirements, and in terms of pollution. Time-use data enables the capturing of such 'footprints' both inside and outside the home, providing potential inputs to scenario modelling of alternative futures (Jiang, Motose and Ihara 2022; Madsen and Weidema 2023).

For all these, and a growing number of other applications we need good, general-purpose, time use data

First principles

- Decades of design development across several continents underpin the most recent general purpose pen and paper diaries – the full Eurostat Harmonised European Time Use Survey (HETUS) diary is widely regarded as a 'gold standard' pen and paper template……

Completed Diary: the Harmonised European Time Use Survey diary (HETUS)

Day 1 Time: 7am – 10am Morning												
Time: 7am–10am Morning (am)	**What were you doing?** Please write down one main activity.	**If you did something else at the same time, what else did you do?**	**Did you use a smartphone tablet, or computer?**	**Where were you?** Location, or mode of transport	Alone	Spouse / partner	Mother	Father	Child aged 0-7	Other person	Others you know	**How much did you enjoy this time?** 1 =not at all 7 =very much
7am-7.10	Woke up the children		☐	At home	☐	☐	☐	☐	▮	☐	☐	5
7.10-7.20	Had breakfast	checked emails	☑		☐	▮	☐	☐	▮	☐	☐	6
7.20-7.30	" "	Talked with my family	☐		☐	▮	☐	☐	▮	☐	☐	5
7.30-7.40	Cleared the table	Listened to the radio	▮		☐	▮	☐	☐	☐	☐	☐	4
7.40-7.50	↓	↓	▮		☑	☐	☐	☐	☐	☐	☐	
7.50-8am	Helped the children dressing	Talked with my children	☐		☐	☐	☐	☐	▮	☐	☐	
8am-8.10	" "	↓	☐		☐	☐	☐	☐	▮	☐	☐	
8.10-8.20	Went to the day care centre		☐	on foot	☐	☐	☐	☐	▮	☐	☐	1

Were you alone or with somebody you know? Mark all relevant boxes — People who live with you

Use an arrow or quote marks to record that an activity lasted longer than 10 minutes.

4 design principles underpin this design:

1. **Multiple fields.** **The instrument should collect**, in addition to a background questionnaire, **diary information on activities** (primary and secondary), **locations** (places or transport modes), **copresence** (multiple codes), **ICT devices** used (multiple codes) and **affective responses** to current activities.

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2. **Continuous fields spanning the entire diary day.** Characteristics which may apply to all activities (eg co-presence) should be collected as complete diary fields. Continuous fields provide flexibility for both collection and analysis.
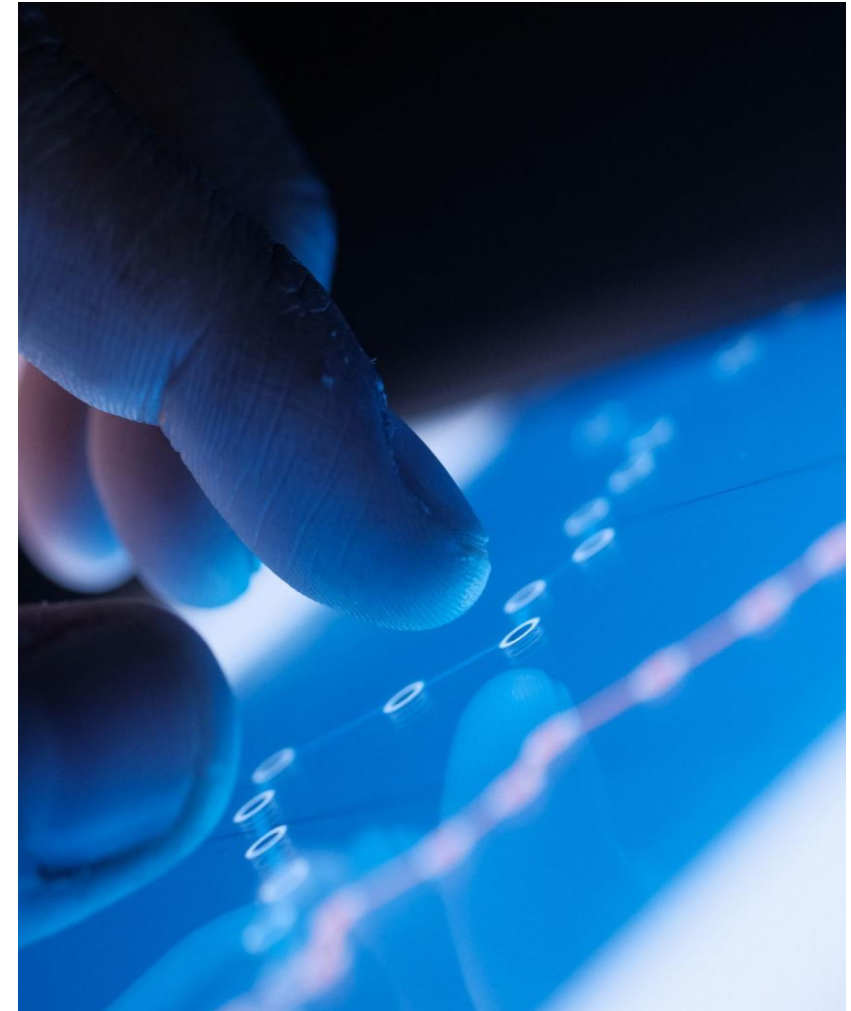
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4. **Visual interface to aid recall. Diary instruments should reveal all diary fields (or as many as possible) throughout the day**. Decades of design work on time use diaries have established the principle of a *visual presentation to help respondents to envisage and recall their entire day.*

