



What do we mean by multitasking? – Exploring the need for methodological clarification in time use research

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Abstract

We can learn a lot about society by knowing how people spend their time during the typical day. However, inconsistency in the recording of time use, specifically, in how we record details of people's participation in more than one activity at a time ("multitasking"), may be preventing full understanding of how people use their time in their everyday lives. It is not clear what "we" – as academics, survey designers and participants – mean by "multitasking". This may be affecting the reliability and validity of recorded multitasking. In consequence, we may not know what we think we know about time use, with implications for "knowledge" in a wide range of academic disciplines and policy areas. This paper begins by presenting examples of popular use of the term "multitasking", taken from a national (GB) survey, illustrating a diversity of understanding of the term amongst participants. Next, analysis of selected time use diaries highlights the impacts of this diversity in meaning for inter-participant and inter-survey consistency and therefore for reliability and validity. Finally, the paper raises a number of questions regarding the meaning of multitasking, with reference to its conceptualisation in selected academic papers. The paper identifies an important gap in the research literature, illustrating a need for methodological investigation in time use research, to enhance our understanding of the meaning of multitasking and therefore to enhance the comparability, reliability and validity of time use studies.

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1 Introduction

We can learn a lot about society by knowing how people spend their time during the typical day. However, inconsistency in the recording of time use, specifically, in how we record details of people's participation in more than one activity at a time ("*multitasking*"), may be preventing the full understanding of how people use their time in their everyday lives.

Termed variously simultaneous activities, overlapping activities, concurrent activities, parallel activities, secondary activities and polychronic time use (Ironmonger, 2003), multitasking has long been recognised as important. In his 1960s study, Szalai (1972) recognised that accounting for multitasking gave a fuller picture of the reality of everyday behaviour. It has been suggested that including multitasking in time accounting presents a more complete and accurate picture of time use and the experience of time. However, perhaps reflecting methodological difficulties in the recording and analysing of multitasking data (Ironmonger, 2003) and theoretical barriers to its conceptualisation within the constraints of the clock time paradigm (Adam, 2006), it is only recently that researchers have begun seriously to record and analyse such data.

Whilst there is some agreement as to the importance of multitasking data¹, analysis of academic papers and time use surveys reveals an absence of an agreed definition of multitasking within the time use community. Where definitions are given, they differ but, more commonly, definitions are not provided, such that survey participants are required to define multitasking themselves. Regardless of the *purpose* behind differing or absent definitions, the absence of an agreed definition to inform survey instruments raises questions regarding the comparability and reliability of existing studies. Where different *studies* define multitasking in different ways, this reduces the extent to which we can compare these studies. When different *participants* in our studies define multitasking in different ways, this reduces the extent to which we can compare different people's time use, affecting the reliability of our findings. In consequence, we may not know what we think we know about time use nor, therefore, about the disciplines which rely upon time use data. This paper addresses this issue, examining the concept and definition of multitasking. In so doing, the paper presents an agenda for research, to clarify what "we" – academics, survey designers and participants – mean when we discuss, collect data about and report "multitasking".

The paper develops as follows. A brief overview of the literature on multitasking provides the context for the research. The research focus is then defined. A discussion of popular use of the term "multitasking", taken from a survey of Internet users, is then presented, which illustrates

¹ The reader should note that many surveys continue to avoid the issue of multitasking. For example, the American Time Use Survey asks participants for only the primary activity. The extent to which this is due to rejection of the importance of multitasking as a concept, or due to complexities in its collection and analysis, is unknown.

that participants in our studies vary in their conceptualisation and use of the term. Examples of the way that multitasking is defined within time use diaries are then presented. This highlights the lack of clear or coherent measurement of multitasking within our time use surveys, which leaves considerable room for measurement error, should participants' definitions of multitasking vary in the way that is suggested in the preceding section. The paper then discusses examples of the use of the concept of multitasking, taken from selected academic papers, highlighting the multiple understandings of the term within the time use community. A number of key questions arise from these discussions, which must be explored if we are to progress towards a greater understanding of multitasking. The paper concludes by identifying further areas of research which may be necessary if we are to more accurately measure multitasking and, therefore, time use behaviour.

2 Context

Studies suggest that multitasking is highly prevalent. Around 95% of the population report multitasking each day (Hungerford, 2001). People participate in more than one activity concurrently for approximately one third of the day (Bittman and Wajcman, 2000; Floro and Miles, 2001; Hungerford, 2001; Ruuskanene, 2004), such that multitasking can “add” up to seven hours to the average waking day (Kenyon, 2008)².

