



## Measuring children's time use: Insights from mixed-methods research in northern Uganda

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### Abstract

Time-use data can provide important insights into children's lives, but measuring children's time use can be challenging. Building on mixed-methods data collection in northern Uganda, this paper discusses and proposes ways to address the following issues: (1) whether to interview parents or children; (2) capturing simultaneous and interconnected activities; (3) addressing issues of unequal power relations and inhibition; and (4) unpacking longitudinal dimensions. This paper calls for more research to address these and other challenges involved in measuring children's time use.

**Keywords:** children, time use, mixed methods, children's work, Uganda

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### 1. Introduction

Since the International Year of the Child in 1979 and the formulation of the Convention on the Rights of the Child in 1989, there has been increasing policy and academic interest in the lived experiences of children and youth (Jones and Chant 2009). Research on children's time has gained more attention, especially in high-income countries (Vogler, Morrow and Woodhead 2009).

Time-use research can be used to study a variety of aspects of children's lives, including wellbeing, life-course transitions, daily lifeworlds, socio-cultural values and power relations (Vogler et al. 2009). Time-use research can show how adults and children negotiate their roles in a given society (ibid.). It can also highlight children's contributions to society (Ben-Arieh and Ofir 2002), which are often essential for the livelihood of the family – especially in low-income settings (Nieuwenhuys 1994).

However, measures of children's time face several methodological issues. Some researchers believe that children are unable to self-report their time, and that their parents should be interviewed instead (Vogler et al. 2009). Children's time use is difficult to measure, as activities are often carried out simultaneously or may be experienced as work, leisure and learning at the same time (Katz 2014). Power relations make it difficult for adult researchers to understand children's points of view and may inhibit children to express

themselves in interviews (Punch 2002). Lastly, especially in low-income rural settings, children's time use tends to be structured around the agricultural work calendar (Abebe 2007), but it is methodologically difficult and costly to capture seasonal differences in children's time.

This paper discusses these four challenges to empirically capturing children's time use and proposes ways to address them, with a focus on low-income settings. This paper is based on data collection in rural northern Uganda, where data on children's time use<sup>1</sup> was collected through a quantitative survey, semi-structured interviews, Focus Group Discussions, participatory methods, spot phone calls and participant observation.

The paper proceeds as follows: It provides an overview of the literature on measuring children's time, the northern Ugandan context and the data collection methods. Then, it discusses four key challenges of measuring children's time and makes suggestions on how to address them. The paper ends with some concluding remarks.

## 2. Measuring children's time use

In recent years, interest in children's time has increased, especially to understand children's paid work and school attendance (Vogler et al. 2009). Quantitative studies have mainly relied on stylised estimates, asking children or their parents to recall how much time children spent on predefined activity categories during the last day or week. This method is relatively inexpensive and only requires one contact per child. But on its own, this approach is limiting, as it provides categories rather than generating categories from children's answers. It may also be less able to account for feelings and motivations related to time use and simultaneity of activities (Vogler et al. 2009). Stylised questions have also been criticised for high risks of recall bias (Seymour et al. 2016). Participants might underreport activities that they find embarrassing or less important (Vogler et al. 2009).

Survey-based recall time diaries minimise recall bias by systematically discussing respondents' activities during a specific period of time, usually the previous 24 hours (Seymour et al. 2016). Compared to stylised questions, time-diary methods do not ask respondents specifically about the amount of time spent on any given activity, but collect information on the full sequence of activities throughout the day. In 'light' time diaries, respondents choose activity codes from a predefined list, while in 'full' time diaries, respondents describe what they are doing in their own words (Sullivan et al. 2020). Time-diary estimates can also capture simultaneous activities. But there is still a risk that respondents under-report activities that are less visible. Some find the grid-like structure of time diaries complicated (Seymour et al. 2016), which may make them less suitable for children.

An increasing number of studies suggest that qualitative research can address some of the issues of quantitative measures and capture different aspects of children's activities (Ben-Arieh and Ofir 2002). Some researchers have used continuous or spot observations to study children's time by observing them continuously or briefly at different times of the day

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<sup>1</sup> This paper uses the term "children" to refer to research participants aged 18 and under, rather than making a distinction between children and adolescents. This decision is based on discussions with local research assistants about understandings and definitions of "childhood", "adolescence" and "youth" in northern Uganda.

(Vogler et al. 2009). Others have trialled using individual interviews, creative methods, games and group discussions (ibid.). These qualitative methods tend to be better at capturing aspects of time use other than quantity and at accounting for local understandings of time. But they often rely on a small sample and are unable to establish robust relationships between time-use patterns and individual characteristics. Most time-use methods tend to be cross-sectional rather than longitudinal. Large national time use surveys typically sample over a period of a year and can therefore capture some dimensions of seasonality. But longitudinal time-use data capturing seasonal variation in time-use patterns of the same individuals over a longer period is rare.