Time use diary design for our times?

- Life is inexorably moving online; online surveys and smartphone apps have been increasingly prominent. For reasons of cost and convenience this is undoubtedly the future of time use diary data collection.

- Problem: many online diaries are still designed in 'survey-style' format:

  1) – doesn't meet principle of independent fields

  2) – burdensome for respondents; result has been cutting back on the number of diary fields

- Can we do better by going back to design first principles?

The 'light diary' design: a simplifying solution?
(Note the visual interface)

Activity groups	Activity codes and descriptions (Also see notes on right hand page)		Early morning				Morning				
			4am	5am	6am	7am	8am	9am	10am	11am	12pm
Personal care	1	Sleeping	1	X X X X X X X X							
	2	Resting (doing nothing, 'time out')	2								
	3	Washing, dressing/undressing, etc	3		X X X						
Eating, drinking	4	Eating or drinking/ having a meal (at home)	4			X X				X X X	X X
Housework and other household tasks	5	Preparing food and drinks, cooking, washing up	5								
	6	Cleaning, tidying house	6								
	7	Washing, ironing or mending clothes etc	7								
	8	Maintenance of house, DIY, gardening	8								
	9	Other household tasks	9								
Travel	10	Travelling	10			X X X X				
	10a	How you travelled (enter letter - see right page)	10a			W T T T				
Work for paid job	11	Work for job (include paid and unpaid overtime and work brought home)	11				X X X X X X X X X X X X X X X X X X	X X X X X X X X X	X X X
Education and courses	12	Formal education	12								
	13	Recreational courses and study	13								
Voluntary work	14	Voluntary work for or on behalf of an organisation, charity or sports club	14								

International organisation recommendations for TUD collection in LMICs:

- **UN Women (CEGS) 2021**

- ==Light time use diary==, 30-35 ICATUS activities + stylized questions for 2ndary/3rdary activities and child supervision (Charmes, 2021)

- **World Bank (Development Research Group) 2022**

- ==Light time use diary== with 25-30 ICATUS activities + stylized questions (Beegle, 2022)

- **UNSD 2024**

- ‘Guide to Producing Statistics on Time Use Module’ (UNSD 2024). ==Light time use diary== with c25 ICATUS activities + stylized questions on supervisory childcare

- **ILO (Department of Statistics) 2023**

- The TUS add-on module on LFS recommendations are aligned with the UNSD guidelines - a hybrid approach where a full time use survey not feasible i.e. ==interview-collected light time use diaries + stylized questions==

  (ILO 'Own-use provision of services: measurement guide', 2023)

However:

These recommendations are not for use of the visual light diary interface, but simply refer to the collection of a simplified (ie limited) range of activities using a survey-style approach

Therefore, they do not meet the principles of multiple continuous independent diary fields with a visual interface

Combining design principles using digitisation:
the Extended Light Digital Diary Instrument (ELiDDI)

- Using digital technology we adapted the light diary visual design to collect the same range of information as the HETUS diary i.e. multiple, continuous independent diary fields with a visual, diary day, interface

- A HETUS-style nationally representative survey of the UK was run in April 2023 using the ELiDDI (conducted by the National Centre for Social Research)

- Average completion time was 26 minutes (excluding very long and very short completion times)

