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Non-technical summary

Time diary data provide a comprehensive and sequential account of daily life and are increasingly used for a wide range of analytic purposes, such as the production of national accounts of wellbeing and the analysis of health-related behaviours. Recent years have witnessed an increasing interest in the collection of time diaries in longitudinal social surveys, as diary data can be used alongside longitudinal data to reveal associations between behaviour patterns and long-term outcomes. This longitudinal use of time diaries accompanies a steady growth of cross-sectional time-use surveys, resulting in a broad pool of data from a large number of countries. The time diary methodology has been shown to produce the most accurate and reliable measures of everyday activities. However, there are particular challenges surrounding the administration of time diaries in large-scale social surveys, namely the relatively high respondent burden of diary completion and the considerable post-fieldwork coding costs of paper-administered diaries.

The UK Millennium Cohort Study (MCS) is a large-scale longitudinal survey following the lives of 19,000 children born between 2000 and 2002 in the UK. The inclusion of a time diary ("MCS time-use record") in the sixth wave of MCS will provide unique information on daily life in early adolescence (age 14), thereby increasing the utility of MCS as a major longitudinal resource. Respondents are asked to fill in a 24-hour time diary for two randomly selected days, a weekday and a weekend day. In order to minimise respondent burden, the MCS diary provides 44 age-appropriate activity codes that cohort members can use to describe their time allocation during the two designated days. The diary also collects information on location, enjoyment/affect, and whom the respondent was with.

Instead of solely relying on conventional paper-administered time diaries, the MCS follows a highly innovative mixed-mode data collection approach: Three instruments, a web-administered diary, a smartphone app, and a paper diary, were developed. Respondents are asked to choose between the web and app mode during the interviewer visit. Paper diaries are only offered to those who do not have access to a personal computer or a smartphone, as well as those who refuse to use the web/app modes. The web and app instruments allow the use of soft and hard checks in order to reduce missing data and to improve overall data quality, leading to simplified post-fieldwork data coding procedures. The MCS approach is therefore particularly important for the future of time-use research, opening up avenues for methodological innovation and for the use of new technologies for large-scale time diary data collection.

The extensive development process included cognitive testing of activity codes as well as two rounds of usability testing for the three data collection instruments (web, app, paper). Following this, the pilot survey and the dress rehearsal offered important insights surrounding the administration of the time diary within the overall survey, as well as mode take-up, response rate, and data quality across the three modes.

This paper provides an overview of the research design and content of the MCS time diary and discusses findings from different stages of the instrument development,

offering a useful resource for other studies interested in administering time diaries and/or in using new technologies for the collection of time-use data.

Abstract

Time diary data provide a comprehensive and sequential account of daily life and are used for a wide range of analytic purposes. Recent years have witnessed a steady growth of large-scale time diary data collection in cross-sectional as well as longitudinal surveys, driven by the increased research interest in population activity patterns and their relationship with long-term outcomes. The majority of social surveys collect paper-administered diaries, which have been shown to produce the most accurate and reliable daily activity estimates but present challenges relating to respondent burden and administration costs. The use of new technologies for data collection could address these weaknesses by providing less burdensome diary instruments, improving data quality, and simplifying post-fieldwork data coding costs. The UK Millennium Cohort Study is the first large-scale social survey to use a highly innovative mixed-mode approach for the collection of pre-coded time diaries among adolescents. Rather than relying solely on conventional paper-administered diaries, the MCS developed innovative methodologies for time-use research: A web-administered diary, a smartphone time-use app, and a paper-administered diary were specifically designed for the MCS Age 14 Survey. Cohort members are asked to choose between the web and app modes. The paper diary is only offered to those who do not have access to a smartphone or a personal computer, and to those who refuse to use the web/app modes. This paper focuses on issues surrounding research design, instrument development, and implementation. We discuss the construction of an activity code scheme relevant for young people growing up in contemporary Britain, and present the three time diary instruments. Findings from the pilot survey and the dress rehearsal are also discussed, including mode take-up, response rate, and data quality.

Keywords: longitudinal; methodology; Millennium Cohort Study; mixed-mode; new technologies; time diary surveys; time-use record; time-use research

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Introduction

Time diary data provide a comprehensive and sequential account of daily life and are increasingly used for a wide range of analytic purposes, such as the production of national accounts of wellbeing and the analysis of health-related behaviours. Recent years have witnessed an increasing interest in the collection of time diaries in longitudinal social surveys, as diary data can be used alongside longitudinal data to reveal associations between behaviour patterns and long-term outcomes. However, there are particular challenges surrounding the administration of time diaries in large-scale social surveys, namely the relatively high respondent burden of diary completion and the considerable post-fieldwork coding costs of paper-administered diaries. This paper documents the development of three time use diary instruments to collect time-use data from adolescents – namely 14 year old study members of the Millennium Cohort Study (MCS).

MCS is a large-scale multidisciplinary cohort study following over 19,000 children born between 2000 and 2002 in the UK. The data collection for the study takes place in the homes of cohort members and involves face-to-face interviews with multiple informants in each household. Five survey waves have been completed so far: at the ages of nine months (2001/2), three years (2003/2004), five years (2006), seven years (2008), and most recently at age 11 (2012). The MCS is based at the Centre for Longitudinal Studies (CLS), and the data collection is competitively tendered and sub-contracted to a fieldwork agency in each wave of data collection. The sixth MCS Survey is conducted by Ipsos MORI, and is in the field in 2015, surveying cohort members at age 14. This paper focuses on the MCS6 time-use record[1]; a new time diary instrument that collects information on cohort members' daily time allocation, and is administered alongside activity monitors (accelerometers).

Earlier MCS survey waves have included time allocation and activity participation questions covering substantive areas of interest such as homework, out-of-school clubs, and leisure activities. However, by focusing on a limited number of pre-specified activities, survey questions only provide a partial picture of everyday life. An alternative method for collecting information on time-use is the time diary, where respondents provide a self-reported sequential description of their activities and their context across the full 24 hours of a day. The time diary technique has been shown to produce more accurate daily activity estimates than survey questions, aiding respondent recall and reducing social desirability bias (UNECE 2013; Robinson 1985; Robinson and Godbey 1999). More importantly, it produces a comprehensive map of daily life, yielding information on participation, duration, timing, and context of daily activities that are often neglected in survey questionnaires, such as sleeping and eating. However, as a result of the high administration and coding costs of the diary instrument, only a few large-scale multidisciplinary social surveys have collected time diaries from their respondents.

[1] The MCS time diary instrument is introduced to cohort members as "time-use record": Findings from qualitative research with fourteen year olds raised concerns about the use of the term "diary", showing that young people associate the term with more personal aspects of their lives. It was decided that the term "record" was more neutral and therefore more appropriate for this age group.

The time diary technique produces a snapshot of daily life, capturing the combinations of behaviours in which populations engage. It does not, however, reveal the full range of activity patterns at the individual level due to its short reference period. When combined with survey questions on time allocation over longer reference periods, time diaries enable the calibration of estimates of individual longer-term time-use estimates (Kan and Gershuny 2009). The time diary element is thus particularly useful for MCS, which provides a longitudinal span of participation questions.

The MCS time diary will produce a representative cross-sectional picture of adolescent daily life in contemporary Britain. More importantly, the instrument will generate unique measures for future longitudinal and life-course research focusing on the potential impact of adolescent behaviour on future life outcomes: sleep patterns during adolescence and adult health, household chores and early emergence of gender roles, and the economic returns of out-of-school leisure activities are only a few examples of the topics that researchers will be able to study with the MCS diary data as the cohort matures. Additionally, the time diary will offer new opportunities for cross-national, cross-cohort comparisons: The Transition to Adulthood and Child Development Supplements of the USA Panel Study of Income Dynamics, Growing Up in Ireland, and the Longitudinal Study of Australian Children have also been collecting time diaries from their cohort members. Finally, the diary data will be particularly important for the study of childhood obesity (Brown et al. 2010; Snell et al. 2007) due to the concurrent collection of objective physical activity data from activity monitors. This will provide will provide MCS users with unique information on the range and intensity of physical activities adolescents engage in, opening up new avenues for future research in this area.

A highly innovative mixed-mode approach has been adopted. Instead of relying exclusively on paper-administered time diaries like earlier studies, the MCS is the first large-scale social survey that makes use of new technologies to collect time diary data, inviting cohort members to choose between a web-administered time diary (web) and a smartphone time-use app (app). Paper-administered (paper) diaries are only offered to those with no access to a personal computer or a smartphone with internet access, and those who refuse to use the web/app modes. The web and app instruments provide opportunities to improve the quality of data and reduce post-fieldwork costs, and are therefore particularly important for the future of time-use data collection.

This working paper provides an overview of the MCS time diary and its development, offering a useful resource for survey practitioners interested in administering time diaries and/or in the use of new technologies for the collection of time diary data. The next section outlines the different stages of research design and instrument development. An overview of the key research design decisions and the time diary content follows before the presentation of the three instruments. The final section focuses on the pilot survey and the dress rehearsal, discussing findings on mode take-up, response rates, and data quality across the three modes.

Background and timeline

The development of the MCS time diary instruments was led by the Centre for Longitudinal Studies (CLS) in collaboration with Ipsos MORI (IM) and the Centre for Time Use Research (CTUR) at the University of Oxford. CLS oversaw and contributed to all aspects of the development. IM produced the time diary instruments and leaflets and carried out the different testing phases. CTUR made a major contribution to the instrument development, regularly advising on key research design and implementation decisions.

The stages of instrument development were:

- March 2013: Consultative conference on the MCS Age 14 Survey, seeking advice from academics, policy makers and other stakeholders on the survey instruments including the time diary and the activity monitor.

- June 2013: A two-day workshop on children's time diaries organized by CLS and CTUR in London, UK. Time-use research and social survey experts were invited to consult on the research design and content of the MCS time diary. Presentations focused on substantive themes that can be analysed with adolescent time diary data, time diaries in longitudinal surveys, web approaches in stand-alone national time-use surveys, and the use of smartphones for time-use data collection.

- September 2013: Research design decisions taken (two surveyed days, "light" pre-coded diary, mixed-mode approach, and provision of a "time-use notebook" as an aide-memoire for web and app users) and activity code scheme produced.

- September–November 2013: First versions of time diary instruments and administration leaflets produced by Ipsos MORI and CLS teams.

- November 2013: Cognitive testing of activity code scheme. Six interviews were conducted with Year 9 (age 13/14) pupils, consisting of an equal split of girls and boys, and a mix of ability levels.

- November-December 2013: Two rounds of usability testing of the three time diary instruments, with participants from a range of ethnic and socio-economic backgrounds. In addition to the main testing of the instruments, feedback was gathered on the "time-use notebook" and information leaflets that were given to participants prior to the testing.

- February 2014: Revised versions of instruments, leaflets, and activity codes finalised. Pilot survey interviewing 50 families begins.

- July–August 2014: Dress rehearsal, including interviews with approximately 100 families.

- October–December 2014: Final changes to the instruments, leaflets and activity codes.

- January 2015: Main stage fieldwork begins. It is anticipated that data collection will be completed in early 2016.

In this paper we present the final versions of the MCS time diary instruments and their content, alongside a discussion of important changes that were made during the development stage.

Research Design

The Age 14 Survey marks an important transition for MCS: cohort members become the main informants of their own lives for the first time. Aside from the main self-completion questionnaire, the Age 14 Survey collects data from cognitive assessments, physical measurements (height, weight, and body fat percentage), saliva collection for DNA extraction, activity monitors, and time diaries. The duration of the interviewer visit is approximately 3 hours. It was therefore considered important to minimise respondent burden in order to ensure longitudinal retention (i.e. that cohort members will remain in the study in the next waves of data collection). Additionally, there was a concern about the challenge of engaging 14 year olds to complete time diaries.[2] These considerations led to the decision to use a "light diary" that provides a pre-determined list of activities (activity code scheme) which respondents use to describe their days. This diary format requires less effort than "heavy" open-ended formats that invite respondents to give an account of their activities in their own words, but still produces similar daily activity estimates at a broad level (UNECE 2013).

The MCS time diary covers a whole day (24 hours), starting at 4am in the morning of the selected day and finishing at 4am the next day. Cohort members are asked to complete two diaries, one on a weekday and one on a weekend day.[3] Sampling one weekday and one weekend day constitutes an increasingly common design in time-use studies, achieving an optimal balance between time coverage and respondent burden (European Commission 2004). At the same time, randomising diary days across weekdays and weekend days and across the four seasons achieves an equal allocation of respondent diaries, assuring that diaries completed during "atypical" days "wash out" in the aggregate (Robinson and Godbey 1999). The sampling window is 7 days, starting 3 days after the interviewer visit. The same combination of days is sampled in cases of twins and triplets. Substitution of the selected days is not allowed.

The survey adopted a mixed-mode approach. A web-administered diary (web) and a smartphone app diary (app) are offered to participants, with a traditional paper-administered diary (paper) held in reserve for participants who do not own a personal computer or a smartphone with internet access, or refuse to use the web/app modes. The web diary can only be completed on a netbook, desktop or laptop, while the app can be completed on a smartphone or tablet. Cohort members are also provided with a "time-use notebook" (see Appendix) that they can use to make notes of their activities during the day before transferring to the web/app diaries (it is likely that cohort members will not have access to their smartphones while at school). Aside from our interest in methodological innovation and the use of new technologies for data collection, the decision to develop these two new instruments was driven by data quality and post-fieldwork data cleaning cost considerations.

[2] It should be noted here that the majority of cohort studies that have collected time diaries have involved parents in diary completion due to cohort members being at younger ages. However, stand-alone time-use surveys have regularly collected time diaries from adolescents without parental involvement.

[3] Activity monitor data are collected for the same randomly selected days.

The few social surveys that have used web diaries have followed a question-based approach that represents a CAPI instrument (Bonke and Fallesen 2010). However, the main methodological strength of the time diary technique is the “time grid”, which has been shown to facilitate respondent memory, generating more accurate accounts of time allocation (Robinson and Godbey 1999). The MCS web instrument is the first stand-alone web diary that is similar to traditional paper diaries, respecting the properties of the time diary method. Data collected from MCS families previously has shown that the majority has internet access and a computer at home, meaning that web diary would be a viable option for most cohort members.

Taking into account the widespread and increasing use of smartphones among adolescents in the UK (Ofcom 2014), the research design team deemed the development of an app an important strategy to make the survey relevant to many participants. As the use of a “time grid” in a smartphone screen could be potentially problematic, this instrument follows a question-based approach, similar to existing apps for the collection of time use-data (Fernee and Sonck 2014; Vrotsou et al. 2014). There are a few differences between the web/paper instruments and the app, which are discussed in detail later in this report.

The time diary collects information on respondents’ main activities, location, enjoyment/affect and whom else they were with (if anybody). The initial plan to collect information on “secondary” (i.e. concurrent) activities was abandoned after the pilot survey. Findings indicated that app users did not register secondary activities, and the element was removed to enhance consistency across modes. Acknowledging that eating and snacking are often reported as secondary activities in time diaries, survey leaflets and instructions were adapted to ask respondents to report all instances of eating and snacking in their time diaries. This proved relatively successful. Reporting of these activities increased across all modes in the dress rehearsal, and approximately 77% of all diaries included at least one eating or snacking episode. Additionally, the average time spent eating was just over an hour, which is consistent with the total eating time reported in the Multinational Time Use Survey and other British time-use surveys.

Sampling

Due to a shortage of activity monitors, a subsample of cohort members are randomly selected to take part in the time diary and activity monitor tasks in the main stage of data collection. In order to achieve large sample sizes in each of the four countries of the UK, 100% of young people in Wales, Scotland, and Northern Ireland are sampled. In England, a subsample rate is decided individually for each of the nine waves of fieldwork in order to ensure that there will be enough equipment for all selected cohort members. The sampling occurs at the interviewer assignment level: each interviewer is allocated an assignment of, on average, 14 addresses. At each wave of fieldwork, a random sample of assignments is drawn, with each cohort member in the selected assignments eligible for the time diary and activity monitor tasks. It is anticipated that 81% of cohort members in England will selected as eligible for these tasks.

Content: Activity, location, who with, and affect codes

The time diary uses 44 activity codes that are grouped under 13 broad activity categories (Table 1). Activity codes were devised in line with existing harmonized activity categories in time-use research. The activity scheme is age-appropriate, including activity codes that are particularly relevant for young people of the new century, such as use of social media.

The level of detail within broad activity categories was determined by substantive topics that will be of interest for MCS data users. For example, the "Chores, Housework, and Looking after People and Animals" broad activity category consists of codes that are likely to reflect gender specialisation in household chores during adolescence. An important decision was not to treat school time as a "black box" (i.e. paid work time and school-related time are both usually covered by a single generic activity code in stand-alone time-use surveys). Instead, a number of school-related codes are provided to enable diarists generate a more detailed description of their school time. The diary also includes a wide set of physical activity codes which can be combined with questionnaire items and activity monitor data for the study of obesity and other health-related topics.

The MCS activity codes were improved following cognitive testing and usability testing. Additionally, young people who took part in the pilot study were asked to return their "time-use notebooks", and these were checked against submitted/returned time diaries to establish whether the activity code scheme is adequate and to detect any areas of concern. Overall, changes made during the development process were minimal and reflected usual problems in time-use research, such as the misunderstanding of travelling codes. As evidenced by the returned "time-use notebooks", some young people did not find that original travel codes made sense in terms of the way they describe their days. There were also a couple of cases where adult-oriented terminology proved to be problematic. For example, "pet care" was a code in the original activity scheme that was not used by some adolescents whose "time-use notebooks" reported spending significant amounts of time caring for their pets. The code was changed to "looking after animals". Finally, it is worth noting that testing procedures suggested that the inclusion of activity examples in parentheses helped young people clarify the meaning of activity codes during completion. For this reason, these examples were retained in the final versions of the instruments.

Cohort members are asked to provide information on their location during the diary day. Three codes are provided: 1) at home, 2) indoors, but not at home, 3) outdoors. The "who were you with" dimension can be multi-coded and includes the following categories: 1) alone, 2) mother, 3) father, 4) friends or other young people, 5) siblings (brother or sister), and 6) other adults.

Finally, an important dimension of the MCS diary is the measurement of affect/enjoyment, which is increasingly used in analyses of wellbeing (Gershuny 2011; Kahneman and Krueger 2006). The question used is "how much did you like it" and a 5-point scale is used. Testing of a 7-point scale during the pilot phase suggested that a 5-point scale was adequate to capture individual emotional variation.