This paper discusses the above-mentioned challenges of quantitative and qualitative methods to capturing children's time use, and uses insights from primary data collection in northern Uganda to make suggestions on how to address the challenges.

## **2.1 Data collection in northern Uganda**

Northern Uganda is an interesting context for studying time use for three main reasons. First, most studies of children's time use to date are from high-income countries, and research on children's time in low-income countries has been scarce (Vogler et al. 2009). Research on time use in the sub-Saharan context has been argued to be particularly relevant as poverty, higher levels of diseases and a lack of public services and infrastructure are often associated with high workloads, especially for women and girls (e.g. Serrano 2012).

Second, children's workloads are particularly high in the northern Ugandan region that has suffered from a long civil war between the Lord's Resistance Army (LRA) and the Ugandan army, which involved long years of displacement (Oosterom 2011). The war destroyed livelihoods and infrastructure and has increased poverty.

Lastly, in post-conflict settings, gender-and age-based roles and related time-use patterns may shift. Research suggests that in northern Uganda, gender and age relations are debated in tensions between "tradition" and "modernity" (Vorhölter 2014; Rost forthcoming). NGOs have addressed children's rights, and research has found that children are less likely to follow their parents' orders and engage in new leisure activities, such as watching films by the roadside (ibid.).

The research project that this paper is based on explored time-use patterns of adults and children in this context of change, with a particular interest in unpaid care and domestic work and related social norms. Data on children's time was collected between 2015 and 2017 in six rural sub-counties in Lamwo district and a semi-urban village near Kitgum. Respondents lived under poor conditions, usually in grass-thatched houses without access to electricity and water on the compound. Most households lived in nuclear family structures with about six household members. They engaged in farming, sometimes combined with low-skilled income-generating activities.

I used a variety of mixed methods (more details will be provided in the following section). First, children's time use was measured through surveys with children and their mothers. Stratified random sampling was used to identify households. Of each sampled household, husband, wife, the oldest girl and the oldest boy (aged between 8 and 18) were

interviewed.<sup>2</sup> Local enumerators were trained on the questionnaire, data collection and research ethics. The data from parents was collected with mobile phones using the software Survey CTO. The data from children was collected with paper questionnaires. Enumerators emphasised that the research was confidential and that no direct support would come for participating in the survey.

I also conducted semi-structured interviews with randomly selected children. With the help of an interpreter, I usually asked, “What do you do on a usual day?”, as well as follow-up/probing questions on time use, social norms and decision making.

I conducted mixed-gender Focus Group Discussions (FGDs) with children (about 10 children per group). Participants were selected randomly with the help of local leaders. I worked with local male and female interpreters who were trained about the research topic, confidentiality and their role.

Further, I engaged in participant observation with randomly selected families. I spent at least one day per family. I followed different household members of different ages in their daily activities, usually from around 10 am until 6 pm. For example, I followed children to the market, a beauty parlour, school, the garden or the borehole. I also continued to informally spend time with the families who lived in the same village. I participated in daily activities, while observing the allocation of tasks, related attitudes, feelings and interactions between household members. If I felt comfortable, I took notes while with the families, otherwise, I took notes immediately after returning home in the evening.

I also conducted spot phone calls, which involved calling selected families on their phones over the period of a year. I called at random times every day for a week in three different seasons (see Rost 2020). During the calls, I talked to each household member aged eight and above and asked what they were doing at the moment of the call, followed by follow-up questions. Table 1 summarises the methods and samples that this paper builds on.

**Table 1:** Research methods

Method	Sample
Household survey	369 women, 369 men, 272 boys (aged 8 to 18) and 255 girls (aged 8 to 18)
Semi-structured interviews	124 interviews (53 women, 52 men, 5 boys aged 8 to 18, 14 girls aged 8 to 18)
Spot phone calls	4 families, 34 household members (adults and children), 42 calls, 91 interviews
Focus Group Discussions	4 FGDs (20 children aged 8 to 12; 20 children aged 12 to 18)
Participant observation	11 families (at least one day per family)

Most of the above-mentioned methods involved children aged 8 and older. This decision was based on recommendations from different ethics committees and on the belief

<sup>2</sup> The survey data from adults was collected as part of Oxfam's Women's Economic Empowerment and Care (WE-Care) Programme. The WE-Care programme aims to develop strategies to address women's "heavy" and "unequal" care work and has implemented research and programmes in a variety of different countries. See Rost et al. (2020) for more information on Oxfam's Household Care Survey methodology, and Karimli et al. (2016) for more information on the 2015 survey findings.

that the methods would have worked less well with younger children at different stages of their cognitive development. Information on time use of younger children was gathered through participant observation, retrospective questions (e.g. "At what age did you start cooking for your family/doing the dishes?") or questions directed at other household members (e.g. "What is your son doing at the moment?").

