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Issues in the Design of Time-Use Surveys for Collecting Data on Paid and Unpaid Work

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Issues in the Design of Time-use Surveys for Collecting Data on Paid and Unpaid Work

by

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Introduction

Data on time-use have been collected on and off since the 1920s (Andorka, 1987). Although time-use information has been gathered on every continent on earth, with the single exception of Antarctica, the United Nations is sponsoring the first attempt to standardise time-use survey methodology world-wide. The impetus for the United Nations' activity has been the growing recognition that conventional economic statistics capture market transactions but overlook economic contributions outside the market. Conventional measures produce a gravely incomplete picture of the economy of developing nations and discount the unpaid work of women and men in all societies across the globe. Time-use statistics also significantly extend the information provided by conventional social statistics. As experts in this field, we have been called upon to make proposals for how time-use research should be done. At the very least this task involves developing a minimum standard, that is, indicating adequate methods that will yield data of an acceptable quality. But what is data of an acceptable quality and which methods are likely to be adequate? This paper attempts a broad overview of some key issues in the formulation of these standards, concentrating on those issues that have, in my view, received too little attention.

Methods linked ultimately to analysis

In the final analysis, the question of which are the best survey methods for collecting time-use data can be reduced to the question of what information will be useful to analysts. This applies as much to issues of acceptable levels of error as it does to the topic investigated. Although they may seem to be technical questions, the issues surrounding the validity and the reliability of time-use information are ultimately analytical issues. The validity and reliability of time-use data cannot be determined in the abstract. The question is always: 'Validity and reliability for what analytical purpose?'

The theoretical motives underlying time-use research

I contend that the various grounds for conducting time-use surveys can be grouped under two broad guiding theoretical motives: an interest in the *conditions of economic progress* and a curiosity about *social change* (National Research Council, 2000:86-87).

Measuring Economic Progress

For over half a century, quantifying economic progress meant measuring national income. However, there has been increasing official recognition that the System of National Accounts (SNA) is incomplete (Goldschmidt-Clermont and Pagnossin-Aligisakis, 1995). Concentrating on cash transactions and excluding the goods and services that communities and domestic households produce for their own consumption ignores a significant proportion of production. Clearly, in many of the subsistence dominated third world economies, the SNA fails to capture even the most fundamental of economic activities. In addition to the millions who live by subsistence agriculture, around the world there are many other millions who survive by pursuing economic activities on the margins of the market economy. The so-called 'informal sector' of petty commodity producers, the black economy, moonlighting, and people working small

agricultural plots 'on the side' all escape the net of the SNA and do not register as economic activities. Finally, in the advanced countries of the first world, unpaid domestic work, particularly the unpaid domestic work of women, on behalf of their own and other households and has officially had no value.

Although these kinds of economic activities do not leave much of a cash trail, they do leave a trace in terms of time spent. For this reason the Fourth World Conference on Women (Beijing, 4-15 September 1995) resolved to encourage national governments to gather information about time-use surveys. The United Nations has already developed an *International Classification for Time Use Activities* (Bediako and Vanek, 1997) designed to capture time spent in all kinds of economic activity, both paid and unpaid.

Social change

A key site of unpaid work is the household. There can be little doubt that a central principle of household organisation is the division of labour between men and women. This division of labour governs what household resources are committed to market or non-market work. There is a further division of labour between 'men's jobs' and 'women's jobs' within non-market production. In Australia, and other OECD countries, on average women contributed two-thirds of all the time devoted to unpaid non-market work. Among household productive activities only yard work, home repairs, car care and pool maintenance are predominantly 'male jobs'. The indoor household tasks of laundry, physical care of children, cleaning and cooking remain predominantly 'female jobs'.

The mass entry of women, especially married women, into the labour market has been described as 'the greatest social change since World War II' (Peattie and Rhein, 1983) and has led many others to talk about a 'revolution' in the sexual division of labour (Bergmann, 1986). The current Eurostat multinational time-use project is more firmly centred on issues connected to the gender revolution (Rydenstam, 1996). Changes in the domestic division of labour affect non-market production, alter the balance between market and non-market activities and may influence whether families live in poverty.