Table 1. Millennium Cohort Study Age 14 Time Use Record: Activity Codes

Top-level codes	2nd level
Sleep and personal care	Sleeping and resting (including sick in bed) Personal care (including taking a shower/bath, grooming, getting dressed etc.)
School, homework, and education	Homework In class School breaks School clubs Detention
Paid or unpaid work	Paid work (including paid babysitting and paid work for the family) Unpaid work for family or other non-household members (e.g. help in family business)
Chores, housework, and looking after people or animals	Cooking, cleaning, and shopping for the household Fixing things around the house, fixing bike, gardening Looking after brothers, sisters, other children in the household Looking after parent or other adult in the household (medical or personal care) Looking after animals
Eating and drinking	Eating or drinking in a restaurant or café Eating a meal Eating a snack or having a drink
Physical exercise and sports	Cycling Individual ball games and training (e.g. tennis, badminton) Jogging, running, walking, hiking Team ball games and training (e.g. basketball, football) Swimming and other water sports

	Other exercise (e.g. dancing, keeping fit) and other sports (e.g. skateboarding, gymnastics)
Travel (including walking to school)	Travel by bus, taxi, tube, plane
	Travel by car, van (including vehicles owned by friends and family)
	Travel by physically active means (walk, bike etc.)
Social time and family time	Attending live sporting events
	Cinema, theatre, performance, gig etc.
	Exhibition, museum, library, other cultural events
	Shopping (including window shopping, hanging out at shopping centre)
	Speaking on the phone (including Skype, video calls)
	Speaking, socialising face-to-face
Internet, TV, and digital media	Answering emails, instant messaging, texting
	Browsing and updating social networking sites (e.g. Twitter, Facebook, BBM, Snapchat)
	General internet browsing, programming (not time on social networking sites)
	Listening to music, radio, iPod, other audio content
	Playing electronic games and apps
	Watch TV, DVDs, downloaded videos
Volunteering and religious activities	Volunteering
	Religious activities (including going to places of worship, praying etc.)
Hobbies and other free time activities	Did nothing, just relaxing, bored, waiting
	Hobbies, arts and crafts, musical activities, writing stories, poetry etc.
	Reading (not for school)
Any other activity	Other activities not listed

Instruments

This section presents the three MCS time diary instruments (paper, web, and app), and provides details surrounding instrument development.

Paper

The MCS paper diary follows the conventional format of pre-coded time diaries traditionally used in time-use research (see Figure 1).

The diary is an A4 booklet containing eight pages: a front cover with instructions, six pages containing the grid itself, and a back cover with data quality questions for the cohort member to complete.

Following young people's suggestions from the first round of usability testing, different colours were added in order to differentiate activity rows from contextual element rows. The instruction page was also simplified. In order to facilitate accurate completion, we added the activity codes to both sides of each double page spread of the diary, and added additional time grids between the contextual sections. The second round of usability testing confirmed that these amendments had been successful, and that young people found it easier to complete the paper diary

Web

The web diary is comparable to the paper diary: it consists of a grid with activity and contextual codes down the side, and 10-minute time slots across the top (see Figure 2). Similar to the paper diary, respondents are required to "draw" a line using their mouse in order to register their activities during the two selected days.

One of the challenges of instrument design was to fit all of the activity codes onto the screen. Activities are nested under the 13 "broad" activity categories. Respondents have to click on those in order to expand and view activity codes (see Figure 3). Contextual elements appear beneath the activity codes, as in the paper diary, and are also nested in the same way as the activity codes. Taking into account that not much of the "time grid" is visible at any one time, a progress bar was added. This is a black bar located at the top of the grid that is filled in over time slots that are completed (see Figure 4). This bar makes it easier for diarists to keep track of completed time slots and to find any omissions in their diary.

The first usability testing highlighted room for improvement in relation to several features of the instrument: Several respondents were unsure as to which time slot the bar had been dragged into – whether, for example, a registered activity ended at 6.30am or 6.40am. The problem was addressed by adding a digital clock at the end of the bar that was dragged. The clock shows the time of the cell the bar is in (see Figure 5), and has improved the usability of the instrument, as evidenced by the second round of the usability testing.

Figure 1. MCS paper time-use record; first grid page

WHAT WERE YOU DOING?		4am	5am	6am	7am	8am	9am	10am	11am	WHAT WERE YOU DOING?	
		10 20 30 40 50	10 20 30 40 50	10 20 30 40 50	10 20 30 40 50	10 20 30 40 50	10 20 30 40 50	10 20 30 40 50	10 20 30 40 50		
Sleep and personal care	Sleeping and resting (including sick in bed)									Sleeping and resting (including sick in bed)	Sleep and personal care
	Personal care (including taking a shower/bath, grooming, getting dressed etc.)									Personal care (including taking a shower/bath, grooming, getting dressed etc.)	
School, homework, and education	Homework									Homework	School, homework, and education
	In class									In class	
	School breaks									School breaks	
	School clubs									School clubs	
	Detention									Detention	
Paid or unpaid work	Paid work (including paid babysitting and paid work for the family)									Paid work (including paid babysitting and paid work for the family)	Paid or unpaid work
	Unpaid work for family or other non-household members (e.g. help in family business)									Unpaid work for family or other non-household members (e.g. help in family business)	
Chores, housework, and looking after people or animals	Cooking, cleaning, and shopping for the household									Cooking, cleaning, and shopping for the household	Chores, housework, and looking after people or animals
	Fixing things around the house, fixing bike, gardening									Fixing things around the house, fixing bike, gardening	
	Looking after brothers, sisters, other children in the household									Looking after brothers, sisters, other children in the household	
	Looking after parent or other adult in the household (medical or personal care)									Looking after parent or other adult in the household (medical or personal care)	
	Looking after animals									Looking after animals	
Eating and drinking	Eating or drinking in a restaurant or café									Eating or drinking in a restaurant or café	Eating and drinking
	Eating a meal									Eating a meal	
	Eating a snack or having a drink									Eating a snack or having a drink	
Physical exercise and sports	Cycling									Cycling	Physical exercise and sports
	Individual ball games and training (e.g. tennis, badminton)									Individual ball games and training (e.g. tennis, badminton)	
	Jogging, running, walking, hiking									Jogging, running, walking, hiking	
	Team ball games and training (e.g. football, hockey)									Team ball games and training (e.g. football, hockey)	
	Swimming and other water sports									Swimming and other water sports	
	Other exercise (e.g. dancing, keeping fit) and other sports (e.g. skateboarding, gymnastics)									Other exercise (e.g. dancing, keeping fit) and other sports (e.g. skateboarding, gymnastics)	
Travelling (including walking to school)	Travel by bus, taxi, tube, plane									Travel by bus, taxi, tube, plane	Travelling (including walking to school)
	Travel by car, van (including vehicles owned by friends and family)									Travel by car, van (including vehicles owned by friends and family)	
	Travel by physically active means (walk, bike etc.)									Travel by physically active means (walk, bike etc.)	
Social time and family time	Attending live sporting events									Attending live sporting events	Social time and family time
	Cinema, theatre, performance, gig etc.									Cinema, theatre, performance, gig etc.	
	Exhibition, museum, library, other cultural events									Exhibition, museum, library, other cultural events	
	Shopping (including window shopping, hanging out at shopping centre)									Shopping (including window shopping, hanging out at shopping centre)	
	Speaking on the phone (including Skype, video calls)									Speaking on the phone (including Skype, video calls)	
	Speaking, socialising face-to-face									Speaking, socialising face-to-face	
Internet, TV, and digital media	Answering emails, instant messaging, texting									Answering emails, instant messaging, texting	Internet, TV, and digital media
	Browsing and updating social networking sites (e.g. Twitter, Facebook, BBM, Snapchat)									Browsing and updating social networking sites (e.g. Twitter, Facebook, BBM, Snapchat)	
	General internet browsing, programming (not time on social networking sites)									General internet browsing, programming (not time on social networking sites)	
	Listening to music, radio, iPod, other audio content									Listening to music, radio, iPod, other audio content	
	Playing electronic games and Apps									Playing electronic games and Apps	
	Watch TV, DVDs, downloaded videos									Watch TV, DVDs, downloaded videos	
Volunteering and religious activities	Volunteering									Volunteering	Volunteering and religious activities
	Religious activities (including going to places of worship, praying etc.)									Religious activities (including going to places of worship, praying etc.)	
Hobbies and other free time activities	Did nothing, just relaxing, bored, waiting									Did nothing, just relaxing, bored, waiting	Hobbies and other free time activities
	Hobbies, arts and crafts, musical activities, writing stories, poetry etc.									Hobbies, arts and crafts, musical activities, writing stories, poetry etc.	
	Reading (not for school)									Reading (not for school)	
Any other activity	Other activities not listed									Other activities not listed	Any other activity
WHERE WERE YOU?		4am	5am	6am	7am	8am	9am	10am	11am	**WHERE WERE YOU?**	
		10 20 30 40 50	10 20 30 40 50	10 20 30 40 50	10 20 30 40 50	10 20 30 40 50	10 20 30 40 50	10 20 30 40 50	10 20 30 40 50		
	At home									At home	
	Indoors, but not at home									Indoors, but not at home	
	Outdoors									Outdoors	
WHO WERE YOU WITH?		4am	5am	6am	7am	8am	9am	10am	11am	**WHO WERE YOU WITH?**	
		10 20 30 40 50	10 20 30 40 50	10 20 30 40 50	10 20 30 40 50	10 20 30 40 50	10 20 30 40 50	10 20 30 40 50	10 20 30 40 50		
	Alone									Alone	
	Mother									Mother	
	Father									Father	
	Friends or other young people (up to 18 years old)									Friends or other young people (up to 18 years old)	
	Siblings (brother or sister)									Siblings (brother or sister)	
	Other adults									Other adults	
HOW MUCH DID YOU LIKE IT?		4am	5am	6am	7am	8am	9am	10am	11am	**HOW MUCH DID YOU LIKE IT?**	
		10 20 30 40 50	10 20 30 40 50	10 20 30 40 50	10 20 30 40 50	10 20 30 40 50	10 20 30 40 50	10 20 30 40 50	10 20 30 40 50		
	1 - Strongly liked									1 - Strongly liked	
	2 - Liked									2 - Liked	
	3 - Neither liked nor disliked									3 - Neither liked nor disliked	
	4 - Disliked									4 - Disliked	
	5 - Strongly disliked									5 - Strongly disliked	

Figure 2. Web MCS time-use record

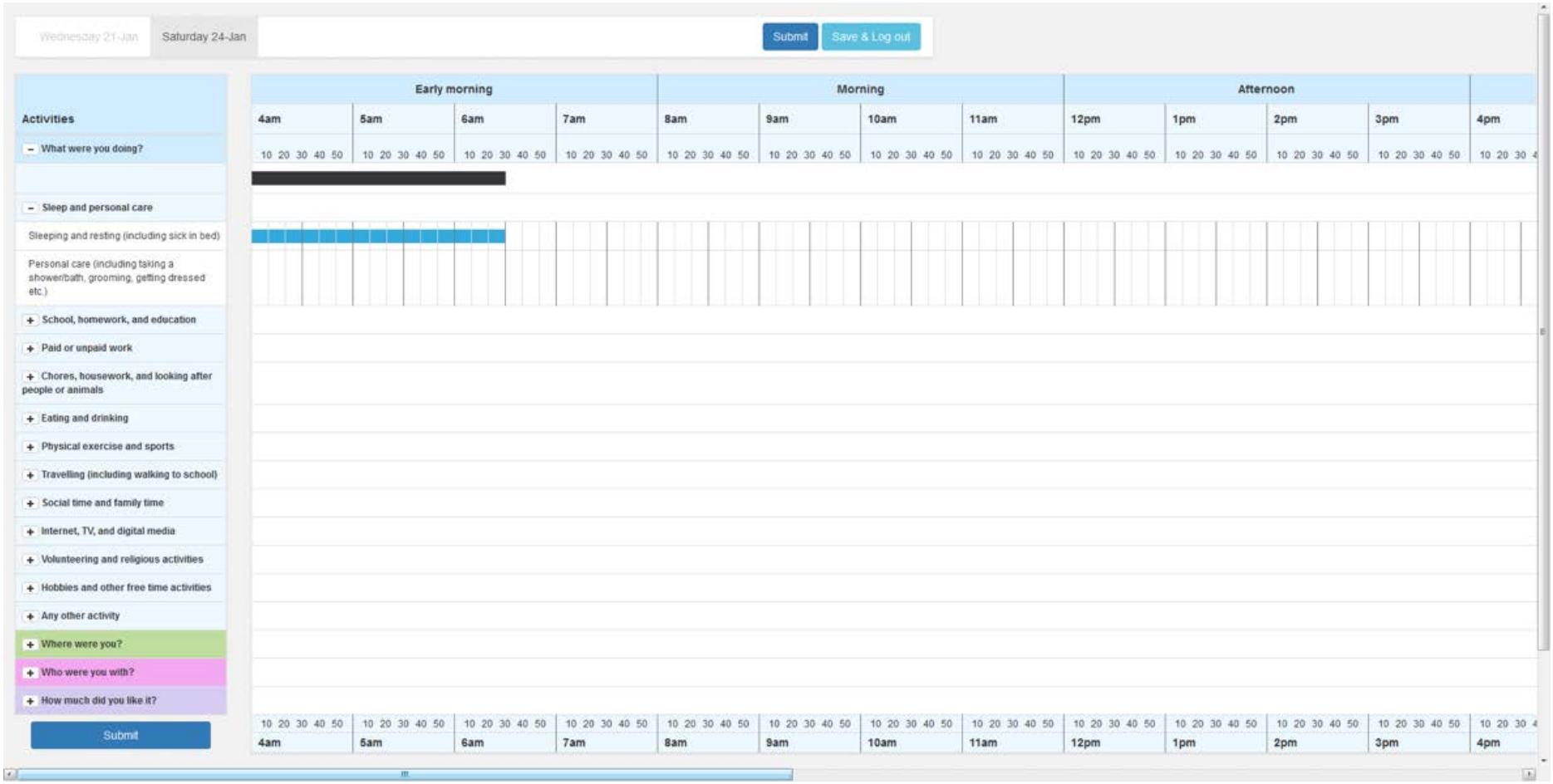


Figure 3: Nesting of activity codes;