I obtained informed consent from children and their parents, carried out reference-checks with enumerators' previous employers and asked enumerators to sign an ethics agreement and to follow a safeguarding plan. The data was secured and kept strictly confidential, and any identifying information was removed in this manuscript. To avoid increasing power imbalances and issues of social desirability bias I did not compensate survey participants, but children who participated in the other methods received a small token of appreciation after their participation (e.g. school book, pen, soap or cooking item).<sup>3</sup>

### 3. Challenges and suggestions

Capturing children's time use poses several methodological challenges, some of which are similar to, and others distinct from, challenges related to studying adults' time. I will now discuss, and make suggestions on how to address, the following four challenges<sup>4</sup> to measuring children's time: (1) interviewing parents or children; (2) simultaneous and interconnected activities; (3) power and inhibition; and (4) seasonality and longitudinal dimensions.

#### 3.1 Interviewing parents or children

Children's time use has primarily been measured by asking parents about their children's contributions, using stylised estimates or time diaries (Vogler et al. 2009). Especially studies with young children, usually ask parents about children's time use rather than interviewing children themselves (Ben-Arieh and Ofir 2002). For example, Hsin (2007) asked an adult member of the household to complete diaries for 8 to 11-year-olds in Java. Interviewing parents rather than children themselves is often easier and more cost-effective, and can help to address concerns about the accuracy of children's self-reported time use (Bianchi and Robinson 1997).

However, it has been argued that asking children for their perspectives is important. Researchers suggest that children know best what they spend their time on and how they feel about activities (Ben-Arieh and Ofir 2002). Parents might not know what their children do, especially if children only spend little time with their parents (Larson and Verma 1999). Some researchers have found that even young children can accurately report their time use, such as 3 to 11-year-olds (Bianchi and Robinson 1997). Asking children themselves about their time use has also been argued to be important to better acknowledge children's agency

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<sup>3</sup> The research was approved by the Central University Research Ethics Committee (CUREC), the Gulu University Research Ethics Committee and the Uganda National Council for Science and Technology.

<sup>4</sup> The relevance of these challenges and suggestions may vary depending on the specific research questions; for example, simultaneous activities may be less important for studies focussed on children's formal education than for those discussing care work; and seasonal time-use patterns tend to be more important for children in rural than in urban areas.

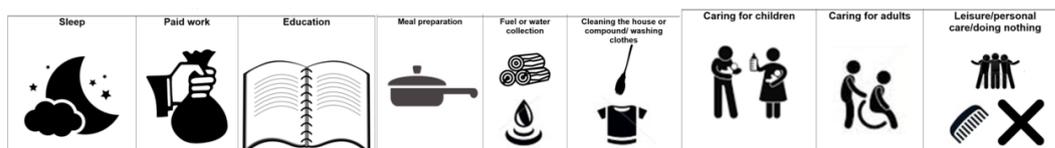
and to involve children as informants in research about their lives (Morrow and Vennam 2010).

The quantitative survey data from northern Uganda was able to add to this debate. Two stylised estimate measures were used to measure children's time use. They were adapted from Young Lives questionnaires (Young Lives 2009). First, stylised activity questions asked mothers about their children's time use (aged 0 to 18). Mothers were given 24 beans representing the last 24 hours (yesterday morning at 4 am, finishing 3 am of the current day) to assign to different activity categories represented by images (see Figure 1).

Second, a slightly adjusted version of this stylised estimate measure was used for asking children aged 8 to 18 about their time use. The measure also used beans and activity images. But the activity images were slightly different because the piloting found that the generic images (see Figure 1) were not clear to children.<sup>5</sup> Based on discussions with children and enumerators, we developed locally relevant and child-appropriate images. The children's measure also included two additional questions to capture the supervision of younger children (see Figure 2).