II. Implications for Collection

Having briefly reviewed the major theoretical motives leading to a demand for time-use information, we are now in a position to state the kinds of information that researchers will need for analysis.

Sampling the unit of observation

Beginning at the beginning: what are the implications for the sampling design? Time-use has to deal with two considerations: first there is the usual business of defining the population in scope and secondly, there are decisions about which units of time to sample. Let us deal with both of these in turn.

Individuals or households

For those studying the distribution of economic resources, the ideal unit of analysis would be the individual but in practice the most frequently used unit of analysis has been the household. Official consumer expenditure data yields information about the spending

of households. Indeed, the problem of disaggregating household expenditure and determining individual shares, while a widely recognised problem, has never been solved to everyone's satisfaction. Similarly, a much larger body of research is concerned more with the distribution of income between households than within households. The voluminous literature on equivalence scales is concerned with bypassing the problem of intra-household distribution and creating a method of making households of varying compositions comparable. The interest in the changing sexual division of labour has typically been grounded in the empirical analysis of the behaviour of couples.

There are two basic choices in this regard: randomly sample individuals and construct synthetic households or randomly sample households and collect information on everyone (in scope) in that household. Sampling individuals has been the most common method and the one most compatible with telephone interviews. Sampling households has been used with great success in three Australian surveys (Australian Bureau of Statistics, 1988, 1993, 1998b) and was the method employed in the pilot for the Eurostat sponsored harmonised surveys. A compromise position is to sample individuals but ask the selected individual about the characteristics of other members of their household.

Time-use surveys not only make unpaid work visible but allow us to study the relationship between paid and unpaid work. Very often the questions of greatest interest to analysts are how the changing balance between paid and unpaid work affects the social and economic welfare of family households. What is the role of unpaid work in helping families survive economic hardship? Can the goods and services produced by unpaid labour at home compensate for the loss of money income in circumstances of unemployment? Does women access to paid work trigger a 'sexual revolution' in the home that redistributes unpaid work to other members of the family? How are children affected by the demands made on their parents' time by employers?

If unpaid work contributes to family well being, then surprisingly little is known about a fundamental economic issue: how is the standard of living affected by family size. Is the old saying, "two can live as cheaply as one" true? An equally important consideration is what resources are required to raise children. What are the costs of children? What demands on parents' time and money are required to raise a family? How much extra cost do successive children add? How many children are living in poverty? Comprehensive answers to these questions require a thorough understanding of the relationship between family size and market and non-market inputs.

Using the a single individuals in a household as the basis of sampling, it is possible to calculate the effects of marriage or an extra child on individual's *personal* use of time but not the effects of marriage or an extra child on the *household, as an economic unit*. Information about all the members of a household is preferable. It is not usually possible to interview all members of the household over the telephone, so from this point of view the collection of time-diaries by telephone becomes less analytically desirable.

Age range of the population in scope

Time-use surveys have usually only been administered to a definite age range. The once popular practice of placing an upper limit on this range has largely fallen out of favour (Robinson and Godbey, 1997: 72; Frederick, 1995; Australian Bureau of Statistics, 1998a; Rydenstam. and Wadeskog, 1998). In view of the interest in the needs of the frail aged and the measurement of informal caring, this seems to be an appropriate development.

However, there are a variety of practices in relation to the lower age limit. In 1987 the Central Statistical Office of Finland collected diaries from individuals above 9 years of age. Canada and Australia currently use a lower age limit of 15 years, while 18 years was the standard used in Szalai studies (Szalai, et al, 1972:34) and many studies in subsequent years. The new Eurostat standard seems to be to collect diaries from everyone above 11 years of age. The Italian national survey of 1989 has diaries for children as young as 3 years while the Bulgarian survey of 1988 claimed to have no lower age limit (Raikova, 1993; Buratta and Sabbadini, 1993). Both the Bulgarian and the Italian surveys used those responsible for the care of children to fill out diaries on behalf of children.