Multitasked activities are not trivial activities, but are those that impact upon quality of life and life chances. These include: childcare and other caring activities (Budig and Folbre, 2004; Ironmonger, 2003); domestic work (Bittman and Wajcman, 2000; Sullivan, 1997); passive leisure (Baron, 2008); communications activities (Baron, 2008); social networks activities (Kenyon, 2008); and online activities (Kenyon, 2008). Furthermore, evidence suggests that these activities are more likely to be recorded as secondary than as primary activities. They are therefore underreported when only primary activities are considered. Thus, it can be suggested that the failure to recognise multitasking has distorted the picture of popular time use devoted to these activities, leading to an inaccurate account of the amount of time that people spend in these activities.

Accounting for multitasking has implications for the understanding of well-being, inequality and disadvantage in society. Studies suggest that multitasking is differentially distributed across the population. Whilst it is not clear if individual characteristics influence participants' *ability* or *desire* to multitask, or the *necessity* of multitasking, propensity to multitask has been linked to demographic factors including age, culture, educational attainment, employment status, gender, household lifecycle (presence of children) and income (Floro and Miles, 2003).

² The reader should note that the majority of surveys shy away from calculations which appear to suggest that there are more than 24 hours in the day. Rather, multitasked activities are measured as composite activities, under revised codes, to ensure that analysis remains within the linear perception of clock time, which suggests that there are a finite number of minutes in the day.

Through analysis of multitasking, studies have highlighted: gender inequity in unpaid work, particularly through the study of caring activities (Bittman and Wajcman, 2000; Carrasco and Recio, 2001; Floro and Miles, 2003; Ironmonger, 2003); the contamination of women's leisure time (Bittman and Wajcman, 2000; Sullivan, 1997); and the impacts of multitasking for stress and well-being (Floro and Miles, 2003; Southerton and Tomlinson, 2005; Sullivan, 2008). However, studies have also introduced the idea of positive contamination of activities (Floro and Miles, 2003; Ruuskanene, 2004), greater status through busyness (Sullivan, 2008) and the possibility of an increase in total activity participation through multitasking (Sullivan, 2008), which may reduce social exclusion (Kenyon and Lyons, 2007). If this increase in activity participation is desirable and without negative effect, there are implications for equality if the ability to multitask is differentially distributed.

Multitasking also influences our understanding of *change* in time use. Rapid changes in time use are taking place, in response to, for example, the changing role of women, changes in the structure of work and the introduction of the Internet and other ICTs (Lindquist and Kaufman-Scarborough, 2007). Studies relying upon primary activity data alone have tended to suggest *substitution* effects following the introduction of new activities. For example, research into the social impacts of Internet use has tended to show a decline in social networks activities. However, such impacts are seen to disappear when multitasking is considered (Anderson and Tracey, 2002; Kenyon, 2008; Nie et al., 2002). Rather, total activity participation is *increased*, as time use is intensified (discussed in relation to offline activities by Floro and Miles (2003)). In this sense, multitasking data reveal that activity participation is not a zero sum game, in which the addition of one activity requires subtraction of another: activities can be added, without taking any away. Finally, studies suggest that multitasking may be becoming more prevalent in response to social changes and, therefore, more important to our understanding of time use.

3 Research focus

During the course of research into the impacts of Internet use upon time use (CTS, nd, a), the present author conducted a number of focus groups into time use diary completion strategies, in an attempt to uncover qualitative reasons behind reported variability in time use. Differences in the completion of the secondary activities fields emerged, secondary to the main purpose of the study, leading the author to question the definition of multitasking offered within the diary. Participants were asked to record their "main" activity, recording also "what else" they were doing, with space provided for up to three „additional activities“ (CTS, nd, b). Perhaps the high degree of variability in reported multitasking (Kenyon, 2008) was due more to interpretations of the diary instructions than to actual differences in behaviour?

The research reported in this paper follows from the author's search for a definition of multitasking for use in future studies, to improve the reliability and validity of the survey tool. The

research uncovered an absence of consensus over the meaning of multitasking. It also exposed a number of questions which must be answered, if we are to progress towards an understanding of what we mean when we talk about multitasking.