**Figure 1:** Children's time-use measurement (mothers)

No	Name of household members	In the last 24 hours, how many hours did [NAME] spend on:									
		410 →	411 →	412 →	413 →	414 →	415 →	416 →	417 →	418 →	419 →
		SLEEP	PAID WORK (Production and farm work)	EDUCATION	MEAL PREPARATION	WATER OR FUEL COLLECTION	CLEANING THE HOUSE OR COMPOUND/WASHING CLOTHES	CARING FOR CHILDREN	CARING FOR ADULTS (e.g. ill, elderly, disabled)	LEISURE/PERSONAL CARE/DOING NOTHING	OTHER ACTIVITIES/ I DON'T KNOW
1.											
2.											
3.		...									



The survey data shows striking differences between estimates of children's time use reported by mothers and by children themselves: children self-reported more time spent on care, domestic, agricultural and income-generating work and less time on leisure and sleep than was reported by their mothers. Education was the only activity category without significant differences between mothers' and children's estimates. Differences between mothers' and children's reports of children's time were strongest for care and domestic work;

<sup>5</sup> Some children thought that the frying pan (for cooking) represented a tap; that the moon and stars (for sleeping) symbolised Muslim religious activities; that the mother holding a child (for childcare) meant playing with dolls or that the wheelchair (for elderly care) represented riding a bicycle. Interestingly, the only generic symbols that children could relate to symbolised school and studying.

mothers reported over two hours less care and domestic work for boys and three hours less for girls compared to what children reported themselves (see Table 2 and 3).

One explanation for this discrepancy might be that children over-reported time spent on care, domestic, agricultural and income-generating work. Because of social desirability bias and expectations of children to be hard-working and obedient, children might have exaggerated their work hours. Children might also have over-reported their work because they perceived it to be difficult, were unhappy about it or expected support from the researchers. However, participant observation and interviews found that children – especially girls – spent most of their time working or being “on-call” for work. For example, a boy (13-18) explained, “In the morning, very early, you will go to the garden, you will come back, you go for fetching water, you come back, you sweep, you slash, then for revising books is usually in the evening”.

**Figure 2:** Children's time-use measurement (children)

20 1	I would like you to think about what you did in the last 24 hours (yesterday morning at 4am, finishing 3am of the current day). Can you please assign these beans to different activity cards to show how much time you spent on each activity yesterday.		
A	How many hours did you spend on sleep yesterday?	Number of hours	<input type="text"/>
Now, think about the rest of your day. I want you to tell me how much time you spent on the following activities yesterday			
B	Work for family business (e.g. farm work, cattle herding, shepherding, piecework or handicrafts done at home)	Number of hours	<input type="text"/>
C	Activities for pay or for money for someone not in the household	Number of hours	<input type="text"/>
D	At school (including play time)	Number of hours	<input type="text"/>
E	Studying at home/ extra tuition outside the home	Number of hours	<input type="text"/>
F	Meal preparation (incl. shopping and doing the dishes)	Number of hours	<input type="text"/>
G	Fuel or water collection	Number of hours	<input type="text"/>
H	Cleaning the house or compound AND washing clothes	Number of hours	<input type="text"/>
I	Caring for younger children	Number of hours	<input type="text"/>
J	Caring for adults (e.g. ill household members)	Number of hours	<input type="text"/>
K	Leisure (playing, sports, seeing friends)/ personal care/doing nothing	Number of hours	<input type="text"/>
L	Other activities, specify: _____	Number of hours	<input type="text"/>
<b>ENUMERATORS MAKE SURE HOURS ADDS UP TO 24. Otherwise, help respondent to adjust the hours.</b>			
20 2	Whilst you were doing your other activities, did you supervise younger children yesterday?	0 = No → skip to 301 1 = Yes	<input type="text"/>
20 3	If 'yes' in 202: How many hours did you supervise children for? (use all 24 beans)	Number of hours	<input type="text"/>

This may mean that mothers under-reported their children's work hours. Again, social desirability bias might be a reason, for example, mothers might have feared that enumerators

would disapprove of their children's long working days. We tried to mitigate this issue by appearing neutral in title and instructions and emphasising privacy and confidentiality.

Another explanation might be that mothers simply did not know what their children were doing. Mothers were very busy spending, on average, about 10 hours (SD=2.95; Min=0; Max=17, N=369) a day on total work (including unpaid care and domestic work and paid/income-generating work). The survey with adults also shows that in the previous seven days, 27% (59; N=349) of women had left a child under six years on their own, knowing that there was no one looking after them. During participant observation, I observed that children were usually nearby, but mothers did not constantly supervise them.

Hence, the primary data collection in northern Uganda suggests that interviewing children about their time is important. Another insight was that the qualitative data helped to interpret the striking differences between mothers' and children's reports of children's time. Even though the stylised estimate survey method generally worked well (e.g. the beans and visual images were well received and made the interview feel more "like a game"), the quantitative data left many questions unanswered. For example, it did not adequately account for motivations, feelings and relational aspects of time, nor simultaneity or interconnected activities.