From a global perspective determining a lower age limit is an issue of some consequence. In many areas of the world children make a crucial contribution to their family's economic welfare. Unfortunately in many regions child-soldiers are an important military resource. Even in the most wealthy regions of the world there is a deep interest in the likely outcomes (low educational attainment, low earnings, high rates of poverty, high crime rates) for adults who were deprived as children. The analytic value of information on the time-use of children is high but methods for its collection are rarely discussed.

Geographical scope

The pioneering Szalai multi-national project specified that the constituent time-use surveys should "cover a city with a population of 40,000 to 200,000" (Szalai et al, 1972: 32). However, most official surveys conducted after 1965 have been national in scope. From the point of view of developing augmented national accounts, there is an obvious preference for national data. National data is useful for the analysis of regional differences, the difference between urban and rural populations. However, national field collection costs can be high and there are many areas, such as the townships in South Africa, which are being surveyed for the first time and perhaps some thought should be given to methods of producing synthetic national estimates.

Diary design issues

Diaries, clocks and the written word

Time-use collection practices in cultures where the everyday experience of time is dominated by clock-time are greatly varied. Developing appropriate standards among the societies of the first world over the last half century has proved difficult. However, collecting time-use information in societies where literacy rates are relatively low and/or where there is little reference to clock-time presents a particular challenge for instrument design. Indeed this challenge is so significant that it probably deserves a whole paper

itself and a paper by someone with greater direct experience of these problems than me. For the purposes of the discussion here it is important to recognise these difficulties and to acknowledge that there have been some thorough attempts to surmount them.

Based on fieldwork in Brazil, Neuma Aguiar has suggested the use of pictograms to overcome some of the difficulties raised by illiteracy. Working in settings where there is little cultural emphasis on clock-time, Meena Acharya in Nepal and others have combined observer's reports (rather than respondent's descriptions) of activity timings within an event sampling framework. At this meeting, I look forward to learning more about these issues from the experience in the Dominican Republic, India, Mongolia, Morocco, Nigeria, Occupied Palestinian Territory, and South Africa.

Time span

Now let us turn to the other great sampling issue – the unit of time to be observed. Some activities, like repainting the house or buying a refrigerator, have a relatively infrequent rhythm. Other activities, such as planting and harvesting crops and some leisure activities (such as ice-skating or swimming), tend to be seasonal. Yet other activities, such as market work or worship, are often organised on a weekly basis. Activities such as eating or sleeping typically happen every day.

In practice gathering information on how respondents use their time is a trade-off between an analyst's wish list and the respondent burden it imposes. Most time-use diaries cover a single day but take steps to ensure each day of the week is sampled in the correct proportion. The Australian Bureau of Statistics and the Eurostat pilot both collect two consecutive days. Australian research shows that for a very small drop in the quality of response, a two-day diary can be collected for much the same cost as a single-day diary (Australian Bureau of Statistics, 1988). As far as I am aware no one has ever analysed these diaries as records of consecutive days, in all cases they have treated each diary day as the unit of analysis. Analysts will be familiar with the problems of 'censored data' and, in dealing with labour market behaviour, there may be a feeling among specialists that they really need weekly data. There is some experience with seven-day diaries. A report for the Economic and Social Research Council[1] in the United Kingdom claims that when one-day and seven-day diaries are compared there was no consistent difference in quality (Robinson and Gershuny, 1994). The Social and Cultural Planning Bureau of the Netherlands has collected seven-day diaries for nearly twenty-five years (Breedveld, van den Broek and Knulst, 1999). However, the vast majority of the time-use survey community remains unconvinced about the feasibility of seven-day diaries. A recent alternative piloted in the Eurostat project is a simple little diary in which respondents record the hours of paid work for each day of the last week.