Web MCS time-use record

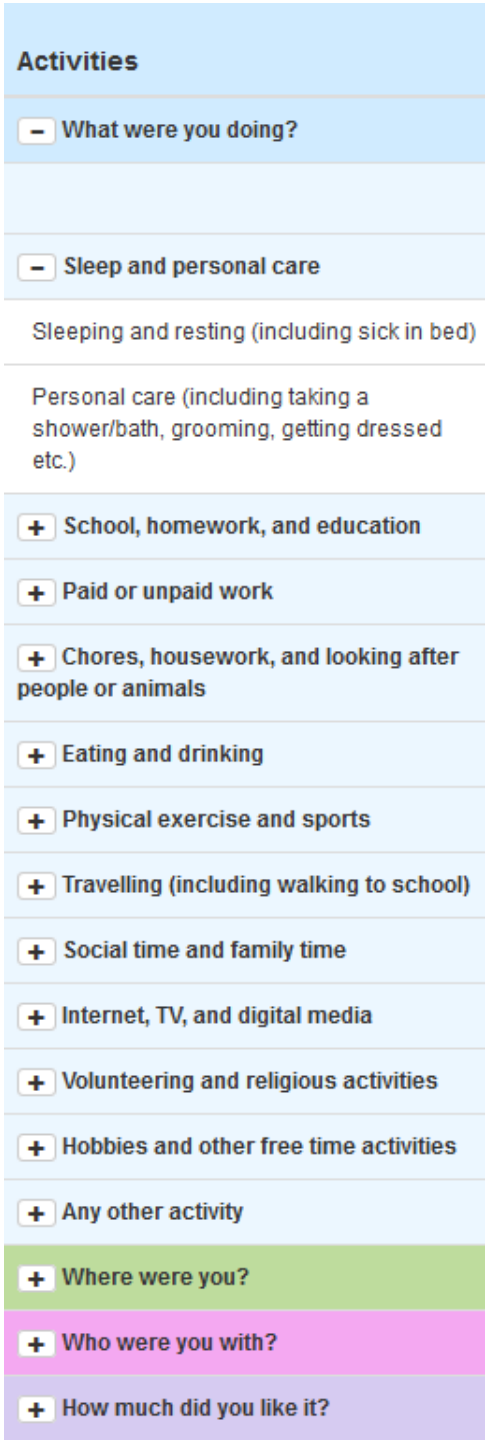


Figure 4. Progress bar; Web MCS time-use record

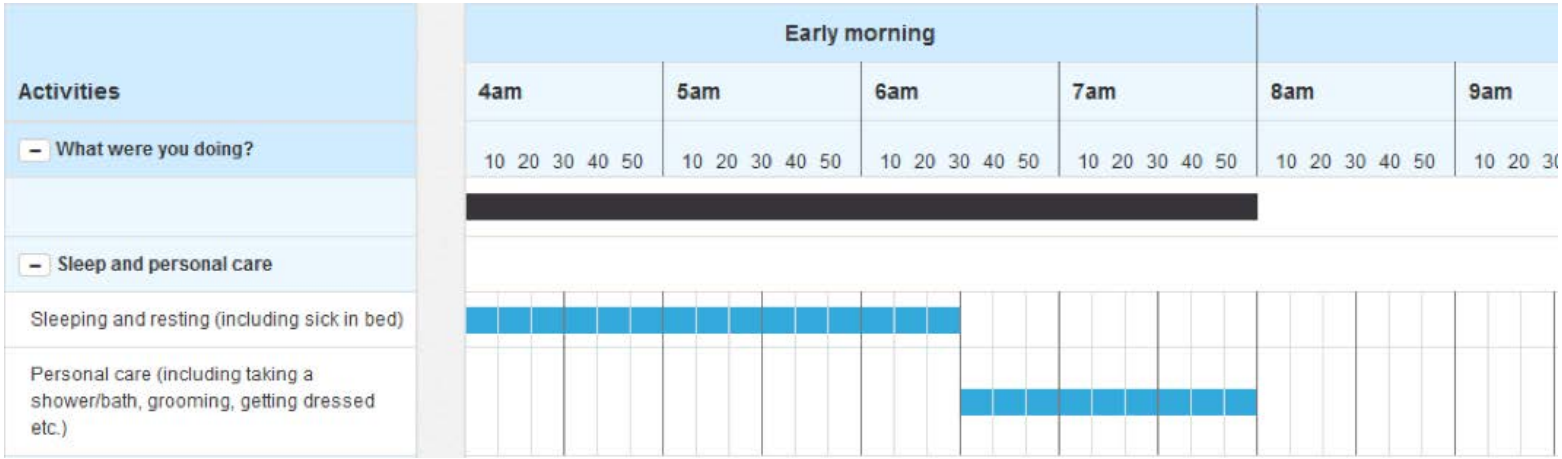


Figure 5. Digital clock; Web MCS time-use record

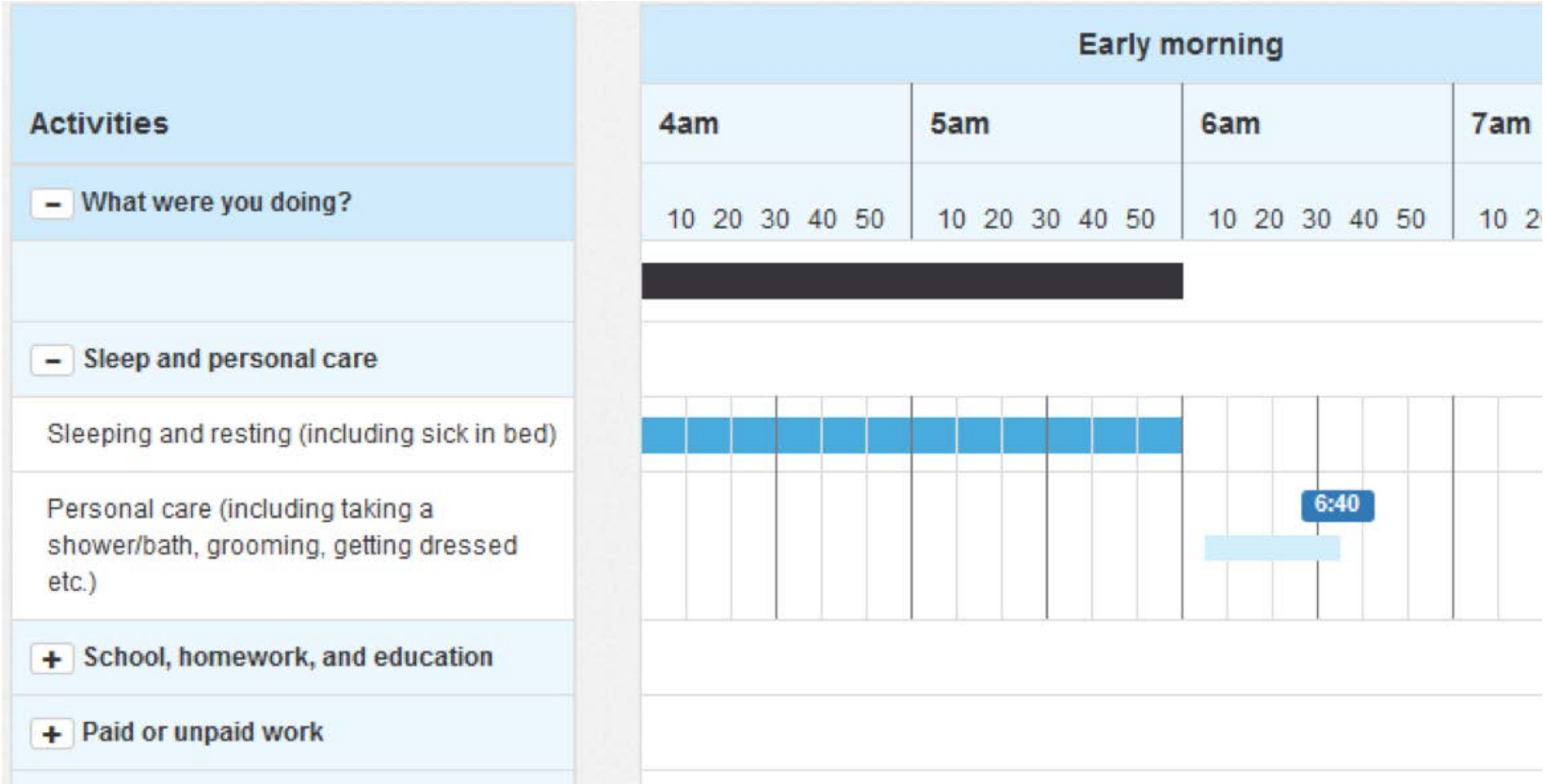
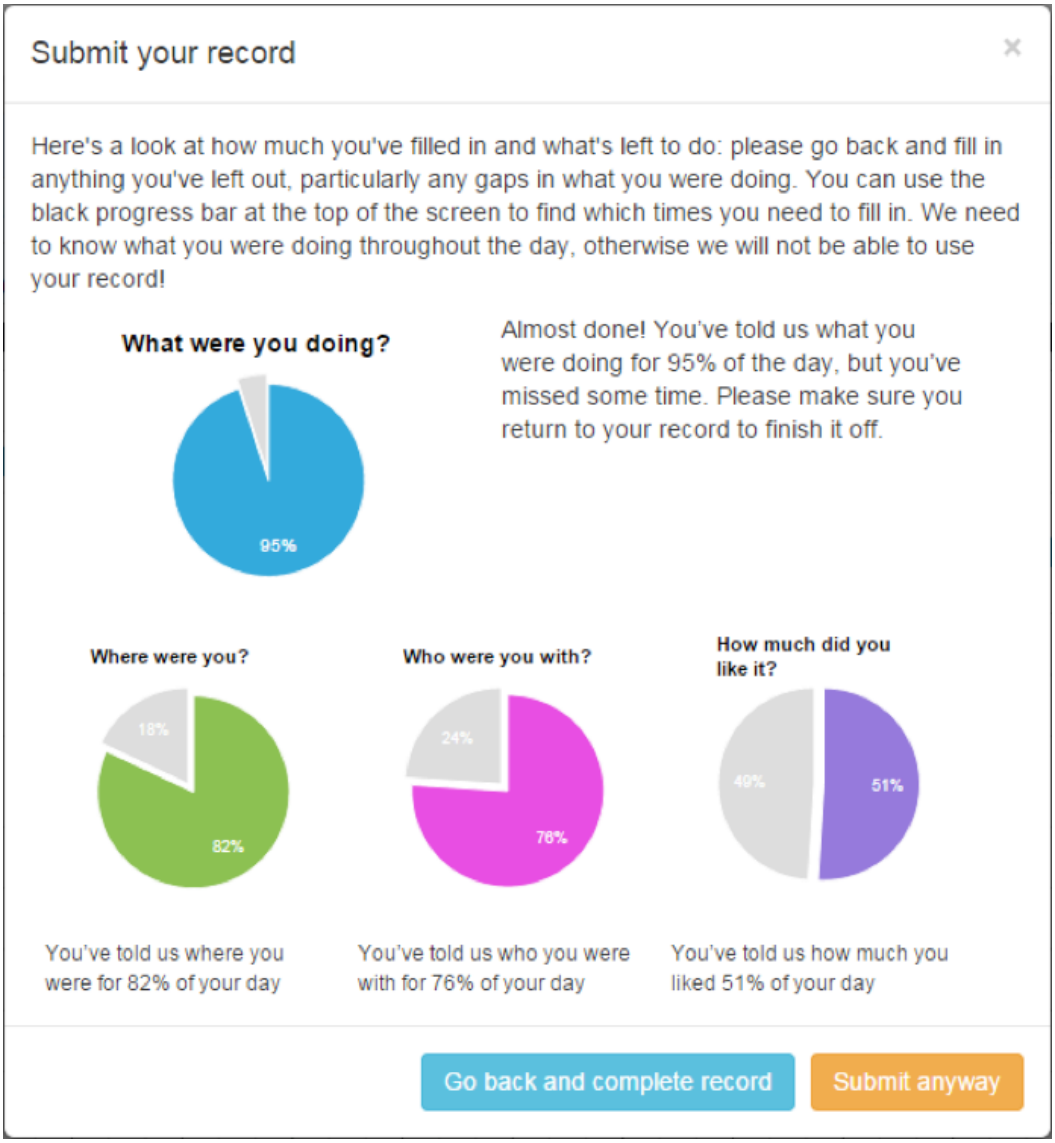


Figure 6. Pie charts that appear following submission attempt; Web MCS time-use record



Another issue that became apparent during usability testing is that not all respondents managed to submit their diary. Probing suggested that this was because they hadn't been able to locate the "submit" button. To counteract this problem, we added a second "submit" button. The two buttons are placed at the top and the bottom of the instrument.

The web diary allowed the implementation of a robust range of error messages in order to improve data quality: When respondents enter an activity other than sleeping or school that lasts for more than three hours, a soft check is triggered asking them whether they are sure that the registered activity lasted for this amount of time. There is also a prompt when diarists attempt to register more than one activity in the same time slot. Another error is triggered on screen when three or more 10-minute slots are left blank before the start of a new activity. Diarists are urged to go back to fill in the gaps in activity reporting. However, this error is only triggered three times in total in order to avoid respondent burden and frustration with the instrument. Each error remains on screen for 10 seconds before automatically disappearing. However, the respondent can also close the error box earlier.

When the respondent attempts to submit his/her diary, a number of pie charts appear, which sum up completion level for both activity and contextual information, prompting them to return and complete any gaps (Figure 6). The respondent can choose not to go back, and press "Submit anyway". This feature was added after the first usability testing, and participants of the second round suggested that they found it very useful.

Instructions are displayed when respondents log in to their diary, and there is an additional "Help" button within the diary itself, with some FAQs as well as contact information in the event respondents cannot fill in the diary. Once the cohort member successfully logs in and clicks past the instruction screen, the two days that have been selected for them to complete the diary are displayed as tabs at the top of the screen (see Figure 2). It is not possible to open the diaries before the actual surveyed dates.

The web diary was programmed using PhP and MyQSL. Cohort members can access the instrument by visiting www.cnc-time-use.com and using their login details (provided during the interviewer visit). Internet connection is not required for completion but it is needed to send the data for each day back.

App

As discussed earlier, the app instrument necessitated a different design approach. Rather than a "time grid" format, it follows a question-based approach, in line with existing app-based time-use instruments (Fernee and Sonck 2014; Vrotsou et al. 2014).

Respondents first select the top-level code that their activity falls under, then the activity itself, followed by the time it ended, where they were, who they were with and how much they liked it, in a linear format (Figure 8). Instead of using 10-minute slots, the app allows cohort members to assign the ending times of their activities. More specifically, the first starting time is set at the start of the day (4am), and the

subsequent starting times are set to match the ending times of the previous activity reported by the user.

Due to the structure of the instrument, contextual elements are coterminous with the main activity. This means that app diarists are not able to specify changes in enjoyment or location of their recorded activities like in the paper and the web instrument allow. However, diarists can register two consecutive episodes for the same main activity, with different contextual elements.

Contextual dimensions are “intrusive” in the app, which means that users have to provide information on all domains before registering another activity. For this reason, a “Don’t want to answer” option is provided for each contextual question.

An instruction guide is available for cohort members when they log in, along with links to access the two selected days (Figure 7).

Figure 7. Instructions and links to the time diaries; Smartphone app

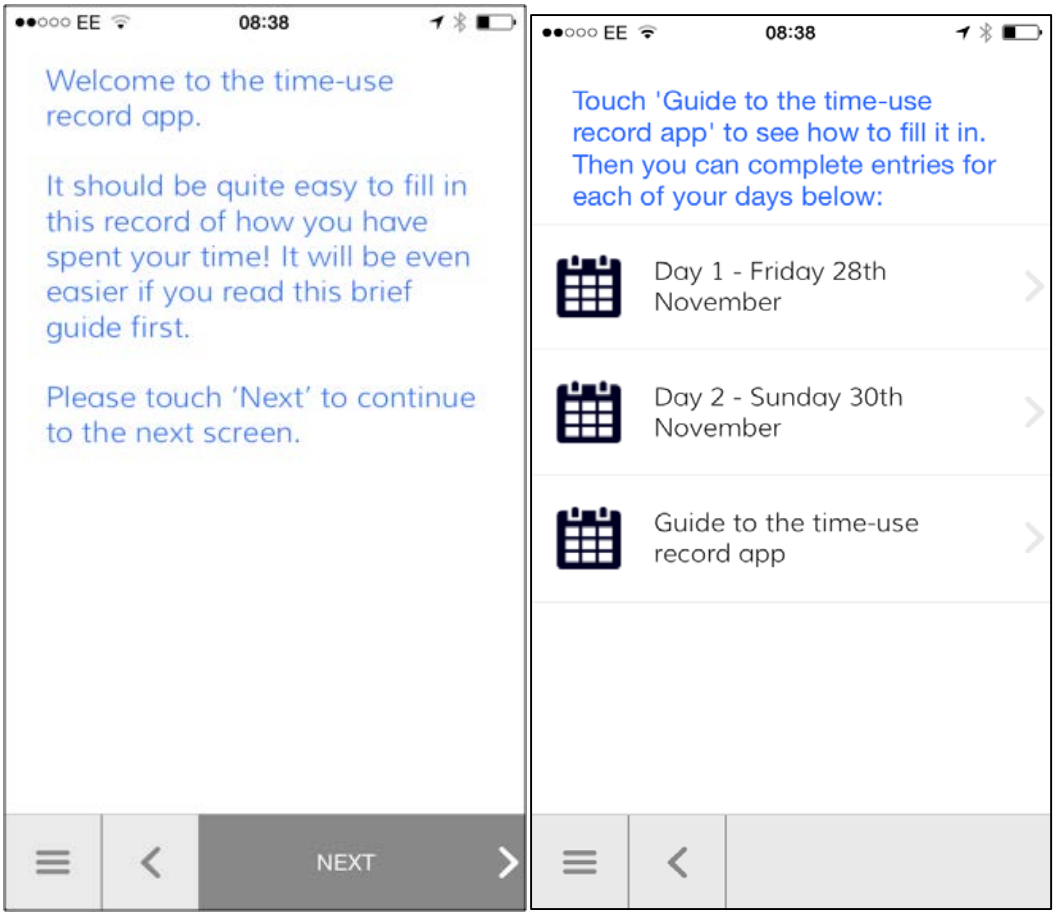
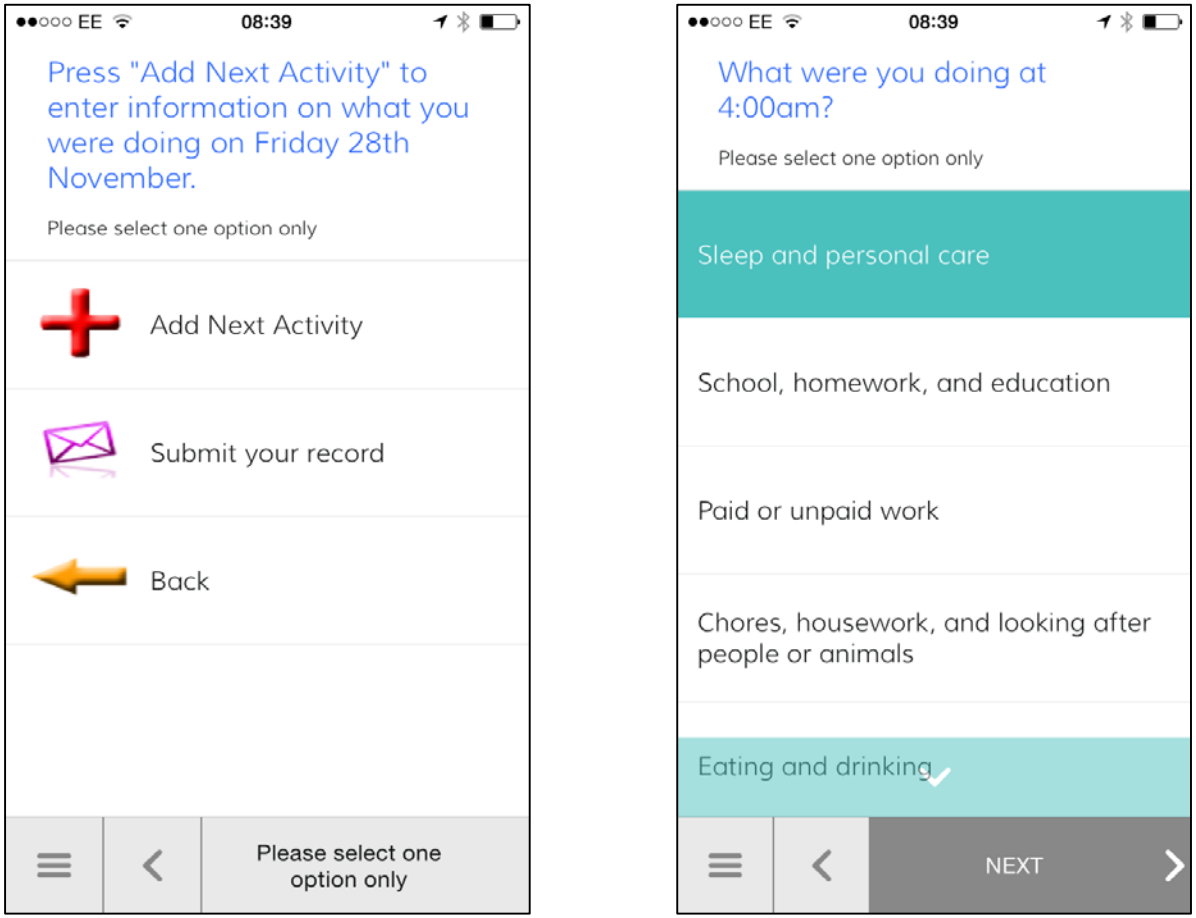
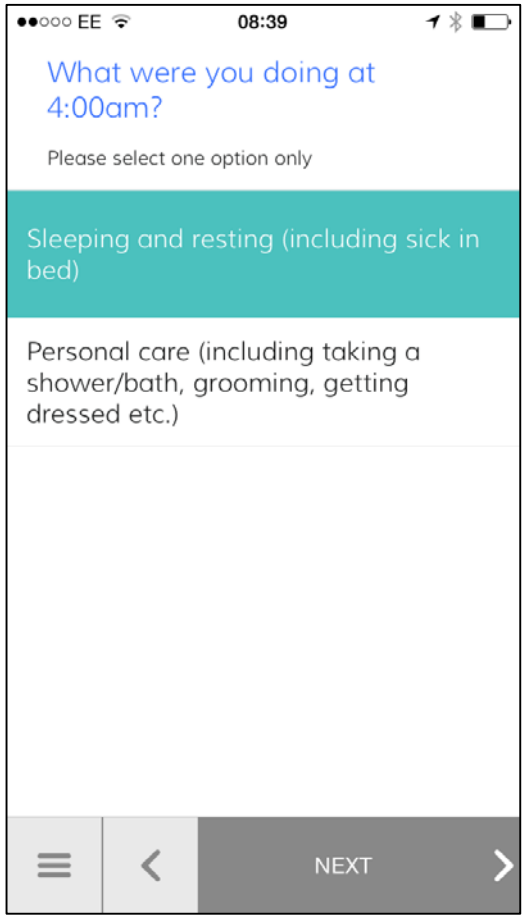
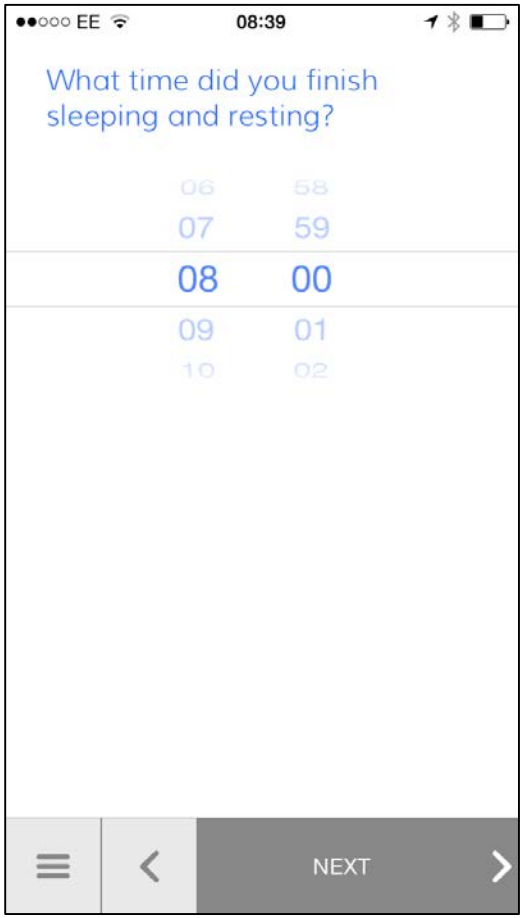
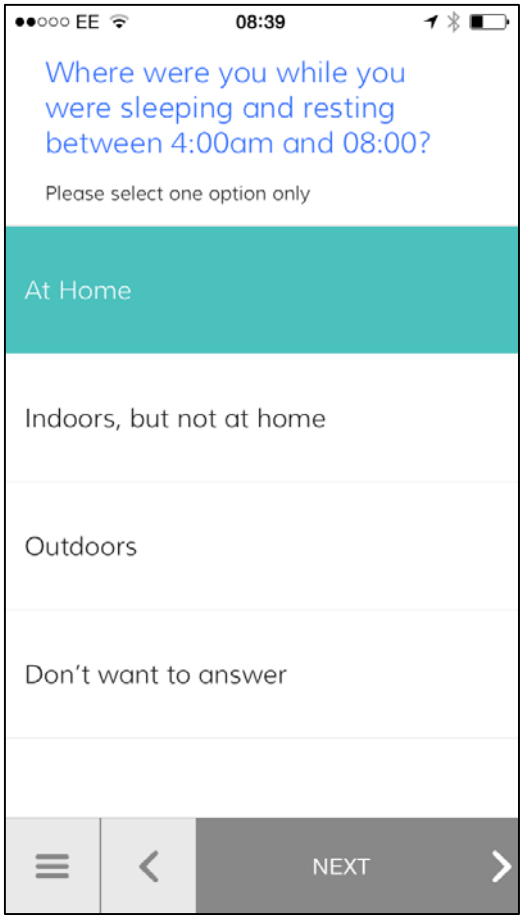


Figure 8. Activity registration; MCS Smartphone app




●●○○○ EE
08:39
What were you doing at 4:00am?
Please select one option only
Sleeping and resting (including sick in bed)
Personal care (including taking a shower/bath, grooming, getting dressed etc.)
NEXT


●●○○○ EE
08:39
What time did you finish sleeping and resting?
06 58
07 59
08 00
09 01
10 02
NEXT


●●○○○ EE
08:39
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


●●○○○ EE
08:40
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

Due to respondents having to enter an activity for every time slot across the 24-hour period, the app has fewer error messages than the web instrument. The main one is triggered when an activity other than sleeping or school is reported to last more than three hours. As with the web diary, this is a soft check and respondents can confirm whether their report is correct. Additionally, errors are triggered if respondents try to submit the app diary with no data (a hard check, which prevents submission), or with the full 24-hour period not completed (a soft check, allowing the submission of incomplete data).