Completed ELiDDI diary day: wide screen
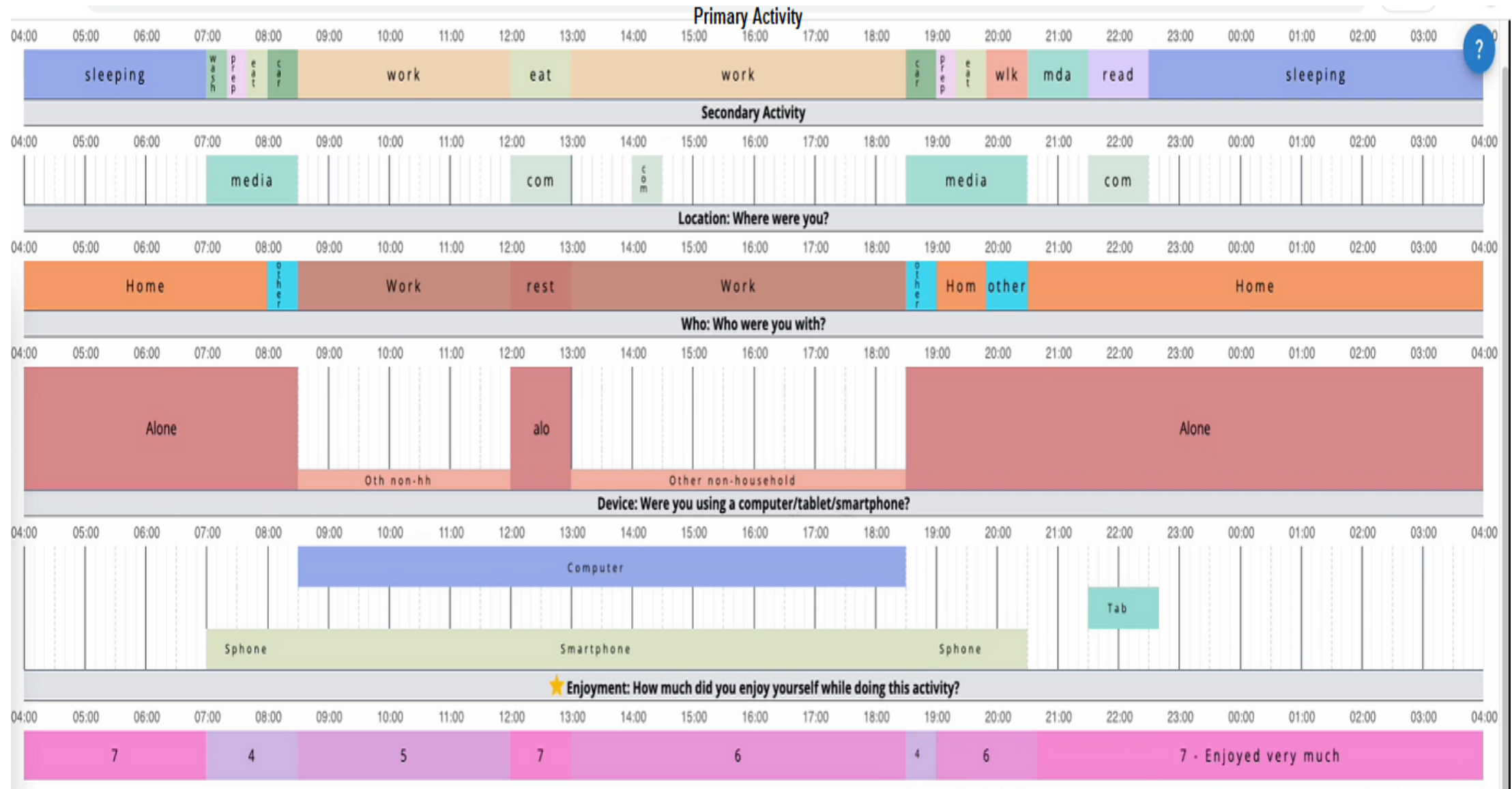
Filling in the primary activity: wide screen

- ELiDDI retains the visual simplicity of the 'light diary' design, but uses online functionality to offer multiple continuous diary fields, with extended lists of activities via drop-down menus (plus the option of additional pop-up boxes including questions about specific activities)

- The co-presence field, for example, in addition to providing full information on child co-presence, can be used to ask additional questions about the nature of particular activities done in the co-presence of children (i.e. the nature of care responsibilities)

- The full diary day is visualised as a whole (aiding recall)