An extra complication arises from the fact that some activities predominantly occur on a particular day. The designers of time-use surveys go to great lengths to ensure the even representation of all seven days of the week. Where survey weights are applied, one of the functions of these weights is to correct for any imbalance in the proportion of days of the week. An obvious examp le, in a predominantly Christian country, of a day-dependent activity is religious worship, which is likely to be concentrated on a Sunday. A practicing Christian's average time spent in worship will vary by day of the week but liturgy is often concentrated on Sunday. Perhaps the most interesting statistic on the significance of religion in Christian societies would be the mean time spent in religious activities by Christian participants on a Sunday.

I am currently working on a project about trends in 'non-standard working hours' in Australia. For that reason, I am interested in how the frequency of work on Saturday and Sunday has changed over the last 23 years. For this kind of analysis the sample resolves itself into a much smaller random sample of each day of the week. Issues surrounding the interpretation of estimates with relatively high standard errors further complicate these problems.

As mentioned earlier, one technique is to ensure that there is an equal representation of days of the week. If, as in the most recent Australian survey, 7,000 people have each completed a two-day diary this gives us a final, effective sample of 14,000 diary-days. With equal representation of days of the week this translates into a sample of 2,000 Sundays, 2,000 Mondays, 2, 000 Tuesdays, 2,000 Wednesdays, 2,000 Thursdays, 2, 000 Fridays, and 2,000 Saturdays. If we are interested in an activity that typically occurs on a particular day of the week - such as paid work on Sunday - the effective sample is 2,000 diary days. Breaking the data down, by industry or broad occupational groupings, for each sex or ethnicity or educational attainment grouping of those working on Sunday, as might be expected by specialists in this field, rapidly runs up against the limits imposed by small cell size.

In short, survey designers should consider what is the minimum number of a particular day of the week that will produce tolerable standard errors in these analytic situations. Presently typical sample sizes are, from this point of view, probably a bit small. I believe that the diary of hours of paid employment over the last week has much to recommend it.

Collecting secondary activity.

Humans regularly engage in more than one activity at the same time. These parallel activities that accompany a main or 'primary' activity are called 'secondary activities'. A major reason for including the opportunity to report secondary activities in a time diary is that respondents experience their activities as simultaneous occurrences. Requiring respondents to record a single primary activity obliges them to violate or distort this experience when they report. Consequently, the diary becomes more difficult for them to complete.

Recording secondary activities also allows many activities that are curiously absent in tables of primary time-use to reappear. This radically changes estimates of the time couples spend in conversation, the audience for radio programs and, most significantly, the time demands imposed by childcare[2].

A peculiar characteristic of market work is that respondents report that they undertake no other activities at the same time. There is an intimate connection between the rise of industrial manufacture, the diffusion of clock-time and the specialisation of labour (Thomson, 1967). Pre-industrial work had a multiform character. The European blacksmith, for example, forged cart tyres, horseshoes, hardware and weapons, often simultaneously, in his foundry. Non-market work still has some of this pre-industrial character. The housewife, as Ruth Schwartz Cowan recognised, is 'the only unspecialised worker left in America - a veritable jane-of-all-trades at a time when the jacks-of-all-trades have disappeared' (Cowan, 1985:198). Consequently many non-market tasks are often performed simultaneously. Maria Floro has argued that this form of intensification is even more prevalent in the context of the developing world (Floro, 1995).

Respondents tend to record those activities that currently require their greatest attention as their 'primary' or main activity. However, the respondent may be undertaking this foreground activity (for example, ironing) because of their responsibility for a background activity (for example, childcare). Parents, especially mothers, often do not recognise themselves in the averages for time spent in child care derived from time-use surveys. And for good reason. In 1993, Statistics Canada compared diary estimates of childcare with 'stylised' estimates of childcare for the same sample of respondents (Pallié, 1993). In stylised estimates respondents are asked baldly: How many hours did you spend in a specified activity last week? Generally, respondents stylised estimates of time spent in non-market work are much lower than estimates derived from primary activities described in diaries. However, in the case of childcare they were higher.