It is imperative that we are clear what “we”, as academics, survey designers and participants, mean by “multitasking”, if we are to be able to compare the behaviour of our participants (both intra- and inter-survey) and if we are to have confidence in our findings. Knowledge about multitasking is essential to our understanding of time use. How we *record* multitasking influences conclusions about its prevalence and importance. How multitasking is *defined* influences how it is recorded. Therefore, questioning „what do “we” mean by “multitasking”?“ is of vital importance to our understanding of time use.

The following section presents the results from an analysis of data from a survey, which aims to expose what participants mean by “multitasking”.

4 Survey

In February 2006, 1,000 weekly Internet users, resident in Great Britain (GB), completed and returned an online questionnaire³. The questionnaire included a number of questions about multitasking. Following these questions, participants were asked to provide any further comments on multitasking in an open text box. This paper considers the comments that were provided in the text box, taking examples to illustrate popular perceptions of multitasking. 99 participants provided comments on multitasking. 28 participants provided examples of their multitasking.

Analysis reveals highly divergent conceptualisations of multitasking amongst this sub-sample. Six types of multitasking were identified. These are listed below. Example quotes are included below each multitasking type, followed by an elaboration of the conceptualisation.

(1) Consecutive multitasking: Doing those activities online means you can start, go do something else for a while, return and your details are still up – having to change a child’s nappy is less of an inconvenience when shopping online than in a store. Here, the individual describes two distinct activities, which may occur in the same block of time⁴, but which clearly occur at distinct times. It would not be physically possible to change a nappy whilst shopping: one would have to pause the shopping activity to change the nappy.

(2) Simultaneous multitasking: “I am currently eating and doing this survey.” This participant describes what may be termed “true” multitasking: the simultaneous conduct of two distinct activities, each undertaken with a separate purpose. Robinson and Godbey (1997) conceptualise multitasking as the “deepening” of time, although it may be more useful to consider the

³ Designed by the author and Glenn Lyons and distributed by GfK NOP. The sample is defined in Kenyon (2008); survey details, CTS (nd, c).

⁴ Full discussion of the nature of the block of time is included in Section 6.1.

broadening of time, such that time is seen as an horizontal entity, in addition to being a vertical entity. In this sense, each constituent of clock time has multiple parallel constituents, in which activity participation takes place. It is these parallel constituents of clock time that are considered when *simultaneous* activities are recorded. Questions have been raised regarding the extent to which humans have the capacity to multitask. Rather, it is suggested that simultaneous multitasking is actually rapid consecutive multitasking, at a timescale too small to be recorded in surveys or, perhaps, to be observed. Thus, Ironmonger (2003) cites Szalai (1972): 'still more minute observations could possibly prove that some activities which seemed to be carried out simultaneously were in effect alternating with one another'. Ironmonger notes that Szalai was unconvinced by this argument, referencing childcare as an activity that could be performed simultaneously (Hungerford, 2001). Whilst psychological research (Levy and Pashler, 2001, 2008; Ruthruff et al., 2003) reports that simultaneity is not possible, for the majority of activities, it is acknowledged that this is activity-dependent, with the possible exception of highly practiced or non-complex tasks – such as eating, walking and, possibly, driving. Whether or not true simultaneity is possible, the perception of its possibility is of importance here: for this participant, “multitasking“ is defined as the simultaneous, or parallel, conduct of multiple, discrete activities. Simultaneous multitasking – that is, the conduct of two or more distinct activities at the same time – can be distinguished from instances in which there is one activity, but multiple purposes, or outcomes. Thus, one may walk with a dog to the shops (one activity), but simultaneously be achieving a number of purposes (physical exercise for the individual; physical exercise for the dog; pet care; travel between activity locations). This example would transform into simultaneous multitasking if the walk were combined with a telephone call, for example⁵.

(3) Active multitasking: ‘Can watch TV or chat on line whilst reading e-mails or looking at websites.’ This individual describes active participation in multiple acts. The extent to which this represents consecutive or simultaneous activity conduct is unknown.

(4) Passive multitasking: ‘My husband can’t do more than one thing at a time, if he’s looking something up on the net – that’s all he can do, he couldn’t combine it with keeping an eye on the dinner!’