# Completed ELiDDI diary day: vertical screen for smartphones
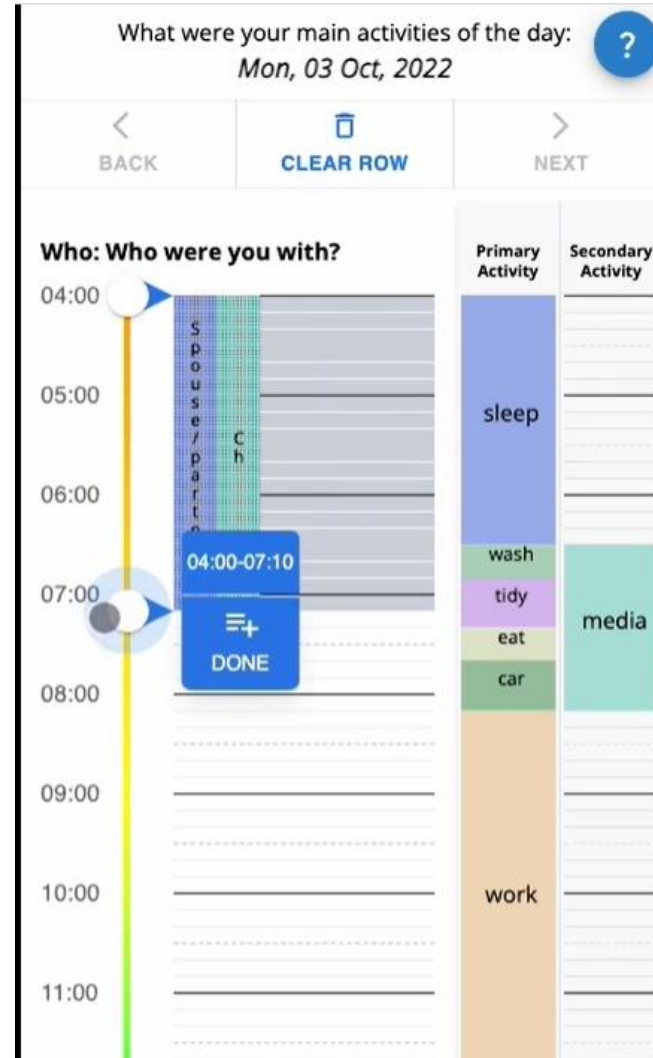
The importance of the principles of multiple, independent, and continuous diary fields: the example of child care time

Child-related time (Minutes/day, UK Adults, ELiDDI, March-April 2023); primary & secondary activity & child (<12) co-presence

	Primary activity	Secondary childcare	Child co-presence	Row total	Child co-presence as % of primary time
sleep, rest, personal care	481	5	78	564	16%
eat, drink	60	2	11	72	18%
paid work @ workplace	121	0	6	128	5%
paid work @ home	52	1	5	59	10%
unpaid work & education	107	4	16	126	15%
shopping @ shops	20	1	2	22	10%
shopping @ home	6	0	1	6	16%
computing	27	0	3	30	11%
out-home leisure	113	3	6	122	5%
home leisure	175	3	29	207	17%
all travel	52	2	8	62	16%
childcare	30	10		39	(100%)
missing	3	0	1	3	
Column total	1246	31	166	1440	

Child-related time: Primary and secondary childcare and child co-presence across the UK pandemic (fathers and mothers, UK CTUR 6-wave pandemic TUS).
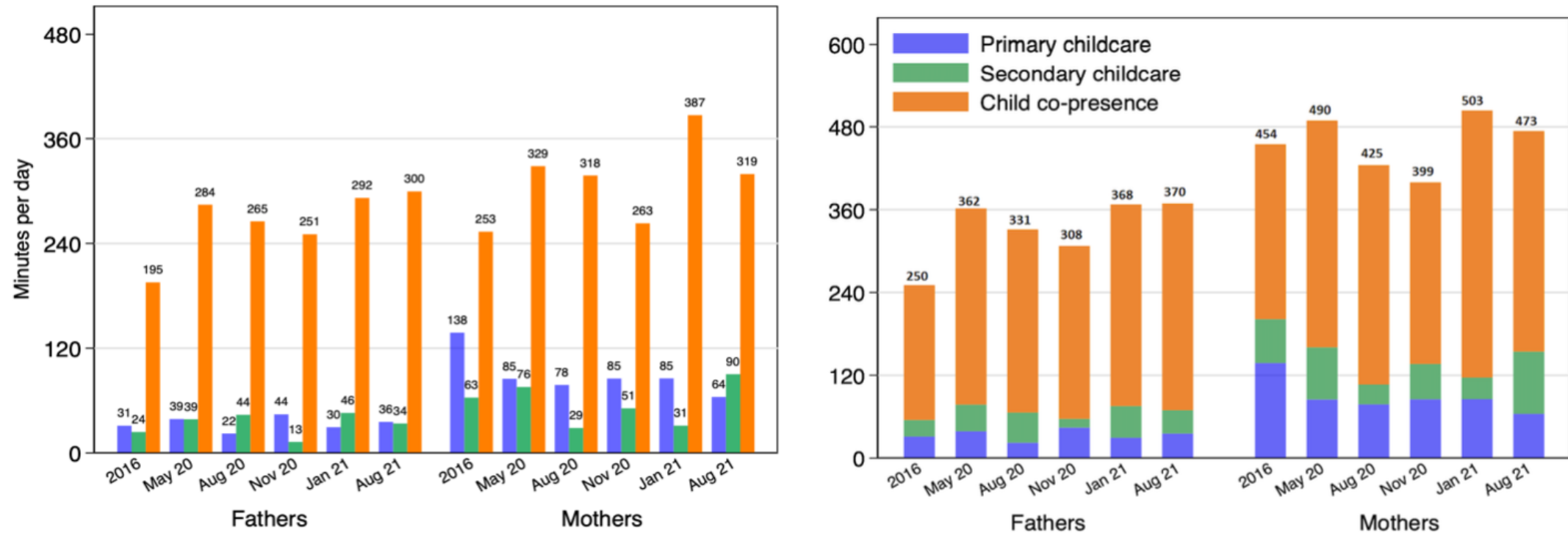
The figure shows changes in childcare time (mins per day) across 6 waves of the UK CTUR pandemic survey data for mothers and fathers. The sample of parents is men (945) and women (1,039) up to 55 years old living with children (N=1,984 quite homogeneously distributed across waves).