**Table 2:** Boys' time use in hours (8 to 18 years)

	Reported by mothers				Reported by boys			
	Mean	SD	MIN	MAX	Mean	SD	MIN	MAX
Care/domestic work	2.7	2.7	0	13	5.0***	2.6	0	12
Sleep	10.0	1.9	6	24	8.8***	1.3	4	11
Leisure	4.9	3.1	0	15	3.7***	2.0	0	10
Agricultural /income-generating work	1.1	2.8	0	10	2.8***	2.6	0	10
Education	3.4	3.9	0	11	3.4	3.7	0	11

Notes: N=140; the sample size is smaller than the number of children interviewed as not all the children and mothers could be matched; \* p < 0.1; \*\* p < 0.05; \*\*\* p < 0.01; the data for "others" is not reported in the table; "care/domestic work" includes meal preparation, fuel/water collection, clean/wash, childcare, adult care; "agricultural/income-generating work" includes work for the family business (incl. farm work and tending animals), activities for pay or money for someone not in the household; "leisure" includes leisure (playing, sports, seeing friends)/personal care/doing nothing.

**Table 3:** Girls' time use in hours (8 to 18 years)

	Reported by mothers				Reported by girls			
	Mean	SD	MIN	MAX	Mean	SD	MIN	MAX
Care/domestic work	3.8	2.9	0	13	6.7***	3.2	2	16
Sleep	9.5	1.5	5	15	8.7***	1.1	6	11
Leisure	4.4	3.4	0	15	2.9***	1.9	0	9
Agricultural /income-generating work	0.8	2.3	0	10	2.5***	2.7	0	10
Education	3.6	3.9	0	12	3.1	3.7	0	12

Notes: see notes for table 2, N=133

### 3.2 Simultaneous and interconnected activities

Daily activities of children and adults do not generally fit easily into predefined activity categories or time slots. Many activities are carried out at the same time, which is generally not recorded in stylised estimate measures. This is especially the case for care and domestic work, especially supervising children, which is often underreported because it is done at the same time as another activity (Floro 1995). The survey finds that only 9% (49, N=523) of children answered “yes” to the question, “Whilst you were doing your other activities did you supervise a younger child?”<sup>6</sup>

But observations showed that most children looked after younger siblings, usually while doing other activities. Like other studies, I found observation methods particularly useful for “capturing context” (Reynolds 1991) and for understanding simultaneous activities and multiple-task performances of both, children and adults (Vogler et al. 2009). For example, during participant observation, I saw older children cleaning younger siblings while playing, washing their siblings while cooking or teaching them while fetching water.

Observations were also particularly useful for understanding the “quick tasks” that children engaged in. Children were often asked to fetch an object – such as a chair, a tool, food, a mat – or to help other children or adults – such as cleaning a sibling’s nose, carrying a baby away from the fire, pouring water for the father to wash his hands, or getting a drink for a visitor. It seemed like children were constantly “on-call” while doing something else (work, play, studying), and jumped in to help their parents (especially their mothers) as required. These quick activities usually only took a few seconds or minutes and would not have been accounted for in the other time-use measures.

Observations also showed that work, learning and leisure were closely connected. Like empirical research in other contexts (e.g. Ethiopia: Abebe 2008; Mexico: Aitken 2006), I found that children learned about their future roles through participation in adults’ work. I observed that adults and older siblings usually performed activities first, handed the task over to younger children and took over again to correct them. For example, I observed mothers and older girls showing younger siblings how to grind on a grinding stone, how to pick leaves or to pull out weeds.

Observations also showed that children’s work and learning can be combined with leisure (Bloch and Adler 1994; Katz 2004). I observed, for instance, that children played with a catapult while looking after younger siblings, sang songs while doing the dishes, chatted with friends on the way to the market or laughed with siblings while cooking. The following extract from my participant observation field notes at a borehole at 7 pm clearly shows how work, leisure and learning were all intertwined:

There are about 15 children at the borehole, mostly girls, no adults, about 5 teenage girls, they chat and giggle ... three small girls, around 6 to 8 years, are waiting together on the other side. A boy [4 years] and a boy [6 years] are jumping around, doing cartwheels, and chasing a child who came to collect water. Their sister [17 years] tells the younger boy off several times, she says “I will beat you”. There are so many children at the borehole, even some who don’t seem to be collecting water. Two

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<sup>6</sup> Even though enumerators discussed the translation and meaning of the word ‘supervising’, children may have misunderstood this question. Asking for co-presence of younger children could potentially have been a better measure of children’s time spent on looking after younger siblings.

teenage girls stand a bit further back, one has her arms crossed and looks upset, the other one pats her shoulder, she seems to console her. Most teenage girls take 20 litres in each hand.