(5) “On-call” multitasking (Budig and Folbre, 2004): ‘I can get on and run my house or do things when the children are in bed.’ Distinct from passive multitasking, on-call multitasking combines two or more activities where presence is required, yet participation cannot be considered to be truly active. Childcare is perhaps the most common example of on-call multitasking: where the carer must be present and is therefore deemed to be providing care, but is not actively involved in this care. Crucially, however, the carer must be able to respond, should the need arise. Therefore, participation in other activities is constrained by participation in this activity. Such activities could be seen to fall between active and passive activities and are conducted simultaneously. (Folbre, 2008) provides an illuminating discussion on the

⁵ I am grateful to Kimberly Fisher for drawing my attention to this distinction and for providing this example.

nature of on-call multitasking in childcare, contrasting this with active and supervisory care (the latter also discussed by Mullan and Craig (2009) in their discussion of data needs in recording childcare time).

(6) Absent multitasking: „I have a 2 year old son so he can sit on my knee and draw whilst I am shopping online.“ This participant describes two activities, yet s/he is actually only engaged in one of the activities: s/he shops online, whilst his/her child draws. Had the participant recorded shopping online combined with childcare, this could be classed as an on-call, simultaneous activity. Therefore, six conceptualisations of multitasking were identified in this survey. Without further research, it cannot be assumed that this divergence is typical of the wider population. However, if it is, the following observations can be made.

The different types of multitasking give rise to different conclusions regarding the importance of multitasking and its effects. For example, a sociologist examining the household balance of labour in the context of the „double burden“ experienced by working women may be interested in the amount of time spent in household tasks, by different genders. The example given above, within „passive multitasking“, would lead to the recording of an hour’s cooking as a multitasked activity, by the male household member. Would the scholar think such passive multitasking appropriate as an indicator of the husband’s engagement in household tasks, or would the recording of passive multitasking suggest greater active participation in household tasks than is actually the case, thus decreasing perceptions of the gender difference in the allocation of household tasks, suggesting a corresponding decrease in the double burden, which may not be valid?

Different perceptions of „what is multitasking“ may lead to differences in its recording, particularly if guidance on how and what to record is not provided. This may call into question the extent to which we can compare inter-participant time use diaries.

The following section presents the results from an analysis of time use surveys, which aims to expose what survey designers mean by “multitasking“. The implications of this, in light of the above, are considered.

5 Multitasking in time use surveys

The above analysis reveals divergent popular conceptualisations of multitasking. When we ask the question, „what do we mean by multitasking?“ of time use surveys, we discover similarly divergent conceptualisations. This raises questions regarding the comparability, reliability and validity of existing time use surveys.

The following surveys have been selected primarily from the Centre for Time Use Research (CTUR) Information Gateway (Fisher et al., 2009), a compendium of time use surveys. Over 200 surveys were reviewed. The author read all survey documentation provided for these surveys, including instructions, the diary instrument and accompanying notes/analyses, if they

were provided in the English language. The purpose of the review was to identify instructions provided to participants with regard to the recording of their multitasking. The following five surveys have been selected on the basis of their compliance with three criteria: the identification of some instructions in the online documentation; their contrasting definitions of multitasking; and being in the English language.

Table 1 presents the results of this analysis, giving the instructions provided, alongside a summary of the instructions given, to highlight the contrasting definitions of multitasking uncovered during the review. Table 1 presents six different ways of recording multitasking within five time use diaries, suggesting that our *surveys* mean different things by “multitasking”.

The same activity sequence may be reported differently, according to which of the above instructions is taken. Take the example given in the UK National Survey of Time Use, cited in Table 1. Table 2 illustrates the different activity sequences that may be reported for each of the instructions.

The judgement as to the main activity, the first activity, the most important activity, that influenced by the example and that requiring the most attention, is entirely subjective. Thus, any activity sequence may be reported in response to these instructions, according to the judgement of the individual, as illustrated in Table 2. Therefore, we have six different activity sequences, one for each of the instructions given in Table 1.

Were all multitasked activities accorded equal weight in analysis, such variation may not be seen as important. However, all activities are not treated equally. The majority of studies record only the primary activity; those that record multitasking mainly record only one multitasked activity. Therefore, the reported activity/activities are likely to vary, according to how the participant is instructed to record multitasking and certain activities will be under-reported. In addition, the majority of reported studies only analyse the primary activity. Few analyse more than one secondary activity. In consequence, certain activities will be under-analysed and the conclusions that we draw from these studies will be highly dependent upon the interpretation of instructions by participants. Those that do record and analyse secondary activities tend to create a hierarchy of activities, judging the importance of the activity according to its classification as primary, first secondary, second secondary, etc. The relative importance of each activity will also vary, according to the interpretation of instructions.