Respondents often list childcare[3] as the secondary activity. Secondary activities have been well captured in recent Australian surveys. In the Australian surveys of 1992 and 1997, for every hour recorded as a primary child care activity there are three more hours recorded of child care as a secondary activity (Australian Bureau of Statistics 1994b: 8, 15, Australian Bureau of Statistics, 1998a: 17, 23). Roughly half of this 'secondary' childcare accompanies a leisure activity or activity associated with personal care. Following standard coding procedures produces the illusion of voluntary leisure and time for oneself and does not reflect the constraints imposed by caring for small children.

Since three-quarters of the time spent in child care is when child care accompanies another primary activity, ignoring secondary child care gives a completely misleading impression, underestimating the practical time constraints of caring for children and the quantity of labour inputs required. Duncan Ironmonger calculates that when primary and secondary forms of the activity are considered there are 203.4 million hours per week devoted to child care in Australia, compared with 272 million hours per week devoted to all forms of paid work (Ironmonger, 1994: 50).

I think that, in principle, it should be possible to collect secondary activities in a telephone interview. However, as far as I am aware, the surveys that have collected the richest information about secondary activities have used either a paper and pencil self-completion diary or a combination of paper and pencil diary and face-to-face interview. In 1998, Statistics New Zealand had respondents fill out a simple diary of primary activities and fleshed out the information about secondary activities in a face-to-face 'yesterday' interview, with the interviewer using the self-completed diary as a prompt. Results from this survey should be published in the next few months. Whatever the method of collection, I believe there are strong analytic grounds for gathering information about secondary activities.

A 'For Whom' Column

A typical difficulty encountered in classifying activities is producing descriptions of activities that correspond to the boundaries that make sense to analysts. A lot of intellectual resources have gone into devising a 'production boundary' to separate non-market work from other non-market activities (Goldschmidt-Clermont and Pagnossin-Aligisakis, 1995). Care for others might be considered a form of non-cash transfer. To study the significance of these transfers, separating care for others from self-care, and distinguishing intra-household transfers from inter-household transfers are important first steps. For these reasons in 1991-92 the Federal Statistical Office of Germany introduced an extra column in their diaries asking respondents 'for whom' they did this activity (Blanke and Schafer, 1993). The column was part of the 'harmonised' instruments piloted by Eurostat but was not included in the guidelines for the full survey, following widespread confusion, and unjustifiably high extra field and coding costs. The Eurostat experience suggests that a well-designed questionnaire module is better able to capture inter-household transfers. The Australian Bureau of Statistics adopted the extra column for the 1997 Time Use Survey. This extra column has more accurate identified time spent in supporting adults in other households. This is a significant issue for societies based on villages and other forms of communal association, where exchanges of services between households are a crucial element of economic organisation.

Activity coding – standardisation

The lasting legacy of the Szalai Multinational project has been the standardisation of activity classification. Although most national agencies, Eurostat and the United Nations do not formally use either the full Szalai 99-activity code and the more summary 37-activity code, the standards that have replaced them have been drawn-up with the explicit intention of being capable of translation into the Szalai codes. Standardised activity codes open the way for the measurement of changes in time-use and for cross-national comparisons. Both prospects are powerfully relevant for analysis. You will recall that an understanding of social change is one of the two most important motives behind the renewed interest in time-use surveys. It follows that having current data that can easily be compared to the past is potentially one of the most

valuable achievements of survey design. Cross-national study of time-use offers significant opportunities for the analysis of the processes and policies that affect household production, household consumption, the distribution of resources between households, and household welfare. With the completion of the Eurostat project in sight, the next few years promise unparalleled opportunities for cross-national comparisons among OECD countries. The *International Classification for Time Use Activities* developed by the United Nations extends standardisation across the globe (Bediako and Vanek, 1997). This should eventually make it possible to develop a better understanding of the effects of policy across the developing as well as the developed world. Most pleasing of all, these large benefits accruing from standardisation follow without incurring any extra field or processing costs.