The extract shows how work was hard (20l in each hand!), but also involved games (cartwheels, chasing), support (consoling a friend), socialising with friends (chatting) and learning from other children (“I will beat you”).

Hence, for research projects that aim to understand simultaneity, quick tasks and interconnected activities of children (and adults), observations may be a good method to employ. Even though observations can be costly and may pose ethical and practical problems (e.g. intruding in private lives (Vogler et al. 2009)), they worked very well in the research context. Observations freed children from recording or reporting their time use and thus eliminated recall bias. They also helped to understand how activities felt and what they involved. For example, I was able to observe the different steps involved in cooking a meal, to feel how fumes from cooking with firewood made my eyes feel itchy, and how heavy water containers felt when carried on the head.

### **3.3 Power and inhibition**

Researching “powerless social groups”, such as children, requires special efforts to avoid oppressive methods (Graeber 2007). Power hierarchies may bias research with children, whose lives are usually controlled and limited by adults (Punch 2002). In settings with strong age-based hierarchies, children may be shy to speak up and express their views in front of unfamiliar adults. Some have even suggested that time-use research can reinforce power imbalances, as it allows adults to control and organise children’s time (Ennew 1994).

Most children who participated in the research were shy and reluctant to express themselves. Even though I tried to reduce power hierarchies through informal conversations, body language, jokes and sitting down to reduce differences in height, children were often shy, looked away and spoke quietly in semi-structured interviews.

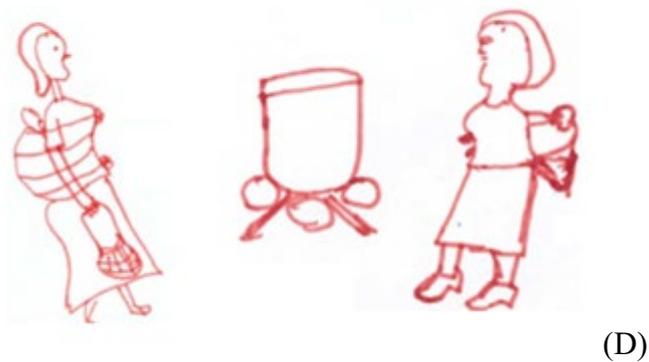
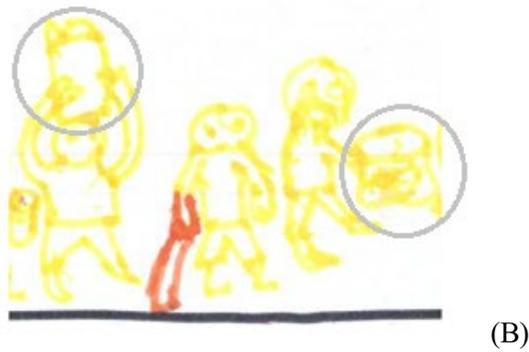
Similar to other studies (e.g. Mmari et al. 2017), I found visual exercises and participatory activities that involved greater engagement used in the focus groups more useful for engaging young participants and encouraging their participation in the research process than interviews. In focus groups, I used “child-friendly” methods, such as games and drawings, which can be useful for situations where children lack confidence in communicating directly with unfamiliar adults (Punch 2002).

Building on Christensen and James’ study (2000) with children in England and Johnson’s study (2006 cited in Vogler et al 2009) in Peru, I asked children to draw their activities (see Figure 3 for example drawings). For each exercise, children were given differently coloured pens and a piece of paper. Children were then asked to draw what they did on a usually day (“draw your day”), throughout the year (“draw your year”) or over the life course (“draw your life”).<sup>7</sup> Afterwards, each child presented their drawing and we had a discussion. I provided circle-shaped papers for the “draw your day” and “draw your year” exercises, but in contrast to the children who participated in Christensen and James’ study (2000), my research participants did not divide the circles into a pie chart.

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<sup>7</sup> I only used one, a maximum of two, of these drawing exercises per focus group discussion.

**Figure 3:** Example drawings from “draw your day” activity



Notes: Drawings by a 12-year-old girl, a 17-year-old boy (A), a 13-year-old boy (B), a 16-year-old girl, a 14-year-old boy (C), a 16-year-old girl or an 18-year-old girl (D)

The drawings generated very interesting data related to time use. Figure 3 shows, for example, that the drawings highlighted: gender differences in play (girls usually drew skipping and boys football; see A); how activities evolved over the life course (younger boys, but not older boys drew themselves carrying water on their heads, see B); how boys and girls carried out activities differently (girls usually sat on the floor and boys on a chair, see C); and that childcare was often carried out simultaneously (only two girls drew childcare as their daily activity and both drew doing something else at the same time, see D).