The app was scripted using Ipsos MORI's "Ipsos Mobile" app. It can only be used on an Apple or an Android device, and cohort members can download it from the App Store or Google Play after the interviewer's visit. An internet connection is needed to download the app as well as to submit the diary information at the end of each selected day. However, connectivity is not required when filling in the app diary.

Placement of the time diary with cohort members

The time diary is to be completed on two selected days shortly after the Age 14 interviewer visit. In advance of the visit, cohort members receive a booklet with information about the tasks they will be asked to complete, including the time diary (see Appendix). This information is relatively brief, but adequate to allow them to make an informed decision about taking part before the visit. Parental consent is needed as cohort members are under 16 years of age, so parents/carers also receive information about the content of the study and the required tasks (see Appendix).

At the time of visit, cohort members are asked whether they would be willing to complete a time diary (and wear an activity monitor). Those who agree are then asked whether they want to complete the diary online or to use the app. Young people who don't have access to the internet, or a smartphone or tablet, or those who refuse to complete it via web or app, are offered the paper diary. If the cohort member selects the app, the interviewer checks that the cohort member has an Apple or an Android device (rather than a Blackberry or Windows device). If they do not have a compatible device, they are asked to select a different mode.

Once the mode choice is made, the Computer-Assisted Personal Interviewing (CAPI) program randomly selects one weekend day and one weekday within a seven-day period for the young person to complete the time diary. Interviewers also give cohort members a login code, which allows them to log into the instrument. The code also allows the survey team to link paper diaries to cohort members' survey data. Cohort members are advised to log out of the web/app instruments when they are not using it in order to protect privacy on shared devices.

Once the administration tasks are complete, the interviewer explains the time-use task to the young person, using a script in CAPI. A variety of materials are also left with the cohort member at the home, depending on the mode that is selected:

- A leaflet containing instructions on how to access and use the app/web diary, depending on the selected mode (see Appendix). If the paper is chosen, instructions are printed on the front cover of the diary itself, and two copies of the paper diary are left behind.
- Two time-use notebooks for app and web diarists (see Appendix). Cohort members can use this to write down their activities throughout the day in order to aid recall of what they had been doing during completion of the instrument (it is likely that smartphone use will not be allowed in school). Notebooks are not sent back to the survey office.
- A letter for teachers, explaining about the time-use task (and activity monitor) should cohort members feel they need it for school.
- A return stamped envelope, pre-printed with the Ipsos MORI address. This is left with young people who agree to complete the activity monitor task, and/or those who are completing a paper diary.

Parents and cohort members are asked to provide their mobile telephone numbers, which are used to send SMS reminders to complete their time-use diaries (and wear

the activity monitor). Parents and young people provide consent to these reminders being sent. Three reminders are sent: the evening before, the morning of, and the day after selected day. If the diary is not submitted/returned within two weeks from the second selected day, a reminder slip is posted out to the household along with the survey thank you mailing.

Pilot and dress rehearsal findings

This section presents findings from the pilot and dress rehearsal, focusing on mode take-up, response rates, and data quality across the three modes.

The pilot survey was conducted with 51 young people and their families. Participants were specifically recruited for the task and received a monetary incentive to take part (£100 per family), including an additional amount for the submission of the time diary (£20). The pilot was intended to test the instruments and interview procedures but not the response rates for different survey elements. A more realistic test of survey instruments as well as response rates was achieved with the dress rehearsal (hereafter DR). The DR surveyed 97 young people including respondents who took part in previous MCS pilots (approximately 80% of the total sample). There were no monetary incentives, as per the main stage MCS survey.

Mode take-up

The time diary was generally well received by both 14 year olds and their parents in both pilot phases. There were no reported concerns over privacy for the element. All young people (n=51) consented to complete the time diary in the first pilot (Table 2). Eleven young people chose to complete the diary online (22%), 29 via the app (57%), and a further 11 opted for the paper mode (22%).

Consent was slightly lower in the DR, with 86 out of 97 consenting to the task (89%). It is possible that this was related to the lack of incentive at this phase. The app remained the most popular mode (41% of total sample, 40 young people). A total of 27 participants chose the web (28% of total sample), and a further 19 opted for the paper diary (20% of total sample).

Overall, the paper diary placement was higher than originally anticipated. This was likely because some interviewers offered the paper instrument up front, instead of only reserving it for participants who were unable/refused to complete the web/app instruments. We adjusted interviewer training for the main stage survey, emphasizing to interviewers that they should only offer the paper if the web/app modes were not feasible or were rejected by respondents.

Table 2. Mode Take-Up in Pilot and Dress Rehearsal

	Web	*App*	*Paper*	*Refused*	*Total*
Pilot	22%	57%	22%	-	100%
Dress Rehearsal	28%	41%	20%	11%	100%

Full diary processing

Prior to examining diary quality across modes, we conducted full diary processing of raw diaries, which is a conventional procedure in time-use research: a time diary is a narrative account of interconnected parts. In contrast with survey questions where a

non-answer is irreparable, the narrative component of the time diary facilitates completion of information that may not have been fully reported by the diarist. Survey-generated codes can be subsequently used to flag such time slots in the diary, giving users a reasonable idea of the range of activities that the young person undertook during these slots. For example, a blank activity column in an open-ended diary can be completed by using information from the location or the who with column (e.g. “with friends at steak house”). Likewise, a short gap in the activity column between two reported activities of different location (e.g. a home activity and a school activity) can be marked as “unreported travel”.

Diary processing follows a clear set of protocols. It should not be understood as missing data imputation in the conventional sense: the procedure uses the narrative accounts provided by diarists themselves to complete some gaps (*within diary* information*)*, rather than information provided by other diarists. Flags enable diary analysts to distinguish between such time gaps and unreported time that cannot be accounted for by the narrative provided by the diarist. The scope for time diary processing is limited for the MCS, given that the diary instrument is pre-coded and includes limited activity and contextual categories. However, the procedure is still valuable in order to fill in patterns that regularly appear in diary surveys (e.g. unreported sleep and travel).

Response patterns

Seventy five percent of pilot survey participants returned diaries with at least some completed information on day 1, and 65% on day 2. Responses were lower in the dress rehearsal, possibly as a result of the lack of incentive at this phase: approximately 48% and 38% of participants returned diaries on day 1 and day 2 respectively. Overall, these results are encouraging, taking into account that stand-alone time-use surveys typically produce relatively low response rates among adult populations (e.g. the most recent 2000-2001 UK Time Use Survey achieved a response rate of 45%).

Having outlined the rate of non-response across the two surveys, we now examine diary quality following full diary processing. This analysis is conducted at the diary rather than the individual level, and we focus on returned/submitted diaries only (excluding returned/submitted blank diaries).

In order to fully understand response patterns and diary quality, it is necessary to provide a definition of a *good quality time diary* (which can be essentially understood as a “productive” diary in social survey terms). We adopt the three criteria followed by the Multinational Time Use Study (Fisher and Gershuny, 2013). A good quality diary should 1) not include more than 90 minutes of missing activity time, 2) report at least seven episodes (that is, at least six reported changes in activity or any contextual dimension across 24 hours), and 3) report at least three out of four basic activity daily domains (sleep or rest; personal care; eating or drinking; and movement, exercise, or travel). Diaries that do not fulfill these criteria are not of sufficient quality for analysis (*bad quality diaries*).

Seventy two per cent of returned/submitted pilot diaries were of good quality. The proportion was slightly higher for the DR at 78%, suggesting an overall data quality

improvement. Similarly, the DR also yielded less bad quality diaries than the pilot survey. Overall, bad quality diaries were principally characterised by substantial amounts of unreported activity time, and did not report daily domains of basic activities. Only a few bad quality diaries reported less than seven activity episodes.

Figure 9 focuses on good quality time diaries by survey phase and mode. Web users were most likely to return good quality diaries across both surveys. Approximately 88% of the submitted web diaries in the pilot were of good quality. The rate reached 94% in the DR. Paper and app users were less likely to return good quality diaries. While there was a substantial increase in the rate of good quality app diaries in the DR, the opposite was the case for paper diaries.

Overall, 90% of submitted web diaries were of good quality, followed by 73% of app diaries, and 65% of paper diaries, across both pilot and DR. This is an important finding, providing support for the potential role of new technologies in improving data quality without the need for the direct intervention of an interviewer to check the diary with the respondent. However, these results also demonstrate that, despite its simplicity and soft checks, the app mode was not entirely successful in ensuring users' productive submissions.

It is worth noting that the web diary appeared to be the most problematic mode during usability testing procedures that took place in Ipsos MORI's premises in London. The majority of participants found the instrument difficult to understand, getting frustrated with scrolling and/or locating activity codes. Findings from the pilot and DR, however, confirmed our initial expectations that the combination of the "time grid" approach along with the use of soft and hard checks would yield high quality diary data.

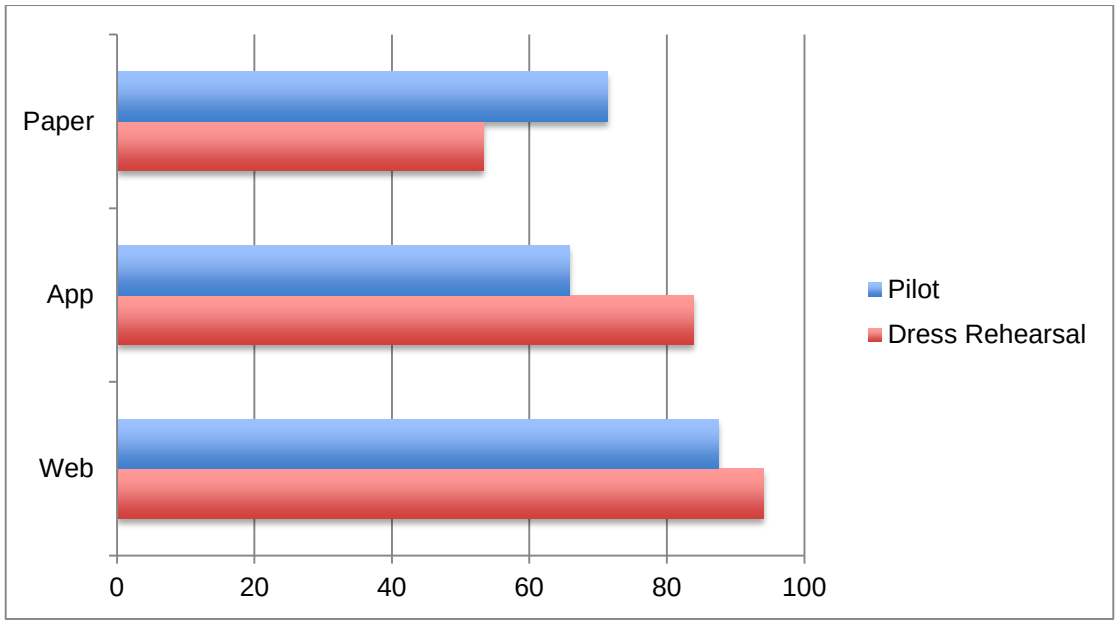


Figure 9. Percentage of Good Quality Diaries by Mode and Survey Phase

One of our initial concerns during the research design phase was the extent to which people in early adolescence (age 14) would adequately engage with the time diary instruments to produce meaningful narratives without interviewer or parental help. The level of good quality diaries produced by the MCS survey and comparisons with Multinational Time Use Study provide evidence that the instruments have actually been very successful, despite our concerns.

Response patterns across the two designated days

We also examined response patterns at a person level, and undertook a preliminary analysis of socio-demographic characteristics of different response profiles, including breakdowns by gender, ethnicity, and self-assessed health status.

One in two respondents (49%) across the two surveys returned good diaries. There were no gender differences. This optimal response pattern was more commonly found among those with very good and good health. However, further research is needed to better understand this association and disentangle the effects of other socio-economic factors like parental education and socio-economic status.

We also examined the profiles of those who produced one good and one bad quality diary (20% of respondents), as well as those who submitted one good diary and a blank diary/did not submit a second diary at all (13% of respondents). It appeared that the latter group consists of respondents who produced a good diary on the first designated diary day. This suggests that the non-submission on day 2 may have been due to respondent burden and frustration with the instrument. Further analyses demonstrated that this response pattern was slightly more common among app diarists in the pilot, and web and paper diarists in the DR.

However, the group that produced one good and one bad diary is more complex: there was an almost equal split between those who submitted a good diary on day 1 and a bad diary on day 2, and those who produced a good diary on day 2, following submission of a bad diary on day 1. This response pattern was more common in the pilot survey, and among app and paper users. Breakdowns by health status also show that, half of those who only managed to produce a good diary on the second designated day had poor health. This may be suggestive of a potentially slower learning progress with the instrument, although further analysis is needed to better understand this response pattern.

Approximately 9% of participants returned two bad quality diaries. There were no differences by gender, ethnicity, or health.

Finally, it should be noted here that the DR took place during school holidays. This blurring of the weekday-weekend boundary in the majority of cases renders the analysis by day of the week inapplicable for this sample. This investigation will be possible with main stage diary data (which are spread across the year), which will also provide adequate sample sizes for further research into socio-demographic influences on response patterns.

Completion of activity and contextual elements

Table 3 provides information on the completion of main activity by mode of completion, diary quality, and survey phase.

The bottom of the table shows that, overall, approximately 85% of the submitted web diaries were of good quality and provided full information on main activity across the two pilot surveys.

Interestingly, only one in two submitted app diaries (51%) were of good quality with full activity information. The breakdown by survey phase shows that less than one quarter of the submitted app diaries from the pilot were of good quality with complete information. Taking into account that the app requires registration of main activity for each new episode, this means that several app diarists submitted the diary before the full 24-hour period was completed. The proportion is noticeably higher in the DR (84% across all submitted diaries), and likely reflects the improved soft checks that were introduced following the first pilot phase to ensure full completion. As expected, the paper instrument is more prone to having some missing activity. Approximately 40% of submitted paper diaries across the two surveys were of good quality with full activity information, following full diary processing by CTUR.

Overall, Table 3 demonstrates the clear strengths of the web diary in prompting users to complete the diary for the full 24-hour period, possibly a result of the pie charts that appear following submission attempt or the ability of diarists to navigate easily throughout a whole day. However, it is also very positive that the app yielded an almost comparable rate of good quality diaries with fully completed activity information in the DR.

We now turn our attention to the three contextual dimensions of the diary. Table 4 focuses on location reporting. It shows that approximately 70% of submitted web diaries across the two surveys were of good quality and had complete location information. Findings are also satisfactory for app diaries: sixty one per cent (61%) of submitted diaries are of good quality for analysis and contain complete location data. Missing location information in app diaries means that diarists selected the “don’t know/don’t want to answer” option or that they submitted their diaries before the 24-hour period was completed. Compared to the much lower rate of 28% for paper diaries, rates for web and app modes provide evidence for the strength of the new instruments in capturing location information. However, findings for the web are more impressive than those for the app, which requires diarists to answer all contextual elements before registering a new activity episode.

The breakdown by survey phase also provides evidence that location reporting became noticeably better in the DR for web and app users. This may be a result of improved operational procedures, leave-behind leaflets, and instrument prompts. The rates for location completion are similar for good quality paper diaries across pilot and DR.

Table 5 focuses on reports of enjoyment (or affective responses to each activity episode). In general, rates demonstrate that the web mode was more likely to

produce good quality diaries with complete data on the enjoyment column (67% of submitted web diaries). Approximately 58% of submitted app diaries were of good quality with complete enjoyment data. However, the rate for paper diaries is also relatively high, at 45%. Approximately one in two submitted good quality diaries had complete enjoyment data in the pilot survey. This was consistent across the three modes of completion. Interestingly, this pattern did not remain the same in the DR, with online diarists more likely to produce diaries of good quality that contained full enjoyment information (77% of submitted online diaries, as opposed to 65% for app diaries, and 42% for paper-administered diaries).

Examining the percentages of good quality diaries with complete enjoyment reporting and those with some enjoyment reporting[4] reveals that the web mode produced better data than the other modes across both phases. In the pilot phase, 87.5% of the good quality web diaries contained sufficient enjoyment data for many analytic questions – rising slightly to 88.2% in the DR phase. In the pilot phase, app and paper diaries produced similar returns – 65.8% of app diaries and 64.3% of paper diaries included either complete enjoyment or sufficient enjoyment reporting. By the DR phase, the rate of good quality app diaries with at least some enjoyment reporting moved closer to that of web diaries (at 83.9%), while the rate of good quality paper diaries with usable enjoyment information dropped to 50.0%.