Questionnaires

Although diaries or their analogues are the distinctive instruments of time-use surveys, it should not be forgotten that diaries are always accompanied by a questionnaire. The content of this questionnaire is often as critical to the interpretation and analysis of time-use as the diary. The need to collect background or 'demographic' variables is generally well understood. Most national statistical agencies also have considerable experience in collecting labour force, income and educational information, have well developed modules to capture the most critical information in the most comparable form. However, as we have seen, time-use surveys have come to be valued precisely because they collected information not captured in other surveys. For this very reason special consideration needs to be given to collecting items that augment the interpretation and analysis of these activities.

Since a key motive for collecting time-use information is to study non-market production, then it is very useful to know something about household stocks of capital (domestic appliances, etc.) and about the consumption of market services that substitute for the households own labour (maids, child care centres, nursing care, etc.). In many countries inventories of domestic appliances have formed part of the questionnaire. In Australia, there has been a module designed to detail childcare arrangements in the last two national surveys. In 1997 questions about the frequency of purchasing restaurant meals, food-to-go, maid's services, lawn mowing services, etc., were included for the first time. This information should provide help in the analysis of the changing boundary between home and market, changes in the domestic division of labour, and the outcomes of many of these processes for children.

A serious interest in studying the provision of informal care implies that it is important to gather information about the circumstances of this care. The Australian national surveys contain a module to identify informal carers of the frail aged and people with disability. In 1992 and 1997, the questionnaire gathered information on care recipients' disabling conditions, whether they required assistance with activities of daily living and who provided this assistance. The question and scale used are the internationally standardised instruments normally found in health surveys. The questionnaire makes it possible to identify carers and analyse the daily time-use diaries according to the type of conditions and assistance required by the recipient of care and their level of dependency. In addition, the 1997 Time Use Survey contains some information about the use of formal support services. This will assist in the study of the complex relationship involving the main informal carer, formal service providers, family members and others. Understanding these relationships allows organisations to direct scarce community services to where they are most needed, realising the fundamental objectives behind the desire to collect time-use data.

III. Conclusion

The task of collecting good information about time-use cannot be reduced to determining the best, most accurate method for the measurement of time. Which method is the best depends ultimately on the purposes for which it will be used – that is, on its value for analysts. It is not a question of simply building the best diary, although that is a critically important step.

While analysts are chiefly interested in the long-standing themes of economic progress and social change, it must be acknowledged that these themes have been brought together in a new form at the beginning of the twenty-first century. The claims of women have directed attention to the unrecorded and often invisible world of unpaid work. The economic and social significance of own-account household production has been rediscovered along with the fact of its allocation by gender.

This implies that good survey design must acknowledge these broader motives in every phase of survey development, from sample selection through to the instruments that supplement the time diary. The unit of observation must be appropriate for the purposes of it use, as must the time interval collected. All the appropriate population should be in scope. The complexity of non-market activity should be recognised and analysts assisted in drawing appropriate boundaries. The information gathered must lend itself to comparison. To borrow a phrase from the world of technology it must be backward compatible, and still conform to international standards. And finally, the diary information must exist in a context of other information that makes it readily interpretable. Only when these conditions are met is there a powerful method for measuring time-use.

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[1] This report is held in the Economic and Social Research Council Data Archive at the University of Essex

[2] The average time spent in conversation by Australians in 1992 as a primary activity is barely over a quarter of hour per day but when conversation that accompanies another activity is included these same 'taciturn' Australians spend almost three hours per day in conversation. Suddenly husbands and wives can be seen to converse. Similar effects occur with listening to the radio or recorded music. Australians spend five minutes per day on this primary activity in 1992. On the basis of primary activities, for every minute spent consuming audio-only media there were more than 20 spent consuming televisual media. However, when primary and secondary activities are taken into account this ratio falls to 1 minute of audio-only media consumption to 1.18 minutes of televisual media. In other words it becomes plain that television is mostly a foreground activity and that listening to radio and recorded music are typically background activities.

[3] To avoid double counting, the convention in time-use surveys is that cleaning is always coded as cleaning. Only those activities involving the direct care of children - physical care and minding of children, care of sick children, teaching, helping or reprimanding children, playing, reading to or talking with children - is coded as child care. This convention also applies to time spent shopping for children and preparing children's meals.

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