Like Johnson (2006, cited in Vogler et al 2009), I also found that the drawings worked well as a warm-up activity and to generate interesting discussions. For example, when I asked about differences between the activities that girls and boys had drawn, a 16-year old boy replied: "Nowadays the world is changing, anyone can do anything". This led to an interesting discussion around modernisation and gender roles.

A "bucket game" also provided insights into children's time-use patterns and gender differences. In her study in Peru, Johnson (2006, cited in Vogler et al 2009) asked children to distribute 15 counters between buckets representing different activity categories. I adapted this method to better account for gender differences. Each child distributed 24 beads representing the 24 hours of the previous day to buckets representing different activities (I used the bottom halves of used water bottles as buckets). Boys and girls were given differently coloured beads. Based on the discussions from the activity drawings, we decided on 8 to 10 activity categories together (such as "baby care", "weeding", "sleeping") that we wrote/drew on different buckets. See Figure 4 for some examples of the "bucket game".

**Figure 4:** Bucket game examples



Notes: Orange/red=girls; green=boys

The bucket game showed that girls generally assigned more beads to unpaid care and domestic work activities, and boys more to animal rearing, farm work and leisure. I used the buckets for follow-up questions, for example, asking participants to select their least favourite or their favourite activity bucket. The bucket game also led to interesting discussions about gender differences and internalised gender norms. For example, when asked to explain the beads allocated to animal rearing, a boy was convinced that "girls don't know how to rear animals" or a girl explained gender differences for fetching firewood, saying "The boys do not know how to tie the firewood into bundles. This is how God has brought them."

The bucket exercise also helped to encourage children to participate in analysing the data, as they were asked to interpret and assess the data that we had collectively collected (i.e. the beads in different containers). This is important from an ethical perspective that aims to involve children as active agents (Vogler et al. 2009). The data was visible and colourful and could be touched and moved around, rather than being presented in abstract tables or chart.

In contrast to Johnson (2006, cited in Vogler et al 2009), who found that assigning counters to buckets was less suitable for younger children, who may have less experience with division and numeracy, I found this activity worked well with eight-year-old children.

Like others (e.g. Vogler et al. 2009), I found visual and participatory approaches useful for examining children's time use, especially in communities with limited literacy. The methods required few resources (a mat to sit on, paper, pens, beads, used water bottles, some tape). The methods helped to engage children, who were generally much more open and outgoing than in interviews. They also allowed for children to generate their own categories of work and to express their feelings about activities – aspects that the other methods were less able to capture.

### **3.4 Seasonality and longitudinal dimensions**

Children's work varies over the year. Seasonality is particularly important in rural settings where work patterns tend to be structured around the agricultural work calendar (Abebe 2007). Children's work patterns also tend to differ during term and school time. Some time-use studies capture seasonal time-use patterns by sampling over a longer period. But longitudinal methods that track time use of the same respondents over a longer period are rare. If children are only interviewed once, time-use measures are “snapshots” of their lives that do not account for longitudinal changes and seasonal variations at the individual level (Robson 2004).

To collect longitudinal data with a cost-effective and easy method, I developed the spot phone call method (see Rost 2020 for more details on this method). The spot phone call methodology builds on the experience sampling<sup>8</sup> and spot observation methods, as it collects time-use data at different times of the day. But rather than prompting respondents to record their time use (experience sampling) or visiting participants to observe their time use (spot observations), participants are called on their phones.

I recorded activities of four selected families at different times of the day (early morning, morning, mid-day, afternoon, evening), once a day for a week in three different seasons of the year: one week in June (planting season), one week in September (weeding season) and one week in March (harvesting/selling season). During the calls, I asked all family members aged eight and older what they were doing at the specific moment, followed by some open-ended and follow-up questions, for example, how they felt about doing the activity or who had decided on their time use. If participants did not answer the phone, I called at a later time on the same day.

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<sup>8</sup> Experience sampling methods alert respondents to record activities at several random points of the day (e.g. through reminders/notifications), usually on a programmed device (e.g. a stopwatch, pager, timer or smartphone) (Seymour et al. 2016). These methods are able to construct a synthetic day by combining individual responses over the whole sample.

The method is not representative of the population because not everyone owned a phone and the sample size was very small. Sometimes, I was unable to talk to children because most phones were owned by fathers, who were sometimes away from home. We also encountered some technological issues with network connection and phones not being charged.