It may, of course, be the objective of survey authors to capture subjective, rather than objective, perceptions of time use, with the conscious decision being taken to enable participants to define multitasking themselves. However, where the individual participant defines the concept “multitasking” themselves, without providing explanation of their strategy to enable contextualisation, it is likely that there will be variability in recording strategies both between participants and within each individual’s diary. Thus, regardless of the aims of such a strategy, the absence of an agreed definition raises questions regarding the comparability and reliability of existing studies. Considering comparability, how much can we learn about multi-

tasking, if we cannot compare and build upon previous studies? Regarding reliability, to be reliable, a study must be *replicable*: one should expect all participants to interpret the question in the same way, every time that the question is answered and to be answering the same question. Should participants interpret the question differently, both between each other and within their own diaries – a likely outcome if participants are not guided in their recording of multitasking – data collected will be unreliable. How valid is our knowledge about multitasking, if it is based upon unreliable data?

Table 1
Review of time use surveys

Survey name and instructions	Instruction summary
<i>American Time Use Survey, USA, 2007</i> „If respondents report doing more than one activity at a time, they are asked to identify which one was the „main“ (primary) activity. If none can be identified, then the interviewer records the first activity mentioned.“ (BLS, 2009) ⁶ .	(1) Main activity (2) First activity mentioned
<i>Norwegian time use survey, Norway, 1980-81</i> The first activity column was headed: „Most important activity in the period“. The second activity column was headed: „The period was simultaneously used for.“ (Kitterod, 2007, 173).	Most important activity
<i>OPCS Omnibus Survey, UK, 1995</i> „Sometimes you maybe doing two things at the same time. Please try and choose what your main activity was. For example, keeping an eye on children while doing housework should be recorded as „Cleaning house/tidying“ rather than „Care of own children and play“. If you can't choose between two or more activities record the one you did for the longest time as the main activity.“ (Gershunv <i>Survey of Adolescent Time Use and Well-Being, Ireland, 2007-2008</i> „If you were doing more than two things, decide which two activities demanded most attention.“ (Hunt, nd).	Longest activity Most attention
<i>UK National Survey of Time Use, UK, 2000-2001</i> „If you were doing more than one thing at the same time, record the second activity in this column. For example, you might be watching television (main activity) and drinking tea or watching children (second activity). You must decide which is the main and which is the second activity.“ (ONS, 2000).	Guidance by example

Source: Tabel based on own compilation.

The definition of the variable by the individual participant who, in all of the surveys reviewed, is required to decide firstly, which activities are primary and which secondary and secondly, when they are multitasking, without guidance and without giving qualitative feedback to enable the contextualisation of decisions, results not only in an *unreliable* dataset, but also in a highly *unstable* dataset. This is demonstrated by the high variability in recorded multitasking, discussed in Kenyon (2008) and Nie et al. (2002). Should differing completion strategies rather than genuine differences in multitasking behaviour be responsible for variability, both inter-participant and intra-participant comparability (the latter where the study is conducted over time) are called into question – and thus are conclusions, including those cited above, regarding the prevalence and importance of multitasking and the propensity to multi-

⁶ This instruction is given to data inputters, rather than to the participants directly.

task, by individual characteristics, by activity characteristics and in response to change, or over time.

Table 2
Possible activity sequences

Instruction	Possible activity sequence
Main	Watching television, watching children, drinking tea
First	Drinking tea, watching children, watching television
Most important	Watching children, drinking tea, watching television
Longest	Watching children, watching television, drinking tea
Most attention	Drinking tea, watching television, watching children
Example	Watching television, drinking tea, watching children

Source: Table based on own compilation.

Analysis reveals two further possible reliability issues. The first considers the provision of example completed diaries within the survey instrument, in addition to the instructions detailed above. The majority of diaries provide this additional guidance. Whilst the intention may be to illustrate good practice in terms of completion, participants may also gain an insight into the prioritisation of tasks, which may contradict the instructions (Table 1), or participants' beliefs (Section 4). In the Survey of Adolescent Time Use and Well-Being (Hunt, nd), an example diary is provided, alongside the following discussion:

„At 8pm, this girl has a shower which takes nearly 30 minutes so she ticks the two timeslots for personal care from 8.00 – 8.30pm. She then watches TV for an hour with her family until 9.30pm. This is her main activity so she ticks these four timeslots. But at the same time she was also texting a friend so she puts a star in the timeslot for „talking on the phone, texting“. From 9.30 – 10.30pm she listens to some music in her bedroom so there are four ticks in these timeslots. She then reads [main activity = √] and sends some more texts [second activity = *] until 10.45pm. She goes to the toilet and brushes her teeth and is asleep by 11pm.“

From this, the participant may assume that texting should be recorded as a secondary activity, overriding the instruction to record the activity taking the most attention as the primary activity (Table 1). Thus, in seeking to understand multitasking behaviour, it is likely to be important to understand the relative importance of participants' beliefs, diary instructions and diary examples in influence recorded behaviour.