Finally, Table 6 examines reports on whom the respondent was with. The performance of the web and app is comparable. Paper diaries fared worse, with only 33% of submitted good quality diaries presenting complete “who with” information. It should be noted that the reporting of “who with” became noticeably better in the DR across all modes, particularly for the web diary, with 82% of good quality diaries providing full information on who respondents were with across the entire day (as opposed to 44% in the pilot).

[4] There are 22 good quality diaries with some enjoyment reporting across the two survey phases. These diaries contain a mean of 18 hours and 6 minutes of reported enjoyment time, with a standard deviation of 5 hours and 31 minutes, which means that they can be analysed for many research purposes focusing on a single or a set of activities.

Table 3. Activity Reporting by Mode of Completion, Diary Quality, and Survey Phase

Activity		Web		App		Paper	
		N	% of diaries	n	% of diaries	n	% of diaries
Pilot	Good diary, full activity	12	75.0%	9	23.7%	5	35.7%
	Good diary, some activity	2	12.5%	16	42.1%	5	35.7%
	Bad diary, full activity	0	0.0%	0	0.0%	0	0.0%
	Bad diary, some activity	2	12.5%	12	31.6%	4	28.6%
	Bad diary, no activity	0	0.0%	1	2.6%	0	0.0%
	Total diaries	16		38		14	
	Total non-diaries	4		2		2	
	Total returns	20		40		16	
Dress rehearsal	Good diary, full activity	16	94.1%	26	83.9%	11	42.3%
	Good diary, some activity	0	0.0%	0	0.0%	5	19.2%
	Bad diary, full activity	0	0.0%	3	9.7%	1	3.8%
	Bad diary, some activity	1	5.9%	2	6.5%	9	34.6%
	Bad diary, no activity	0	0.0%	0	0.0%	0	0.0%
	Total diaries	17		31		26	
	Total non-diaries	5		7		2	
	Total returns	22		38		28	
Total good diary & no missing main activity		28	84.8%	35	50.7%	16	40.0%
	Total good diaries	30		51		26	
	Total bad diaries	3		18		14	
	Total returns	42		78		44	

Table 4. Location Reporting by Mode of Completion, Diary Quality, and Survey Phase

Location		Web		App		Paper	
		n	% of diaries	n	% of diaries	n	% of diaries
Pilot	Good diary, full location	9	56.3%	18	47.4%	4	28.6%
	Good diary, some location	5	31.3%	7	18.4%	5	35.7%
	Good diary, no location	0	0.0%	0	0.0%	1	7.1%
	Bad diary, full location	0	0.0%	4	10.5%	2	14.3%
	Bad diary, some location	2	12.5%	9	23.7%	1	7.1%
	Bad diary, no location	0	0.0%	0	0.0%	1	7.1%
	Total diaries	16		38		14	
	Total non-diaries	4		2		2	
	Total returns	20		40		16	
Dress rehearsal	Good diary, full location	14	82.4%	24	77.4%	7	26.9%
	Good diary, some location	2	11.8%	2	6.5%	8	30.8%
	Good diary, no location	0	0.0%	0	0.0%	1	3.8%
	Bad diary, full location	0	0.0%	3	9.7%	2	7.7%
	Bad diary, some location	1	5.9%	2	6.5%	6	23.1%
	Bad diary, no location	0	0.0%	0	0.0%	2	7.7%
	Total diaries	17		31		26	
	Total non-diaries	5		7		2	
	Total returns	22		38		28	
Total good diary & no missing location		23	69.7%	42	60.9%	11	27.5%
	Total good diaries	30		51		26	
	Total bad diaries	3		18		14	
	Total returns	42		78		44	

Table 5. Enjoyment Reporting by Mode Completion, Diary Quality, and Survey Phase

Enjoyment		Web		App		Paper	
		n	% of diaries	n	% of diaries	n	% of diaries
Pilot	Good diary, full enjoyment	9	56.3%	20	52.6%	7	50.0%
	Good diary, some enjoyment	5	31.3%	5	13.2%	2	14.3%
	Good diary, no enjoyment	0	0.0%	0	0.0%	1	7.1%
	Bad diary, full enjoyment	0	0.0%	4	10.5%	1	7.1%
	Bad diary, some enjoyment	2	12.5%	9	23.7%	2	14.3%
	Bad diary, no enjoyment	0	0.0%	0	0.0%	1	7.1%
	Total diaries	16		38		14	
	Total non-diaries	4		2		2	
	Total returns	20		40		16	
Dress rehearsal	Good diary, full enjoyment	13	76.5%	20	64.5%	11	42.3%
	Good diary, some enjoyment	2	11.8%	6	19.4%	2	7.7%
	Good diary, no enjoyment	1	5.9%	0	0.0%	3	11.5%
	Bad diary, full enjoyment	0	0.0%	3	9.7%	1	3.8%
	Bad diary, some enjoyment	1	5.9%	2	6.5%	7	26.9%
	Bad diary, no enjoyment	0	0.0%	0	0.0%	2	7.7%
	Total diaries	17		31		26	
	Total non-diaries	5		7		2	
	Total returns	22		38		28	
Total good diary & no missing enjoyment		22	66.7%	40	58.0%	18	45.0%
	Total good diaries	30		51		26	
	Total bad diaries	3		18		14	
	Total returns	42		78		44	

Table 6. Who With Reporting by Mode of Completion, Diary Quality, and Survey Phase

Who else was present		Web		App		Paper	
		N	% of diaries	Number	% of diaries	Number	% of diaries
Pilot	Good diary, full with whom	7	43.8%	19	50.0%	4	28.6%
	Good diary, some with whom	7	43.8%	6	15.8%	5	35.7%
	Good diary, no with whom	0	0.0%	0	0.0%	1	7.1%
	Bad diary, full with whom	0	0.0%	4	10.5%	1	7.1%
	Bad diary, some with whom	2	12.5%	9	23.7%	2	14.3%
	Bad diary, no with whom	0	0.0%	0	0.0%	1	7.1%
	Total diaries	16		38		14	
	Total non-diaries	4		2		2	
	Total returns	20		40		16	
Dress rehearsal	Good diary, full with whom	14	82.4%	24	77.4%	9	34.6%
	Good diary, some with whom	2	11.8%	2	6.5%	5	19.2%
	Good diary, no with whom	0	0.0%	0	0.0%	2	7.7%
	Bad diary, full with whom	0	0.0%	3	9.7%	2	7.7%
	Bad diary, some with whom	1	5.9%	2	6.5%	6	23.1%
	Bad diary, no with whom	0	0.0%	0	0.0%	2	7.7%
	Total diaries	17		31		26	
	Total non-diaries	5		7		2	
	Total returns	22		38		28	
Total good diary & no missing with whom		21	63.6%	43	62.3%	13	32.5%
	Total good diaries	30		51		26	
	Total bad diaries	3		18		14	
	Total returns	42		78		44	

Diary element quality summary

Overall, results in this section demonstrate that the web and app modes yield better quality data than paper diaries across all diary domains. Three out of four dimensions provide evidence for the superior performance of the web diary in terms of diary completeness. However, further analysis is needed to explore the extent to which this also reflects potential differences in the profile of online diarists that took part in the pilot and DR surveys.

The paper diary retains some advantages that we discuss later in the 'episodes' section. In relation to this mode, it should be noted that time-use literature does consistently document that when interviewers go over paper diary accounts with participants before diaries are accepted for coding, data quality significantly improves (Harvey 1999, UNECE 2013). Nevertheless, the respondent burden and the cost also increase as interviewers spend more time with respondents. It is therefore particularly important that our analysis documents the effectiveness of web and app modes in producing high quality data without interviewer intervention.

Reports on quality of enjoyment and who else present

In order to check whether the affect measure is effective, we examined the distribution of responses. One measure of the effectiveness of the enjoyment measure is the distribution of responses across the categories of enjoyment (Kahneman and Krueger 2006). We found that there were more positive than negative enjoyment reports and some reporting across the full spectrum of the 5-point scale (strongly liked, liked, neither liked or disliked, disliked, strongly disliked). Approximately 53 per cent of all diaries reported three to five emotional states across the day, without counting unreported emotion. Overall, the distribution of emotions across the diary day was reasonable. Breakdowns by socio-demographic groups show some differences by gender and health, suggesting that the time diary attained face validity for this dimension. For example, young people reporting excellent health strongly liked 13 hours of their days, whereas strongly liked time fell to 10 hours and 28 minutes for those reporting very good health, 10 hours for those with only good health, and 9 hours and 12 minutes for those reporting fair health.

We expected that the majority of diaries would report a combination of time spent alone and time with others, and that a smaller set of diaries would report only time alone or only time with others. Our analysis confirmed our expectations. Approximately 61 per cent of the submitted/returned diaries provide fully complete "who with" information. The percentage is approximately 80% after taking into account good quality diaries with some missing "who with" time.

Episodes

This section presents findings on the mean number of activity episodes across the three modes of completion. Activity episodes constitute an overall indicator of diary data quality (Glorieux and Minnen 2009; UNECE 2013). The definition of an episode

is that of a time interval during which all dimensions of the diary (activity, enjoyment, location and who else was present, in the case of MCS) remain constant[5].

Table 7 provides information on activity episodes by mode of completion, diary quality, and survey phase. The overall mean number of episodes is 25.5. This is remarkably high when compared with results from stand-alone national time-use surveys focusing on the same age group. For example, good quality diaries from adolescents aged 14-15 in the 2009-2010 Spanish Time Use Survey and the 2000-2001 UK Time Use Survey produced an average of 21 episodes. We reviewed results from 22 time-use surveys focusing on the same age group. MCS time-use diaries produce the highest number of episodes, with the sole exception of the 2008 Spanish Time Use Survey that also generated a mean number of 25.9.

It is important to note that MCS produces this number of episodes by using a "light" pre-coded record, whereas other studies rely on diaries where respondents describe their days in their own words. Such open-ended time diaries generally generate a higher number of episodes than "light" diaries (UNECE 2013). Although the MCS diaries do not collect information on secondary activities like diaries of stand-alone time-use surveys usually do, they measure enjoyment, so they contain the same number of dimensions as other studies. We investigated the contribution of the enjoyment dimension to episode change, and found it to be minimal: In the pilot, between 0.9% and 4.3% of episodes changed on the basis of emotion only, while in the DR the "emotion only" new episodes accounted for 0.9% to 2.1% of episodes across different modes. This finding suggests that the considerably higher number of episodes in the MCS data cannot be attributed to the additional affect column included in the instrument. Overall, results demonstrate that the MCS time-use element has been very successful in engaging young respondents to produce rich accounts of their daily lives.

[5] Some time use diary collection modes enable respondents to self-define the start of a new episode even when dimensions recorded in the diary do not change. For instance, a young person may shift from swimming practice to diving practice in the same sports facility and in the presence of the same people with the same level of enjoyment. This difference might matter to the respondent but not be captured in the codes used in the survey. The MCS modes do not capture such instances.

Table 7. Mean Number of Episodes by Mode of Completion, Diary Quality, and Survey Phase

Episodes		Web			App			Paper			All diaries		
		Mean	*min*	*max*	*Mean*	*min*	*max*	*Mean*	*min*	*max*	*Mean*	*min*	*max*
Pilot	Good diary, no missing activity time	27.8	16	35	21.6	8	50	30.2	9	41	26.1	8	50
	Usable, some missing activity time	35.5	28	43	26.1	11	64	23.8	7	36	26.4	7	64
	Not usable, some activity time	28.0	25	31	12.8	3	42	22.3	18	27	16.6	3	42
	All diaries with at least some reporting	28.8	16	43	20.7	3	64	25.6	7	41	23.7	3	64
	Non-diaries	1	1	1	no cases	no cases	no cases	1	1	1	1	1	1
Dress rehearsal	Good diary, no missing activity time	26.4	9	40	21.4	8	40	32.4	12	53	25.2	8	53
	Usable, some missing activity time	no cases	no cases	no cases	no cases	no cases	no cases	34.2	20	45	34.2	20	45
	Not usable, some activity time	12	12	12	7.2	3	22	17.2	6	34	13.8	3	34
	All diaries with at least some reporting	25.5	9	40	19.1	3	40	26.9	6	53	23.3	3	53
	Non-diaries	1	1	1	no cases	no cases	no cases	1	1	1	1	1	1
	All diaries with no missing activity time	27.0	9	40	21.4	8	50	31.7	9	53	25.5	8	53
	All usable diaries	27.6	9	43	22.9	8	64	30.7	7	53	26.1	7	64
	Total diaries (excluding non-diaries)	27.1	9	43	19.7	3	64	26.5	6	53	23.3	3	64

Paper diaries produce a remarkably high number of episodes. For example, when examining good quality diaries with no missing time from the DR, we find that paper diaries produce a mean number of 32 episodes, as opposed to 26 for the web and 21 for the App. Patterns are similar, albeit less pronounced, in the pilot data. These results suggest that the trade-off between modes is not straightforward, and demonstrate the strength of the traditional paper time-grid approach in capturing variation in daily life patterns. In a similar manner, web diaries consistently yield a higher number of episodes than app diaries.

The lower number of episodes captured by app diaries partly can be attributed to the coterminous nature of different diary dimensions in the app. However, it should be acknowledged that, with a mean number of 22.9 episodes across all usable diaries, this mode still yields a higher number of episodes than the majority of national time-use surveys focusing on the same age group, many of which used collection modes associated with higher episode reporting (i.e. paper).

Overall, results suggest that the time-grid approach yields a higher number of episodes. However, more research is needed to disentangle possible sample selection effects.

Activity Distributions

The final section of our analysis looks at the distribution of activities across the three modes. We examine the average time reported in each of the activities by mode of completion (Table 8). We also examine average time by participants of those activities only, which refers to those young people who reported at least one episode doing a specific activity in their record (Table 9). Finally, we also provide participation rates, which refer to the percentage of records that report time in each activity (Table 10). Our analysis includes “imputed” categories that were created during full record processing.

Results are encouraging. Average daily time spent in different activities is similar across different modes, with only a few exceptions: Face-to-face socialising is much higher for app diarists: 1hour and 44 minutes across all usable app records as opposed to 49 minutes in web records and 39 minutes in the paper records. The difference remains pronounced when focusing on participants only (Table 8). The participation rate is also considerably higher (25% for app diarists, 10% for online diarists, and 5% for paper diarists).

Another finding that is worth mentioning is that diarists using the paper mode report more time browsing or updating social network sites than online and app diarists. The difference becomes more pronounced among participants only (Table 8). Findings on other technology and media use are more intuitive – for example, more app and online users watch DVDs and download videos (Table 9). There are also some interesting differences in reports of travelling by mode of completion, but these may be explained by the small sample sizes in these testing phases.

Table 8. Average Time Spent on Different Activities. Good Quality Diaries (standard deviations in parentheses)

	All	Web	App	Paper
Sleep, rest, sick in bed	8 hr 55 min	8 hr 49 min	9 hr 4 min	8 hr 46 min
	(2 hr 33 min)	(2 hr 55 min)	(2 hr 27 min)	(2 hr 20 min)
Imputed sleep	28 min	28 min	32 min	23 min
	(1 hr 32 min)	(1 hr 54 min)	(1 hr 23 min)	(1 hr 26 min)
Personal care	1 hr 9 min	1 hr 21 min	1 hr 3 min	1 hr 8 min
	(1 hr 33 min)	(1 hr 47 min)	(1 hr 24 min)	(1 hr 35 min)
Imputed personal care and arrangements	1 hr 47 min	1 hr 13 min	1 hr 47 min	2 hr 27 min
	(1 hr 51 min)	(1 hr 3 min)	(1 hr 58 min)	(2 hr 7 min)
Homework	10 min	9 min	15 min	4 min
	(36 min)	(37 min)	(41 min)	(20 min)
In class	58 min	1 hr 21 min	52 min	44 min
	(2 hr 4 min)	(2 hr 17 min)	(2 hr 5 min)	(1 hr 45 min)
School breaks	8 min	12 min	8 min	5 min
	(26 min)	(26 min)	(30 min)	(18 min)
School clubs	1 min	4 min	No reports	No reports
	(8 min)	(14 min)		
Detention	No reports	No reports	No reports	No reports
Paid work	2 min	No reports	4 min	No reports
	(18 min)		(27 min)	
Unpaid work for family business	2 min	1 min	4 min	No reports
	(14 min)	(5 min)	(20 min)	
Cook, clean, or shop for household	23 min	18 min	23 min	30 min
	(46 min)	(34 min)	(45 min)	(59 min)

Fix things around house, gardening	1 min	2 min	2 min	No reports
	(7 min)	(9 min)	(8 min)	
Look after other child in household	2 min	2 min	2 min	1 min
	(10 min)	(9 min)	(12 min)	(6 min)
Look after parent or other adult in household	No reports	No reports	No reports	No reports
Look after animals	10 min	6 min	12 min	9 min
	(30 min)	(18 min)	(36 min)	(27 min)
Eat or drink in a restaurant or café	8 min	7 min	2 min	20 min
	(23 min)	(20 min)	(10 min)	(36 min)
Eat a meal	54 min	1 hr 4 min	49 min	51 min
	(44 min)	(51 min)	(44 min)	(34 min)
Eat a snack or have a drink	10 min	17 min	7 min	7 min
	(28 min)	(45 min)	(21 min)	(12 min)
Cycling	1 min	1 min	No reports	1 min
	(1 min)	(2 min)		(2 min)
Individual ball games and training	2 min	1 min	No reports	5 min
	(10 min)	(5 min)		(19 min)
Jog, run, walk, hike	3 min	No reports	6 min	1 min
	(13 min)		(18 min)	(3 min)
Team ball games and training	6 min	1 min	5 min	13 min
	(23 min)	(4 min)	(20 min)	(37 min)
Swimming and other water sports	3 min	No reports	2 min	10 min
	(17 min)		(7 min)	(33 min)
Other physical exercise	11 min	3 min	16 min	8 min
	(35 min)	(9 min)	(47 min)	(22 min)
Travel by bus, taxi, tube, plane	12 min	No reports	18 min	12 min
	(30 min)		(33 min)	(26 min)
Travel by car, van	8 min	14 min	No reports	16 min