Nevertheless, I found this method useful for understanding seasonal differences in children's time use. For example, in the dry season, children told me that they had spent one to three hours collecting water because the nearby boreholes were broken. Children also reported more household work during school holiday times.

I was also able to observe how shocks affected the time use of children. For example, when calling a family in September, I found out that the father had recently had an accident on the bicycle hurting his hand, which meant that he was unable to work as a carpenter and spent more time socialising with his friends. Children were taken out of school because there was not enough money for school fees. The older girls and the oldest boy said that, as a result of the accident, they had more work, such as selling cassava by the roadside (17-year-old girl), bathing younger siblings, cleaning and digging (15-year-old girl) or "mentoring" younger children (13-year-old boy). This example showed that shocks affected time-use patterns of household member differently (please see Rost 2020 for a detailed discussion of the spot phone calls methodology).

Children were surprisingly open and happy to talk over the phone. This might have been the case because I had built up trust with them before starting the calls (through participant observation and repeated interviews). The spot phone calls worked well for capturing longitudinal dimensions of children's time, which none of the other methods was able to do. The method does not require literacy or numeracy, and does not rely on respondents' ability to recall activities. It also suits agricultural and informal work arrangements where taking a phone call during work hours is not an issue, and where children are spending much of their time near their parents. But the method works less well in contexts where parents work in an office and where children are in formal childcare.

#### **4. Conclusion**

The discussion of the different research methods used to capture children's time use in northern Uganda shows that some methods worked better than others for addressing certain challenges. No method was perfect, but together the different mixed methods were able to address some of the described challenges to measuring children's time. Insights for studying children's time use from the primary data collection in northern Uganda can be summarised under five suggestions:

First, I follow others (e.g. Ben-Arieh and Ofir 2002; Vogler et al. 2009) in calling for research on children's time to use a variety of quantitative and qualitative methods. Even though mixed-methods research usually involves more resources, time and expertise, it can help to gain a deeper and broader understanding of the phenomenon in question (McKim 2015). A mixed-methods approach can help to triangulate findings and to minimise the weaknesses and maximise the strengths of quantitative and qualitative approaches (Johnson and Onwuegbuzie 2004).

Second, interviewing children themselves is important for understanding their activities, and can generate results that differ from parents' estimates of their children's time use. For example, mothers who participated in the survey reported that their daughters had spent about three hours on care and domestic work the previous day, but their daughters said they had spent six hours on this activity.

Third, participant observation can help to unpack the complexity of time-use patterns. It can highlight simultaneity, quick activities and how the same activity can be experienced as work, learning and leisure at the same time.

Fourth, I found using creative and engaging methods, such as drawings and games, more effective for engaging young people and for triggering interesting discussions than semi-structured interviews.

Fifth, longitudinal data can shed light on how children's time use evolves over the year. Spot phone calls – calling participants once a day over a longer period – may be a cost-effective longitudinal method to be further tested in other contexts.

In addition to the above-described challenges, there are some conceptual issues that the research did not address but that would be interesting to explore further. Even though some of the methods involved children in the analysis of the data (especially the participatory methods), my approach did not fully involve children's views. But it has increasingly been recognised that children themselves have valuable insights into their everyday activities and should be included as agents in all stages of the research process, including data gathering, analysis and dissemination (Vogler et al. 2009).

Further, children, especially those from rural settings with low-literacy, may have different conceptions of time than researchers. In settings where life is not structured around hour blocks and where people do not own watches/clocks, time-use results may be less accurate. Especially younger children may not have fully developed ideas of a linear scale of time, measured in hours, days, weeks and so on (Vogler et al. 2009). Children may report more time spent on activities when they are aroused or interested (e.g. an exciting football match) than on activities that are more routine or perceived as boring (e.g. washing clothes) (Vogler et al. 2009). I used the qualitative methods to explore children's conceptions of time, but more in-depth data collection and analysis to explore these issues (e.g. through games or experiments) would have been useful.

Lastly, a gap in the literature (Vogler et al. 2009) that my research was only partly able to address is that most research on children's time use has been conducted with children around 10 years of age and above, while much less is known about younger children's daily activities. I found that all research methods worked well with eight-year-old children, but I did not interview younger children. Participant observation showed that even children as young as four made significant contributions to the household, usually through domestic work (e.g. doing the dishes, fetching water, sweeping) and caring for younger siblings. It would be interesting to develop methods to collect more systematic data from younger children to make sure that their contributions are accounted for. More generally, improving approaches to measuring children's time use is important to better account for children's important contributions to their families, communities and societies.

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