ELiDDI design extension: CATI/CAPI format

- Not everyone will be able to access an online time use diary, particularly in LMICs, so a CATI version of the ELiDDI diary was also used, in which phone interviewers record the diary day in the same way as online respondents (10% of respondents)

- In our nationally representative UK survey we found that the CATI version information was as good quality as the online version, with slightly higher response rates. It was also regarded positively by the phone interviewers, who found it easy to understand and complete.

- The CATI version of the ELiDDI took on average 2 more minutes to complete than the web version : approximately 28 minutes vs approximately 26 minutes (excluding very long and very short completion times).

- **The CATI format would be transposable and equally applicable to a CAPI design, with the advantage that respondent and interviewer could look together at the visual interface showing the diary day………………**

Click and drag accessibility?

- This technology is not accessible to everyone, and is listed as level AA (webpages should conform) in the latest Web Content Accessibility Guidelines (WCAG).

- However, accessibility conformity can be provided with use of zoom tools for the timeline, and clicking at the start and end of an activity, rather than dragging (ie click-click rather than click and drag)

- In addition, and at least as important, those not able to access the online tool at all will always need alternative options (e.g. CATI)

Overview: Back to first principles

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Summary points: ELiDDI

The ELiDDI design mimics the visual intuitiveness and simplicity of the light diary design, but includes multiple fields of a full diary

The digital functionality enables expansion of the light diary via dropdown menus to the full HETUS activity classification, while maintaining the simple and intuitive light diary visuals

This makes it analogous both visually and in terms of functionality to the gold-standard pen and paper design, maintaining the built-in independence of multiple diary fields.

ELiDDI instruction video links – wide and vertical versions:

- https://d2n88fe5uqdqty.cloudfront.net/rnd/projects/caddi/2022/assets/Desktop_short_v7_x264.mp4

- https://d2n88fe5uqdqty.cloudfront.net/rnd/projects/caddi/2022/assets/Mobile_cut_v2_x264.mp4

CTUR working paper:

- 'Time use diary design for our times: general principles for online design'

  Available from timeuse.org

Thank you

ELiDDI HETUS-style survey (parallel run with the UK OTUS) – run in April 2023

- ELiDDI diary tool with full HETUS activity classification and diary fields

- Individual questionnaire completion + 2 randomly allocated diary days

- Phone completion by interviewer offered to 'hard to reach' population (10% of sample)

- N= 3874 diary days collected from national population-representative sample of individuals

Example of a survey-style diary: The Millenium Cohort Study App: UK 2014

What time did you finish sleeping and resting?

06   58
07   59
08   **00**
09   01
10   02

≡   <   NEXT   >

Where were you while you were sleeping and resting between 4:00am and 08:00?

Please select one option only

At Home

Indoors, but not at home

Outdoors

Don't want to answer

☰   ‹   NEXT   ›

How much did you like sleeping and resting between 4:00am and 08:00?

Please select one option only

1 - Strongly liked

2 - Liked

3 - Neither liked nor disliked

4 - Disliked

⌄

5 - Strongly disliked

☰   ‹   NEXT   ›

Next activity……….and so on through 24 hours