	(19 min)	(17 min)		(30 min)
Travel by physically active means	8 min	15 min	5 min	7 min
	(21 min)	(26 min)	(18 min)	(19 min)
Unreported travel	2 min	1 min	2 min	3 min
	(8 min)	(5 min)	(6 min)	(12 min)
Attend live sporting events	1 min	4 min	1 min	No reports
	(13 min)	(24 min)	(3 min)	
Cinema, theatre, performance, gig	7 min	No reports	6 min	15 min
	(37 min)		(31 min)	(1 hr 1min)
Exhibition, museum, library, other events	7 min	1 min	9 min	11 min
	(38 min)	(7 min)	(47 min)	(40 min)
Shopping, window shopping, hanging out	19 min	13 min	21 min	20 min
	(1 hr 0 min)	(47 min)	(1 hr 12 min)	(50 min)
Speak on phone, Skype, video calls	6 min	11 min	3 min	4 min
	(26 min)	(41 min)	(18 min)	(17 min)
Socialising face-to-face	1 hr 13 min	49 min	1 hr 44 min	39 min
	(2 hr 1 min)	(1 hr 37 min)	(2 hr 17 min)	(1 hr 38 min)
Answer emails, instant messaging, texting	9 min	10 min	8 min	8 min
	(26 min)	(25 min)	(22 min)	(36 min)
Browse or update social networking sites	35 min	18 min	34 min	59 min
	(1 hr 15 min)	(31 min)	(1 hr 13 min)	(1 hr 46 min)
General internet browsing, programming	14 min	32 min	9 min	5 min
	(50 min)	(1 hr 11 min)	(45 min)	(15 min)
Listen to music, radio, iPod, other audio	16 min	26 min	17 min	3 min
	(50 min)	(58 min)	(56 min)	(8 min)
Play electronic games and Apps	37 min	48 min	39 min	21 min
	(1 hr 22 min)	(1 hr 8 min)	(1 hr 39 min)	(52 min)
Watch TV, DVDs, downloaded videos	2 hr 3 min	2 hr 15 min	1 hr 53 min	2 hr 8 min
	(2 hr 26 min)	(1 hr 46 min)	(2 hr 53 min)	(2 hr 12 min)

Volunteering	1 min	5 min	No reports	No reports
	(15 min)	(27 min)		
Religious activities	13 min	27 min	11 min	No reports
	(83 min)	(2 hr 24 min)	(49 min)	
Did nothing, just relax, bored, waiting	22 min	25 min	17 min	29 min
	(45 min)	(54 min)	(39 min)	(46 min)
Hobbies, arts and crafts, music, writing	7 min	14 min	5 min	No reports
	(29 min)	(44 min)	(23 min)	
Reading (not for school)	13 min	11 min	2 min	36 min
	(59 min)	(30 min)	(17 min)	(1 hr 52 min)
Other activities not listed	44 min	36 min	50 min	41 min
	(1 hr 23 min)	(1 hr 13 min)	(1 hr 32 min)	(1 hr 20 min)
Missing activity time	10 min	3min	13 min	13 min
	(21 min)	(15 min)	(24 min)	(20 min)

Table 9. Average Time Spent on Different Activities. Good Quality Diaries. Participants Only (standard deviations in parentheses)

	All	Web	App	Paper
Sleep, rest, sick in bed	9 hr 0 min	9 hr 8 min	9 hr 4 min	8 hr 46 min
	(2 hr 24 min)	(2 hr 26 min)	(2 hr 27 min)	(2 hr 0 min)
Imputed sleep	3 hr 53 min	3 hr 28 min	3 hr 50 min	4 hr 55 min
	(2 hr 33 min)	(4 hr 34 min)	(1 hr 3 min)	(2 hr 29 min)
Personal care	1 hr 27 min	1 hr 27 min	1 hr 25 min	1 hr 33 min
	(1 hr 37 min)	(1 hr 48 min)	(1 hr 28 min)	(1 hr 41 min)
Imputed personal care and arrangements	2 hr 12 min	1 hr 21 min	2 hr 23 min	2 hr 53 min
	(1 hr 49 min)	(1 hr 2 min)	(1 hr 56 min)	(2 hr 0 min)
Homework	1 hr 33 min	1 hr 30 min	1 hr 33 min	1 hr 40 min
	(1 hr 5 min)	(1 hr 35 min)	(1 hr 3 min)	(0 min)
In class	5 hr 12 min	5 hr 4 min	5 hr 34 min	4 hr 43 min
	(47 min)	(27 min)	(58 min)	(44 min)
School breaks	1 hr 9 min	1 hr 2 min	1 hr 40 min	40 min
	(40 min)	(13 min)	(50 min)	(44 min)
School clubs	55 min	55 min	No reports	No reports
	(7 min)	(7 min)		
Detention	No reports	No reports	No reports	No reports
Paid work	3 hr 10 min	No reports	3 hr 10 min	No reports
	(0 min)		(0 min)	
Unpaid work for family business	1 hr 3 min	30 min	1 hr 13 min	No reports
	(43 min)	(0 min)	(45 min)	
Cook, clean, or shop for household	1 hr 13 min	1 hr 1 min	1 hr 8 min	1 hr 39 min
	(55 min)	(36 min)	(56 min)	(1 hr 9 min)

Fix things around house, gardening	43 min	50 min	40 min	No reports
	(12 min)	(0 min)	(14 min)	
Look after other child in household	44 min	35 min	1 hr 0 min	30 min
	(17 min)	(7 min)	(14 min)	(0 min)
Look after parent or other adult in household	No reports	No reports	No reports	No reports
Look after animals	1 hr 1 min	43 min	1 hr 10 min	1 hr 0 min
	(50 min)	(33 min)	(59 min)	(47 min)
Eat or drink in a restaurant or café	51 min	37 min	40 min	1 hr 5 min
	(34 min)	(32 min)	(17 min)	(37 min)
Eat a meal	1 hr 3 min	1 hr 14 min	1 hr 0 min	55 min
	(42 min)	(48 min)	(42 min)	(32 min)
Eat a snack or have a drink	39 min	50 min	40 min	24 min
	(46 min)	(1 hr 8 min)	(35 min)	(9 min)
Cycling	10 min	10 min	No reports	10 min
	(0 min)	(0 min)		(0 min)
Individual ball games and training	36 min	20 min	No reports	47 min
	(31 min)	(0 min)	(min)	(38 min)
Jog, run, walk, hike	31 min	No reports	36 min	10 min
	(31 min)		(33 min)	(0 min)
Team ball games and training	1 hr 16 min	20 min	1 hr 23 min	1 hr 25 min
	(46 min)	(0 min)	(15 min)	(59 min)
Swimming and other water sports	45 min	No reports	25 min	1 hr 5 min
	(48 min)		(6 min)	(1 hr 5 min)
Other physical exercise	1 hr 0 min	20 min	1 hr 32 min	40 min
	(1 hr 4 min)	(12 min)	(1 hr 17 min)	(37 min)
Travel by bus, taxi, tube, plane	47 min	No reports	49 min	43 min
	(46 min)		(50 min)	(34 min)

Travel by car, van	31 min (26 min)	26 min (15 min)	No reports	38 min (37 min)
Travel by physically active means	34 min (32 min)	28 min (30 min)	48 min (37 min)	43 min (33 min)
Unreported travel	24 min (18 min)	30 min (0 min)	18 min (11 min)	35 min (35 min)
Attend live sporting events	1 hr 15 min (78 min)	2 hr 10 in (0 min)	20 min (0 min)	No reports
Cinema, theatre, performance, gig	2 hr 55 min (1 hr 31 min)	No reports	2 hr 35 min (35 min)	3 hr 15 min (2 hr 29 min)
Exhibition, museum, library, other events	2 hr 36 min (1 hr 33 min)	40 min (0 min)	3 hr 45 min (1 hr 46 min)	2 hr 25 min (21 min)
Shopping, window shopping, hanging out	2 hr 4 min (1 hr 48 min)	1 hr 38 min (1 hr 42 min)	2 hr 31 min (2 hr 20 min)	1 hr 46 min (1 hr 5 min)
Speak on phone, Skype, video calls	1 hr 27 min (1 hr 2 min)	1 hr 53 min (1 hr 25 min)	1 hr 20 min (57 min)	55 min (35 min)
Socialising face-to-face	2 hr 57 min (2 hr 11 min)	2 hr 15 min (2 hr 1 min)	3 hr 16 min (2 hr 11 min)	2 hr 47 min (2 hr 31 min)
Answer emails, instant messaging, texting	51 min (45 min)	43 min (36 min)	44 min (34 min)	1 hr 45 min (1 hr 46 min)
Browse or update social networking sites	1 hr 40 min (1 hr 38 min)	49 min (33 min)	1 hr 41 min (1 hr 38 min)	2 hr 34 min (2 hr 3 min)
General internet browsing, programming	1 hr 58 min (1 hr 35 min)	2 hr 0 min (1 hr 33 min)	3 hr 40 min (1 hr 39 min)	43 min (15 min)
Listen to music, radio, iPod, other audio	1 hr 22 min (1 hr 27 min)	1 hr 18 min (1 hr 20 min)	1 hr 48 min (1 hr 46 min)	23 min (12 min)
Play electronic games and Apps	2 hr 13 min (1 hr 45 min)	1 hr 43 min (1 hr 6 min)	3 hr 3 min (2 hr 23 min)	1 hr 50 min (1 hr 8 min)

Watch TV, DVDs, downloaded videos	2 hr 58 min (2 hr 25 min)	2 hr 36 min (1 hr 38 min)	3 hr 6 min (3 hr 9 min)	3 hr 16 min (1 hr 55 min)
Volunteering	2 hr 30 min (0 min)	2 hr 30 min (0 min)	No reports	No reports
Religious activities	4 hr 34 min (5 hr 6 min)	6 hr 50 min (8 hr 57 min)	3 hr 3 min (1 hr 50 min)	No reports
Did nothing, just relax, bored, waiting	1 hr 6 min (57 min)	1 hr 14 min (1 hr 13 min)	59 min (54 min)	1 hr 9 min (47 min)
Hobbies, arts and crafts, music, writing	1 hr 40 min (59 min)	1 hrs 48 min (1 hr 15 min)	1 hr 30 min (44 min)	No reports
Reading (not for school)	2 hr 33 min (2 hr 30 min)	1 hr 6 min (43 min)	2 hr 0 min (0 min)	5 hr 10 min (2 hr 53min)
Other activities not listed	2 hr 15 min (1 hr 35 min)	2 hr 1 min (1 hr 28 min)	2 hr 15 min (1 hr 46 min)	2 hr 33 min (1 hr 21 min)
Missing activity time	39 min (24 min)	45 min (50 min)	41 min (25 min)	33 min (20 min)

Table 10. Participation Rate by Mode of Completion; Good Quality diaries.

	All	Web	App	Paper
Sleep, rest, sick in bed	99.1%	96.7%	100.0%	100.0%
Imputed sleep	12.1%	13.3%	13.7%	7.7%
Personal care	79.4%	93.3%	74.5%	73.1%
Imputed personal care and arrangements	81.3%	90.0%	74.5%	84.6%
Homework	11.2%	10.0%	15.7%	3.8%
In class	18.7%	26.7%	15.7%	15.4%
School breaks	12.1%	20.0%	7.8%	11.5%
School clubs	1.9%	6.7%	0.0%	0.0%
Detention	0.0%	0.0%	0.0%	0.0%
Paid work	0.9%	0.0%	2.0%	0.0%
Unpaid work for family business	3.7%	3.3%	5.9%	0.0%
Cook, clean, or shop for household	31.8%	30.0%	33.3%	30.8%
Fix things around house, gardening	2.8%	3.3%	3.9%	0.0%
Look after other child in household	4.7%	6.7%	3.9%	3.8%
Look after parent or other adult in household	0.0%	0.0%	0.0%	0.0%
Look after animals	15.9%	13.3%	17.6%	15.4%
Eat or drink in a restaurant or café	15.9%	20.0%	5.9%	30.8%
Eat a meal	86.0%	86.7%	82.4%	92.3%
Eat a snack or have a drink	25.2%	33.3%	17.6%	30.8%
Cycling	1.9%	0.9%	0.0%	0.9%
Individual ball games and training	4.7%	1.9%	0.0%	2.8%
Jog, run, walk, hike	9.3%	0.0%	7.5%	1.9%
Team ball games and training	7.5%	0.9%	2.8%	3.7%
Swimming and other water sports	7.5%	0.0%	3.7%	3.7%

Other physical exercise	17.8%	4.7%	8.4%	4.7%
Travel by bus, taxi, tube, plane	24.3%	0.0%	17.8%	6.5%
Travel by car, van	25.2%	15.0%	0.0%	10.3%
Travel by physically active means	23.4%	15.0%	4.7%	3.7%
Unreported travel	7.5%	0.9%	4.7%	1.9%
Attend live sporting events	1.9%	0.9%	0.9%	0.0%
Cinema, theatre, performance, gig	3.7%	0.0%	1.9%	1.9%
Exhibition, museum, library, other events	4.7%	0.9%	1.9%	1.9%
Shopping, window shopping, hanging out	15.0%	3.7%	6.5%	4.7%
Speak on phone, Skype, video calls	6.5%	2.8%	1.9%	1.9%
Socialising face-to-face	41.1%	10.3%	25.2%	5.6%
Answer emails, instant messaging, texting	16.8%	6.5%	8.4%	1.9%
Browse or update social networking sites	35.5%	10.3%	15.9%	9.3%
General internet browsing, programming	12.1%	7.5%	1.9%	2.8%
Listen to music, radio, iPod, other audio	19.6%	9.3%	7.5%	2.8%
Play electronic games and Apps	28.0%	13.1%	10.3%	4.7%
Watch TV, DVDs, downloaded videos	69.2%	24.3%	29.0%	15.9%
Volunteering	0.9%	0.9%	0.0%	0.0%
Religious activities	4.7%	1.9%	2.8%	0.0%
Did nothing, just relax, bored, waiting	33.6%	9.3%	14.0%	10.3%
Hobbies, arts and crafts, music, writing	6.5%	3.7%	2.8%	0.0%
Reading (not for school)	8.4%	4.7%	0.9%	2.8%
Other activities not listed	32.7%	8.4%	17.8%	6.5%
Missing activity away from home	0.0%	0.0%	0.0%	0.0%
Missing activity time	26.2%	1.9%	15.0%	9.3%

Some activity distributions also reflect the quality of the time diary accounts. We expect the majority of respondents to have spent some time in sleep or rest, some form of personal care, and some eating or drinking during the day. We previously discussed reporting of eating in the MCS records in the discussion of secondary activity in the Research Design section. Table 10 reveals this eating issue in the context of other activity reporting. A related under-reporting of personal care also appears in Table 12, primarily associated with the app records, where reporting of personal care is lower (though still present in more than three quarters of records). More reassuringly, virtually all diaries contain some form of sleep or rest.

In general, results show a consistent picture of time allocation and participation. However, future multivariate analyses need to examine the influence of background characteristics on reported behavior in order to disentangle sample selection and mode effects.

Concluding remarks

This working paper presented the mixed-mode time diary approach followed by the MCS Age 14 Survey for the collection of information on cohort members' daily life and time allocation. The MCS time diary will generate unique and detailed measures of behaviour patterns in early adolescence, which can also be triangulated with existing MCS survey questions on activity participation to produce estimates of longer-term time-use patterns. The diary data will thus become particularly useful as the cohort matures, expanding research opportunities for life-course and longitudinal research across a range of domains.

At the same time, the new time diary instruments designed for MCS offer important insights into the use of new technologies for the collection of time diary data. Our analyses of pilot and Dress Rehearsal data demonstrate the overall high quality of both the smartphone time-use app and the web diary. Data quality improvement and reduction of post-fieldwork costs are crucial for future time-use research. This study provides evidence for the potential contribution of new technologies towards this direction. Our future research with time diary data from the main stage MCS survey will further evaluate response patterns and data quality, and allow separation of sample selection and mode effects.

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Appendix: MCS Age 14 Time Use Record Survey Materials

ACTIVITY LIST

Activity Type	Activities
Sleep and personal care	Sleeping and resting (including sick in bed)
	Personal care (including taking a shower/bath, grooming, getting dressed etc.)
School, homework, and education	Homework
	In class
	School breaks
	School clubs
	Detention
Paid or unpaid work	Paid work (including paid babysitting and paid work for the family)
	Unpaid work for family or other non-household (e.g. help in family business)
Chores, housework, and looking after people or animals	Cooking, cleaning, and shopping for the household
	Fixing things around the house, fixing bike, gardening
	Looking after brothers, sisters, other children in the household
	Looking after parent or other adult in the household (medical or personal care)
	Looking after animals
Eating and drinking	Eating or drinking in a restaurant or café
	Eating a meal
	Eating a snack or having a drink
Physical exercise and sports	Cycling
	Individual ball games and training (e.g. tennis, badminton)
	Jogging, running, walking, hiking
	Team ball games and training (e.g. football, hockey)
	Swimming and other water sports
	Other exercise (e.g. dancing, keeping fit) and other sports (e.g. skateboarding, gymnastics)
Travelling (including walking to school)	Travel by bus, taxi, tube, plane
	Travel by car, van (including vehicles owned by friends and family)
	Travel by physically active means (walk, bike etc.)
Social time and family time	Attending live sporting events
	Cinema, theatre, performance, gig etc.
	Exhibition, museum, library, other cultural events
	Shopping (including window shopping, hanging out at shopping centre)
	Speaking on the phone (including Skype, video calls)
	Speaking, socialising face-to-face
Internet, TV, and digital media	Answering emails, instant messaging, texting
	Browsing and updating social networking sites (e.g. Twitter, Facebook, BBM, Snapchat)
	General internet browsing, programming (not time on social networking sites)
	Listening to music, radio, iPod, other audio content
	Playing electronic games and Apps
	Watch TV, DVDs, downloaded videos
Volunteering and religious activities	Volunteering
	Religious activities (including going to places of worship, praying etc.)
Hobbies and other free time activities	Did nothing, just relaxing, bored, waiting
	Hobbies, arts and crafts, musical activities, writing stories, poetry etc.
	Reading (not for school)
Any other activity	Other activities not listed

Ipsos MORI 13-025042-02/B04

CHILD OF THE NEW CENTURY

AGE 14 SURVEY

TIME-USE NOTEBOOK

WHAT DID YOU DO TODAY?

Day ☐ _____ / /

Day (Mon-Sun) DD MM YYYY

This notebook is for you to use to write down what you are doing on the day written above. This will help you remember what you were doing when you fill in your time-use record.

HOW TO USE THIS NOTEBOOK

Please write down what you do - from waking up to going to sleep - along with the time you started doing it, like this.

Time	What did you do?
8:20	Had a shower
8:40	Got dressed
8:50	Had breakfast
9:20	Walked to the bus stop

- The best way to complete this notebook is to carry it with you and fill it in throughout the day.
- Remember to include things like getting dressed, eating and drinking, travelling, and waiting around or doing nothing.
- If you feel something is too personal to write down, just write 'personal'.
- If it's a school day, you should write in the times that you were in class but you don't need to write in what you did in class.
- You should also write in all the times you were eating and drinking during the day.
- There is a list of activities on the back page of this notebook, which also appears in the time-use record. When you fill in your time-use record, you will need to decide which of the activities on the list best describes what you were doing.

THANK YOU!


WHAT TIME DID YOU WAKE UP?
TIME:
WHAT DID YOU DO?
TIME:
WHAT DID YOU DO?
WHAT TIME DID YOU GO TO SLEEP?

CHILD OF THE NEW CENTURY

AGE 14 SURVEY

TIME-USE RECORD

APP

This leaflet gives you more information about how to log in to and use the time-use record. Please keep it safe and don't lose it!

Please tell us how you spent your time by completing the time-use record for both of your days.

FOR EACH DAY, WE WOULD LIKE TO KNOW:

- What you were doing
- Where you were
- Who you were with
- How much you liked each activity

For each day, please make sure that you fill in what you were doing from 4am to 4am, and try not to miss out any times. If you used your paper time-use notebooks to write down how you spent your time, you can use these to help you remember what you did when you fill in your record using the app. The activity list printed on the back of your notebooks is the same as the list you will be asked to select your activities from in the app record.

HOW TO DOWNLOAD THE APP AND LOG IN

- Go to the app store (if you are using an Apple device) or to Google Play (if you are using an Android device) and search for 'Ipsos Mobile'. You can also find the app by typing: https://bit.ly/ipsosmobile into the internet browser of your smartphone or tablet.
- Download the 'Ipsos Mobile' app onto your Apple or Android smartphone or tablet. You will not need to pay for the app but it is best to connect to a wifi network to avoid possible data charges. Note that the app will not work on Windows or Blackberry devices. If you have any difficulties accessing the app please call 0808 238 5446 or email childnc@ipsos.com
- Open the Ipsos Mobile app. You will see the following screen. (The screenshots in this leaflet are from an Android phone. Your screen may look slightly different if you are using a different device).

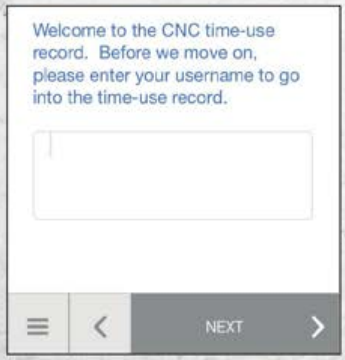
From this screen, enter your username:

Affix log-in sticker

You do not need to enter a password.

Touch 'Log in'

- You will see the following screen. Enter your username again, then touch 'Next'.



There is a short delay between your interviewer visit and your record being ready to fill in. If your record is not yet ready to fill in, you will be asked to come back to it later. It will be ready to fill in by your first selected day.

GETTING STARTED

After you have logged in, you will see this screen:

From this screen you can see a guide to the time-use app. This will show you how to fill it in. You should go through the guide before starting to fill in the record.

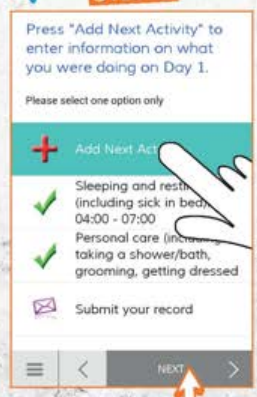
Your two days will be shown on the screen too (where it says Day 1 and Day 2 in the screenshot on the left). When you are ready to start filling one in, just touch it.

Make sure you fill in what you did for both of your days.

HOW TO FILL IT IN:

You need to enter all of the activities you do throughout each day, starting at 4am. For each activity, you will need to:

STEP 1



Select "Add next activity"

On some of the screens, you will need to scroll down to see all of the options.

STEP 2

Find the type of activity from the list and select it.

If you would prefer not to tell us what you were doing, please enter 'Any other activity'.

STEP 3

You will now see a list of more specific activities to choose from.

Choose the activity that best describes what you were doing.

STEP 4

What time did you finish eating a meal?

08 00

NEXT

Enter the time when you finished doing that activity.

After each activity, you will then be asked where you were, who you were with and how much you liked it.

04:00

SUBMIT

STEP 5

20:15

Cooking, cleaning, and shopping for the household: 20:15 - 20:45

Watching TV, DVDs, downloaded videos: 20:45 - 22:00

Personal care (including taking a shower/bath, grooming, getting dressed

Sleeping and resting (including sick in bed): 22:20 - 03:59

Submit your record

Back

NEXT

Once you have finished recording all your activities for the whole day you should touch '**Submit your record**'.

You will then be asked some final questions about filling it in. Remember to fill in what you did for both of your days!

It is best to submit your record while you are connected to the internet so that it is sent right away.

KEEPING YOUR INFORMATION PRIVATE

The app will automatically save your data as you go along. If you are completing your record on a smartphone or tablet which you share with other people, you should close the app when you are not using it.

Your login is just for you - nobody else has been given your login, so nobody else can see what you have entered.

THANK YOU FOR YOUR HELP

Ipsos MORI

13-025042-02/Z06

WHAT DO I DO WHEN I HAVE FINISHED FILLING IN ONE OF MY DAYS?

When you have finished filling in one of your days, click on the 'Submit' button to send it back to us. You can find the submit button at the bottom of the screen, and also at the top of the screen. It doesn't matter which one you use. You will then be shown a summary of what you have completed. You can go back to the record to fill in any gaps if you need to. You will also be asked some final questions about filling the record in.

Remember to fill in and submit both of your days!

HOW DO I MAKE SURE MY INFORMATION IS SAFE?

If you are completing your record on a computer which you share with other people, you should click 'Save and logout' at times you are not using it, so that nobody else can see what you have entered. When you return to your record, you will need to enter your login again.

Your login is just for you - nobody else has been given your login, so nobody else can see what you have entered.

THANK YOU FOR YOUR HELP

SUBMIT

Ipsos MORI

13-025042-02/Z05

CHILD OF THE NEW CENTURY

AGE 14 SURVEY

TIME-USE RECORD

ONLINE

This leaflet gives you more information about how to log in to and use the time-use record. Please keep it safe and don't lose it!

Please tell us how you spent your time by completing the time-use record for both of your days.

FOR EACH DAY, WE WOULD LIKE TO KNOW:

- What you were doing
- Where you were
- Who you were with
- How much you liked each activity

For each day, please make sure that you record what you were doing from 4am to 4am the next morning, and try not to miss out any times. If you used your paper time-use notebooks to write down how you spent your time, you can use these to help you remember what you did when you fill in your record online. The activity list printed on the back of your notebooks is the same as the list you will be asked to select your activities from in the online record.

HOW TO ACCESS THE TIME-USE RECORD AND LOG IN

- You will need to use a desktop computer, a laptop computer or a netbook. The computer must have a mouse.
- Go to the following web-page: www.cnc-time-use.com
- Enter your login: AFFIX LOGIN STICKER

There is a short delay between your interviewer visit and your record being ready to fill in. If your record is not yet ready to fill in, you will be asked to come back to it later. It will be ready to fill in by your first selected day.

You are now ready to begin filling in your time-use record. Please turn over to see how to do this.

BEFORE YOU START

To view your record properly your web browser view, or zoom, should be set to 100%. Press CTRL-0 to set this if you are using a Windows desktop or laptop or Command-0 for Apple.

GETTING STARTED

After you login, you will see some instructions for how to fill in the record online. Once you have read the instructions, click the 'Go to time-use record' button to access your time-use record.

We would like you to fill in what you did on both of your days. Your days are at the top left of the screen. For instance, if your days were Thursday 16th January and Sunday 19th January, they would look like this:

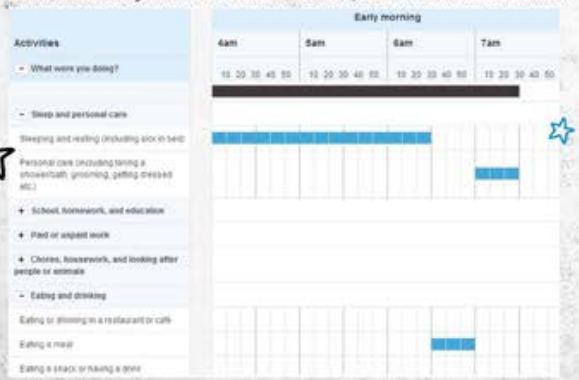
You can select which day you are filling in by clicking on it.

If you get stuck at any time, press the 'Help' button at the bottom left of the screen.

HOW TO FILL IT IN

For each day, the time-use record is a big grid. You will see a list of different types of activities down the side, and time going across the top.

To record what you have done, you need to find the type of activity that you were doing from the list, and then click on the + button to see the different activities in that group. You will then need to draw a line across the boxes using the mouse, from the time you started that activity to the time you stopped. You can do this by clicking and dragging from the start time to the end time. Alternatively, you can click once in each box to record the time. A blue bar will appear in the boxes for the times you have selected. For example, if you woke up at 6:30am, ate breakfast until 7:00am, then had a shower and got dressed until 7:30am, your lines would look like this:



The black bar at the top of the screen shows you the times you have filled in, so you can tell if you have left any gaps.

If you would prefer not to tell us what you were doing for any times during the day, please enter 'Any other activity'.

WHAT IF I WAS DOING SOMETHING ELSE AT THE SAME TIME?

If you were doing more than one activity (for instance, eating a snack while watching TV), you will need to decide which was your main activity, and record only that one. You can only record one activity at a time.

WHAT ELSE SHOULD I FILL IN?

At the bottom of the grid, please record for **each** activity where you were (the **green** question), who you were with (the **pink** question) and how much you liked it (the **purple** question), as shown in the screen below. You can do this by drawing lines across the boxes using the mouse. You will need to remember to scroll down on the screen to find these questions.

HOW CAN I FIND OUT MORE...

...ABOUT THE AGE 14 SURVEY?

If you would like more information about the Age 14 Survey please contact Ipsos MORI:

Stephan Tietz
Ipsos MORI
79-81 Borough Road
London
SE1 1FY

Freephone 0808 238 5446 (costs from mobile phones may vary, please check with your provider)

Email: childnc@ipsos.com

...ABOUT CHILD OF THE NEW CENTURY?

For more information about the study you can phone 0800 092 1250, or email childnc@ioe.ac.uk or visit the study website: www.childnc.net.

FOLLOW US

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THANK YOU FOR YOUR HELP

Ipsos MORI

13-025042-02/808

CHILD OF THE NEW CENTURY

AGE 14 SURVEY

WHAT WOULD WE LIKE YOU TO DO?

INFORMATION FOR STUDY MEMBERS

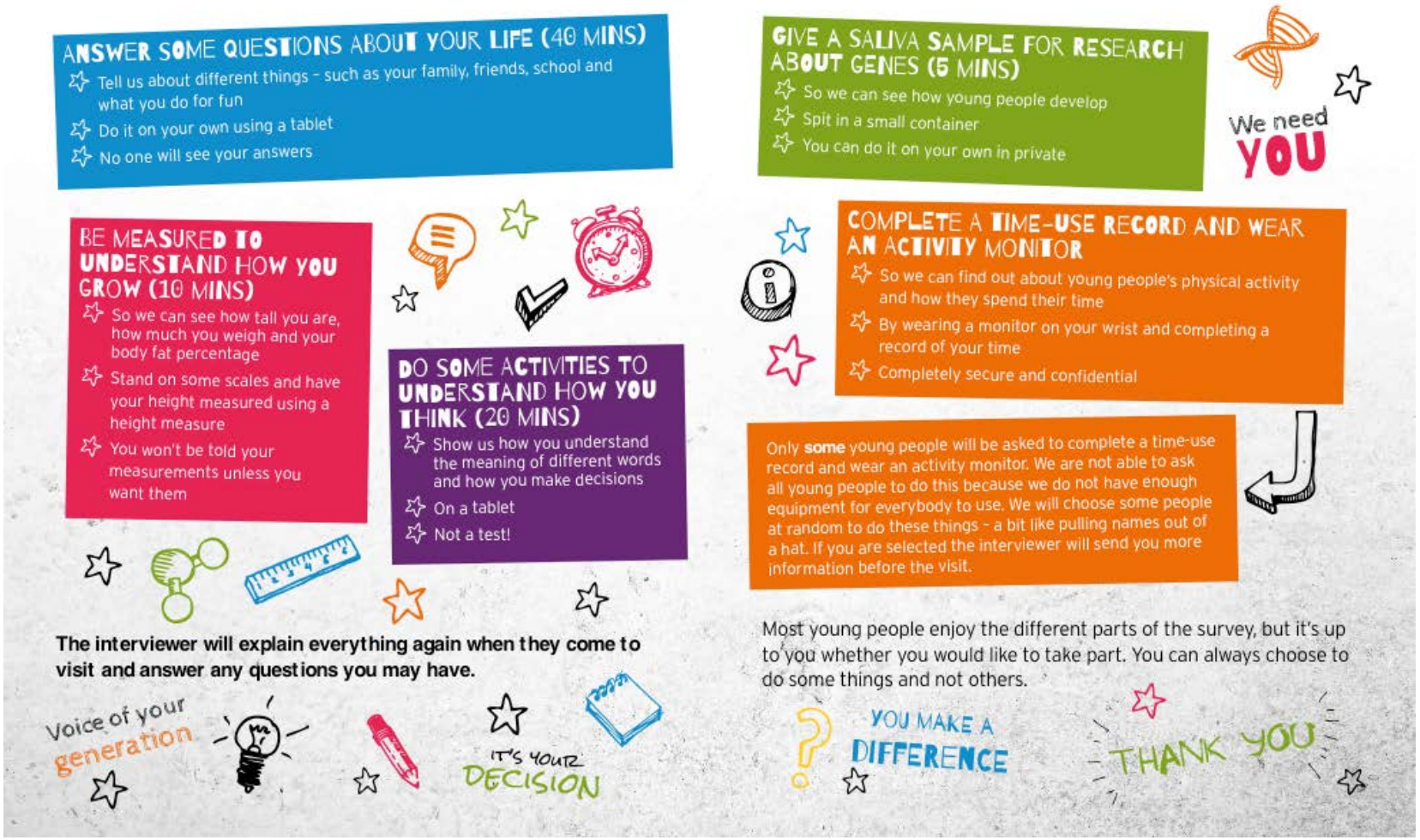
GIVE YOUR IDEAS

WHAT YOU DO WITH FREE TIME

MEASURE YOU UP

RELATIONSHIPS AND FAMILY

A QUICK GUIDE TO THE AGE 14 SURVEY



the country of your age. The study covers many different parts of young people's lives, including their health, education and what they do for fun, which helps us to see how everything fits together. Your unique contribution is incredibly valuable so we do hope that you will take part.

WHAT'S SO IMPORTANT ABOUT AGE 14?

Age 14 is a very important age – you are growing up and changing, and making some really important decisions about your future. In school you are likely to be choosing the subjects that you want to study for the next two years. You will also be experiencing new things, making new friends and thinking about what you want to do when you finish school.

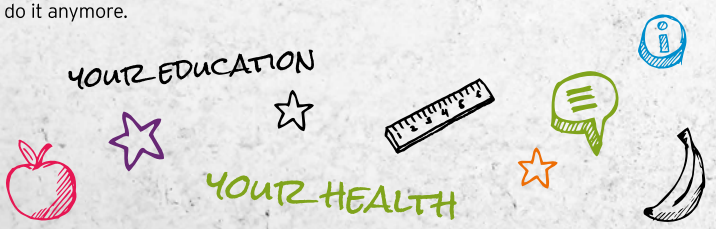
Because this is such an important age, we want to record how you think, what you do, and how you feel, so we can see how you've changed since you were younger.

DO I HAVE TO TAKE PART?

It's crucial that all different kinds of young people continue to take part in the study – we need to make sure we are representing all of the different voices of your generation.

Most young people enjoy the different parts of the survey, but it's up to you whether you would like to take part You can always choose to do some things and not others.

The interviewer will ask you about one activity at a time and you can say yes or no to each. You can stop at any time if you decide you don't want to do it anymore.



We will ask your parents' permission for you to give a saliva sample. We are required to get your parents' permission for this because of its special nature, and because you are not yet an adult. **Even if your parent says yes, it's still up to you whether you want to give the sample.**

WILL ANYONE ELSE IN MY FAMILY TAKE PART?

We would like to ask your parent(s) who live with you to answer some questions, do a word activity and give a saliva sample.

WHAT WILL I GET FOR TAKING PART?

As a thank you for your time, you will be given a small gift by the interviewer.

You're unique and the picture isn't complete without you. If you choose not to take part, we can't replace you with anyone else.

interviewer's tablet.

WHY?

These questions help us learn about different aspects of your life, like your family, friends, school, and what you do for fun.

HOW?

THE QUESTIONS ARE ABOUT DIFFERENT THINGS INCLUDING:

- How you spend your free time
- What you think about different issues
- How you feel about school and your future
- Your identity
- Your friends, family and relationships
- Things you might have experienced, like bullying
- Your body, health and feelings
- Your personality

It is not a test so there are no right or wrong answers. If you don't want to answer a question that's ok, you can skip it.

Some questions are about things that not all people your age will have done. We're just as interested in what people have done as well as what they haven't. It's important that you answer honestly.

Take as much time as you need. If you make a mistake or change your mind you can go back and change your answer.

The interviewer won't show or tell your answers to anyone.

measure how you think. **They are not like school tests**.

WHY?

How we think is an important part of who we are. By comparing these activities to your answers on other parts of the survey, we can figure out how things like your school, parents, and home life are related to how you think.

WHAT ARE THE ACTIVITIES?

WORD ACTIVITY –

This activity looks at how you understand the meaning of different words. The interviewer will show you a list of 20 words. For each word on this list, you need to pick another word, out of a total of five, which you think has the same meaning. The words get harder as they go on. Most young people will not know all the words, so don't worry if you don't.

DECISION-MAKING ACTIVITY –

This activity looks at how you make decisions. You will need to guess if a token is in a red or blue box on the screen, and decide how many points you want to risk on whether your guess is right.

BE MEASURED TO UNDERSTAND HOW YOU GROW (10 minutes)

We would like to measure how tall you are, how much you weigh, and your body fat percentage. It is ok if you only want some of the measurements taken or if you don't want any taken.

Why?

Taking these measurements helps us learn how 14-year-olds are growing. This is useful because we can look at how things like diet and lifestyle affect how you grow.

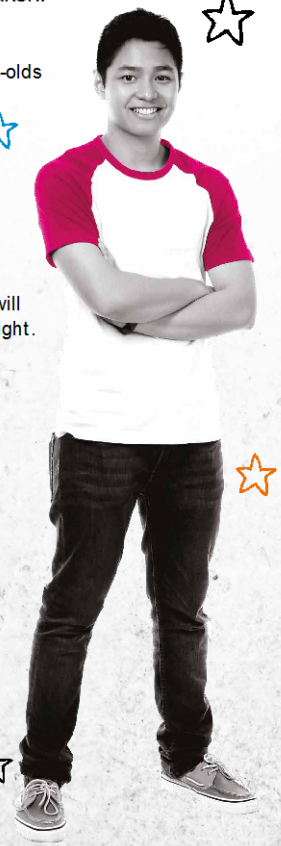
How?

The interviewer is trained in how to take these measurements and will make you feel comfortable.
They will ask you to take your shoes and socks off.
They will measure your height using a height measure.
They will need you to stand in a certain position. They will hold your head to make sure they measure your full height.

To weigh you and to take your body fat percentage, the interviewer will ask you to stand on some scales.

Your parent(s) will be in the room with you when you have your measurements taken.

The interviewer won't read your measurements out loud, or show or tell anyone (including your parent[s]). They won't tell you your measurements if you don't want to know them. If you do want to know them, they will give you a paper copy of the measurements. You can choose to have a copy of just some of them if you like.



GIVING A SALIVA SAMPLE FOR RESEARCH ABOUT GENES (5 minutes)

We will ask one of your parents whether they give permission for you to give a sample of your saliva. If your parent says yes, it will still be up to you whether you want to do it or not. We will also ask your parent(s) to give a saliva sample.

Why?

The saliva sample will be used for research about genes. Genes are made up of sections of DNA. Your DNA contains the information that makes you who you are. For example, the DNA in your genes determines if you have curly or straight hair, or your height. It can even control how you might smile or laugh.

Families pass traits from one generation to the next through their genes. But everyone has a slightly different set of genes – like your own personal recipe book.

It is important to study genes so we can understand the way people develop.

How?

Giving a saliva sample is very easy – the interviewer will explain how.

You will be given a small container and asked to spit into it. You can do it in private.

You should not eat, drink, smoke or chew gum for 30 minutes before giving a saliva sample.

There is no risk of harm to you or others when giving a saliva sample. Your parent(s) will be asked to do the same thing.

What will happen to the saliva samples?

The interviewer will post the saliva samples to a research laboratory at the University of Bristol. A sample of DNA will be taken from your saliva. We will **not** attach your name and address to the saliva sample when it goes to the laboratory.

GOT QUESTIONS?

Is there anything else you will ask me?

We would like to ask if you would be willing to give us your mobile phone number and email address (if you have one) so we can keep in touch with you about the study in the future. We will not give your contact details to anybody else, and we will not contact you about anything other than Child of the New Century.

If you are one of the young people who have been asked to wear an activity monitor and complete a time-use record, we will also ask if you would be happy for us to send you texts to remind you to complete them

What will happen to my information?

The information will be sent back to Ipsos MORI, the company doing the survey. The information will then be sent to the Institute of Education and added to the information collected from other young people in the survey. It will then be made available to researchers so they can find out more about your generation.

Will anyone see the information I gave?

We keep your name and address completely separate from the other information you give us. This way no one knows whose information is whose.

What if I have questions or concerns?

After you have taken part the interviewer will give you a leaflet with some further information and guidance in case you have any questions.

When will we be coming back?

We hope to visit the Children of the New Century every few years to see how they are growing up. We don't know yet when the next survey will be. We hope you will be willing to take part again. You can decide at the time whether you would like to help us again.

WhaT If i cHAnGe mY miNd IN t He f UTur E?

You can change your mind about taking part at any time by contacting us at:

Freepost RTKC-KLUU-RSBH
Child of the New Century
20 Bedford Way
London
WC1H 0AL
Tel: 0800 092 1250
Email: childnc@ioe.ac.uk

HOW CAN I FIND OUT MORE...

...About The AGE 14 Survey?

If you would like more information about the survey please contact Ipsos MORI:

Stephan Tietz
Ipsos MORI
79-81 Borough Road
London
SE1 1FY
Freephone 0808 238 5446 (costs from mobile phones may vary, please check with your provider)
Email: childnc@ipsos.com

...About Child of the New Century?

For further information about the study in general you can phone 0800 092 1250, or email childnc@ioe.ac.uk or visit the study website: www.childnc.net.

Follow us

@childnewcentury
www.facebook.com/childofthenewcentury

Ipsos MORI

Thank You for Your Help

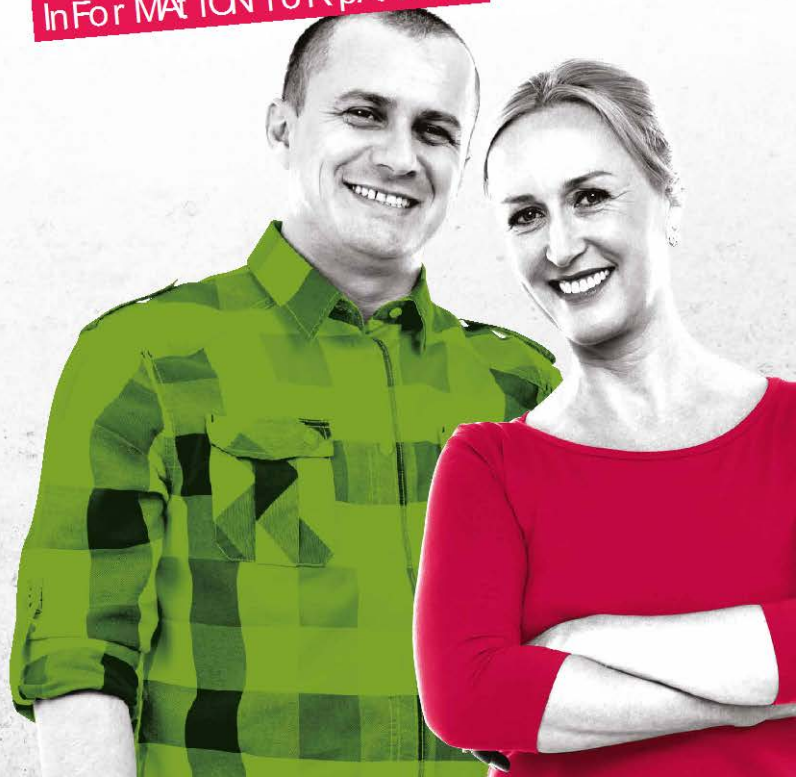
B-025042-02/B07

CHILD OF THE NEW CENTURY

age 14 survey

WHAT WOULD WE LIKE YOU AND YOUR CHILD TO DO?

Information for Parents



A QUICK GUIDE TO THE AGE 14 SURVEY

WE WOULD LIKE YOU TO:

ANSWER SOME QUESTIONS ABOUT YOUR FAMILY (55 MINS USUALLY WITH MUM/25 MINS USUALLY WITH DAD)

- Get a full understanding of family life by speaking to the parent(s) and/or partner living with the young person
- You don't have to answer anything you don't want to
- Some private questions which are completed yourself

COMPLETE A SHORT WORD ACTIVITY (5 MINS)

- Looks at people's understanding of the meaning of words
- On a tablet computer
- Not a test!

GIVE A SALIVA SAMPLE FOR GENETIC RESEARCH (5 MINS)

- So we can extract a sample of DNA for research purposes
- Spit in a small container
- You can do it on your own in private

The interviewer will arrange the visit for when is most convenient for you and your family. They can vary the order of activities depending on who is available. You do not all have to be there for all of it and some things can be done at the same time. The interviewer can also arrange to come back on a different day to finish if necessary.

Your participation is entirely voluntary. You do not have to do all of the activities. You can choose to do some and not others.

WE WOULD LIKE YOUR CHILD TO:

ANSWER SOME QUESTIONS ABOUT THEIR LIFE (40 MINS)

- So young people have the opportunity to tell us about their lives
- Do it on their own in private
- Questions are relevant to young people of their age

DO SOME ACTIVITIES TO UNDERSTAND HOW THEY THINK (20 MINS)

- So we can understand how young people understand the meaning of different words and how they make decisions
- On a tablet computer
- Not a test!

BE MEASURED TO UNDERSTAND HOW THEY ARE GROWING (10 MINS)

- So we can see how tall they are, how much they weigh and their body fat percentage
- By standing on some scales and having their height measured using a height measure
- No one will be told their measurements (including your child) if they don't want them to

GIVE A SALIVA SAMPLE FOR GENETIC RESEARCH (5 MINS)

- So we can see how young people develop
- By spitting in a small container
- They can do it on their own in private

COMPLETE A TIME-USE RECORD AND WEAR AN ACTIVITY MONITOR (ONLY SOME YOUNG PEOPLE)

- So we can find out about young people's physical activity and how they spend their time
- By wearing a monitor on their wrist and completing a record of their time
- Completely secure and confidential

We are not able to ask all young people to do this because we do not have enough equipment for everybody. If your child is randomly selected to do these things the interviewer will send you both more information before the visit.

We will ask for your consent before we ask your child to do each of the activities.

WHAT WOULD WE LIKE YOU TO DO?

ANSWER SOME QUESTIONS ABOUT YOUR FAMILY

We would like to ask you some questions about your family.

THE QUESTIONS COVER:

- Your family situation
- Your child's education
- Things you do with your child
- Your child's health
- Your health
- Your employment
- Your income and housing

If there are two parents (or a parent and their partner) living with the young person, we would like to speak with both of you. We would like to speak with one of you (usually Mum) for around **55 minutes**, and the other parent (usually Dad) for around **25 minutes**. We will ask fewer questions but on similar topics. This is important to get a full understanding of family life.

You don't have to answer anything you don't want to. For some questions, which might be more private, you will fill in the answers yourself on the interviewer's tablet computer. The tablet is easy to use, and the interviewer can show you what to do. We would also like you to answer a small number of questions on paper.

COMPLETE A SHORT WORD ACTIVITY

You will also be asked to do a short word activity. This looks at people's understanding of the meaning of words. This is the same activity that your child is doing (but with different words). It takes around **5 minutes**. More information is provided later in this booklet.

GIVE A SALIVA SAMPLE FOR GENETIC RESEARCH

We would also like to ask natural (biological) parents to provide a saliva sample for genetic research. This will take around **5 minutes**.

DO WE HAVE TO TAKE PART?

No. Your participation is entirely voluntary and you or your child can choose not to take part. You do not have to do all of the things described in this booklet. You can choose to do some and not others.

DO YOU STILL WANT ME TO TAKE PART IF MY CHILD DOESN'T WANT TO?

Yes. Even if your child does not want to take part we would still like you to take part. Your participation is extremely important to us.

WHAT WOULD WE LIKE YOUR CHILD TO DO?

ANSWER SOME QUESTIONS ABOUT THEIR LIFE (40 MINUTES)

We would like to ask your child to answer some questions on their own on the interviewer's tablet computer.

WHY IS THIS USEFUL?

Asking young people about their experiences and interests is important as it gives them the opportunity to talk about their lives. The information helps us to understand how different aspects of young people's lives – such as home, school, and social elements - affect their general wellbeing, emotional development, and educational progress. The information can also be compared to similar data collected from previous generations of young people around the same age, to understand how lifestyles have changed over time.

WHAT WILL WE BE ASKING YOUNG PEOPLE?

THE QUESTIONS ARE ABOUT A LOT OF DIFFERENT THINGS INCLUDING:

- How they spend their free time
- What they think about different issues
- How they feel about school and their future
- Their identity
- Their friends, family and relationships
- Their body, health and feelings
- Things they might have experienced, such as bullying
- Their personality

Most young people find the questions interesting and enjoyable to answer. They have been designed to reflect their lives and interests.

There are no right or wrong answers and if there are questions they don't want to answer they can skip them. It is important that young people answer the questions privately so we get their own answers.

Most questions will be relevant to all young people of their age. Some of the questions are about things that not all young people of this age will have done.

It is still important that all young people answer them so we know how many young people of this age have done these things.

If you would like to know more about what we will be asking your child, please ask the interviewer when they visit

WHAT WOULD WE LIKE YOUR CHILD TO DO?

DO SOME ACTIVITIES TO UNDERSTAND HOW THEY THINK (20 MINUTES)

We would like to ask your child to do two activities on a tablet computer which help us understand how they think.

WHY IS THIS USEFUL?

These activities help us understand how young people of this age think and learn. This is useful in understanding, for instance, the extent to which activities that young people do in and out of school influence their learning and skills development.

WHAT ACTIVITIES WOULD WE LIKE YOUR CHILD TO DO?

WORD ACTIVITY –

This activity looks at young people's understanding of the meaning of words. They will be shown a list of 20 words. For each word they have to choose another word out of five others which they think has the same meaning. The words get harder as they go on. **Most people will not know all the words**. This is the same activity that parents are asked to do (but using different words.

DECISION-MAKING ACTIVITY –

This activity looks at how young people make decisions. Young people will need to decide how many points they are prepared to risk on finding a token in a red or a blue box on the computer screen.

You are welcome to be present during these activities. However, please do not interrupt the activity or help your child so we make sure the results are their own.

Ideally, the activities should be carried out in a quiet, well-lit room at a table.

WHAT WOULD WE LIKE YOUR CHILD TO DO?

BE MEASURED SO WE CAN UNDERSTAND HOW THEY ARE GROWING (10 MINUTES)

We would like to measure your child's height, weight and body fat percentage.

WHY IS THIS USEFUL?

This provides valuable information about the growth of young people. For example, these measurements help to understand the extent to which diet and lifestyle contribute to young people being healthy. This helps policymakers decide which policies will be more effective in helping young people stay healthy - such as encouraging more physical activity or taxing sugar in soft drinks.

HOW DO WE MEASURE YOUR CHILD?

The height measurement will be taken using a device called a stadiometer. The interviewer will need to hold your child's head in a particular position in order to make sure their full height is measured.

For the weight and body fat measurements the interviewer will ask your child to stand on a special set of scales. The scales measure body fat by sending a weak electrical current around the body from one foot to the other. The electrical current is completely safe and painless. It cannot be felt at all.

We would like you to be present during the measurements, although the interviewer will have very little physical contact with your child.

The interviewer won't tell your child their measurements if they don't want to know. Your child will be offered a record of their measurements to keep if they would like it. It is up to your child if they want to show or tell these to anyone.

For the height and weight measurements, shoes and socks must be taken off, and for the weight measurement your child should remove any heavy clothing or items in their pockets.

GIVING A SALIVA SAMPLE FOR GENETIC RESEARCH

We are asking you and your child to give a saliva sample to extract a sample of DNA for research purposes.

We would like you to consent for your child to give a saliva sample as they are not yet an adult. We will also ask your child if they are happy to do this.

WHAT ARE GENES AND DNA?

Genes are the instructions which help determine the growth and development of all living things. For example, genes determine eye colour. Genes are made up of sections of DNA, which is the language our bodies use to write these instructions. Genes are inherited from our parents and they are the biological way parents pass on traits to their children. Everyone has a slightly different set of genes - so they are like our own personal recipe book.

WHY IS IT IMPORTANT TO STUDY GENES?

Researchers can use DNA samples to look at whether parents and their children have certain types of genes. Studying the relative importance of genes and other factors helps researchers to understand differences in young people's development, health, behaviour, growth and learning. For instance, recent research has identified genes associated with common allergies including pollen, dust-mite and cat allergies. It is believed that allergies are very often passed from one generation to the next. Understanding the genetic factors underlying allergies may be key to understanding who might be most likely to suffer from allergies and how this very common condition might best be treated.

WHO DO YOU WANT TO COLLECT DNA SAMPLES FROM?

As children inherit their genes from their parents, we would like to collect a saliva sample for DNA samples from natural (biological) parents who are living with the study child. This will allow researchers to understand which genes are passed from parent to child, and how parents' genes influence their children. As such, we are only collecting saliva samples from parents who are biologically related to the study child.

HOW DO YOU GIVE A SALIVA SAMPLE?

You and your child will be asked to spit your saliva into a small container. It is very easy and can be done in private. About half a teaspoon of saliva is needed. This typically takes about 5 minutes. There is no risk of harm to you or others when giving a saliva sample.

You should not eat, drink, smoke or chew gum for 30 minutes before giving a saliva sample

WHAT WILL HAPPEN TO THE SALIVA SAMPLES?

The interviewer will post the saliva samples to a research laboratory at the University of Bristol. A sample of DNA will be extracted from the saliva and stored for genetic research in the future. The saliva sample and DNA samples will be stored securely and anonymously. Your family's name and address will not be attached to the saliva sample when it is sent to the laboratory. Any researchers using the DNA will not have access to your family's name and address.

WHAT WILL THE DNA SAMPLES BE USED FOR?

The DNA samples will be used for research purposes only. This could include research by the commercial sector. Researchers who want to use the DNA samples to look at particular genes will have to apply for permission to an independent committee which oversees access to the samples. Researchers only get permission to use the samples if they put forward a strong scientific case and explain the potential impact of the research and its wider value to society.

The anonymised DNA samples will be treated in strict confidence in accordance with the Data Protection Act.

WHAT IF I CHANGE MY MIND AFTER I'VE GIVEN THE SAMPLE?

You can withdraw your consent for the use of your DNA, or your child's DNA until they are an adult, without giving any reasons, by writing to the Centre for Longitudinal Studies (see details at the end of this booklet). They will inform the laboratory and the stocks of your samples will be destroyed. When your child is an adult (or earlier if he or she can demonstrate that he or she is old enough to understand), he or she can withdraw permission for the storage and use of his/her DNA.

WHERE CAN I GET MORE INFORMATION ABOUT THE SALIVA COLLECTION ELEMENT OF THE SURVEY?

You can ask the interviewer any questions you may have. You may also want to look at the Frequently Asked Questions section of our website, **www.childnc.net**.

MORE INFORMATION ABOUT THE SURVEY

IS THERE ANYTHING ELSE YOU WILL ASK MY FAMILY?

With your permission we would like to ask your child if they would be willing to give us their mobile phone number and email address if they have one so we can keep in contact with them about the study. We will not give their contact details to anybody else, and we will not contact them about anything other than Child of the New Century.

If your child is one of the young people who have been asked to wear an activity monitor and complete a time-use record, we will also ask them if they would be happy for us to send them texts to remind them to complete them. We will only ask them to provide their mobile number for this purpose if you give your permission to allow us to do so.

WHO HAS APPROVED THIS SURVEY?

This survey has been reviewed and approved by an independent group of people called a Research Ethics Committee to protect your safety, rights, wellbeing and dignity.

WHO GIVES PERMISSION FOR MY CHILD TO TAKE PART?

We will ask for your written permission before we ask your child to take part in each of these activities. We will ask you to provide written consent for your child to give a saliva sample on their behalf. We are asking for your consent for this because your child is not yet an adult, and it is more complex to understand. Your child will still be able to decide for themselves whether to do this or not. The other elements are more straightforward to understand, and we think your child can verbally consent for themselves.

WILL YOU WANT TO SPEAK TO MY FAMILY AGAIN?

We don't know exactly when the next survey will be but we hope to visit the Children of the New Century every few years to see how they grow up. As your child gets older we will build up a detailed picture of how their generation develops from a very young age, through their school years and into adulthood.

WHAT IF MY CHILD HAS QUESTIONS OR CONCERNS AFTERWARDS?

After your child has taken part in the survey, they may have questions. You may wish to discuss with your child what they thought about taking part in the survey, particularly if you think they may be worried about something. The interviewer will give your child a leaflet containing information about how they can get advice, for example by talking to you, other adults or other support services. Young people are given contact details for:

CHILDLINE (0800 1111):
A 24-hour helpline for young people. **www.childline.org.uk**

GET CONNECTED (0808 808 4994):
Free confidential advice for young people on a wide range of issues including bullying, crime, health and education. **www.getconnected.org.uk**

TALK TO FRANK (0300 123 6600):
Free confidential advice on drugs and alcohol. **www.talktofrank.com**

WHAT IF I HAVE QUESTIONS OR CONCERNS AFTERWARDS?

If you have concerns about your child's education, speak to your child's teacher or head teacher. If you are concerned about your child's health, speak to your GP.

Family Lives provides confidential advice, information and support on a range of family issues. Contact Family Lives (**www.familylives.org.uk**) on 0808 800 222 (free from landlines and most mobiles).

Your local Citizens Advice Bureau (CAB) can offer independent advice in person on a range of general issues including housing, debt and consumer issues. You can find out more, including where your nearest CAB is, at **www.citizensadvice.org.uk**.

HOW CAN MY FAMILY WITHDRAW CONSENT?
If you or your child would like to withdraw consent please contact:
Freepost RTKC-KLUU-RSBH
Child of the New Century
20 Bedford Way
London
WC1H OAL