A second possible reliability issue concerns the interpretation of time use by the coder, who may be instructed to code activities in a similar way, for all participants, overriding the priorities ascribed by the participants themselves. For example, the survey designer may believe that travel is always a primary activity (Section 6.2); or that judgement should be made by the individual coder as to the importance of the activities when deciding which should be recorded as primary and which secondary (ONS, 2003); or that instances of multitasking should be removed from the data file (Gershuny and Smith, 1995). Should this be the case, whilst

inconsistencies in the data may be reduced, alongside the influence of participants' beliefs upon data collected (Section 7), declaration of the coding strategy and awareness of the survey designer's definition of multitasking become central to our understanding of reported multitasking behaviour.

In summary, when we ask the question, „what do we mean by multitasking?“ of time use surveys, we discover divergent conceptualisations of multitasking. This, combined with the knowledge that participants also mean different things by“multitasking“ (Section 4), gives rise to the following questions:

- (1) How comparable are surveys and how comparable are our participants, if the instructions that we give are so variable?
- (2) How comparable are our surveys and how comparable are our participants, if the instructions we gave can be so variably interpreted?
- (3) How reliable are our findings, if the instructions that we give can be so variably interpreted?

6 Multitasking in academic papers

The majority of papers reviewed fail to define the concept of multitasking, presenting instead examples of multitasking, analysis of which reveals highly divergent conceptualisations, both between authors and within individual papers. This section considers three academic papers, which discuss multitasking in the context of three different disciplines⁷. The papers were chosen to highlight the differences in the conceptualisation of multitasking between and within academic papers. This raises a number of questions which influence the definition of multitasking and, therefore, its measurement.

6.1 Lindquist and Kaufman–Scarborough (2007)

The authors present the following definition of multitasking, which they term “polychronicity”:

“Polychronicity has traditionally been defined as a form of behavior wherein a person engages in two or more activities during the same block of time, while monochronicity occurs when a person engages in one activity at a time” (Lindquist and Kaufman-Scarborough, 2007).

This definition has two key components: the definition of “activity”; and the definition of “block of time”.

⁷ The potential influence of differing disciplinary demands upon definitions is considered in Section 7.

Considering the definition of activity, the authors illustrate their definition with examples of “polychronic” activities:

- (1) “...telecommuting while the clothes dryer is going and dinner is in the oven” (Lindquist and Kaufman-Scarborough, 2007, 254).
- (2) “...the grocery shopper who is having photos processed, sushi made, and is calling mom on the cell phone concerning a greeting card purchase, all during the same clock block of time” (Lindquist and Kaufman-Scarborough, 2007, 264).

A wide range of activities are covered in these examples. The following discussion raises a number of questions, which arise when we try to define, using these examples, what the authors mean by multitasking.

Considering activity sequence (AS) (1), three *acts* are mentioned: telecommuting; drying clothes; cooking dinner. But can the latter two be termed “activities”? In other words, is the individual *actively* involved in these activities? Whilst it is true that three acts are being undertaken, the extent to which the individual is involved in more than one *activity* can be questioned. Does the passive presence of the individual transform these acts into activities, despite the individual’s lack of active involvement in the act? If this is the case, multitasking may be recorded for a wide range of activities in which the individual is not actively involved, activities in which others in the household are participating, but the individual is not. Would we wish these activities to be recorded by the individual?

It may be suggested that the requirement of the individual’s presence transforms an act into an activity. However, the extent to which the individual’s presence is *required* in each of the examples in AS (1) is debatable. Thus, we must ask – can the example given in AS (1), a passive, absent interpretation of polychronicity, really be termed multitasking? If this were recorded as multitasking, to what extent would our understanding of the amount of time spent by the individual in unpaid work be inflated?

Considering AS (2), it appears that four activities are being undertaken simultaneously. However, having photographs processed, or sushi made, cannot be seen as an *activity* in which the individual is *actively* involved, for these are activities that are being undertaken by a third party. The individual may be deemed to be involved in *waiting* for these services. Could this legitimately be recorded as an activity, despite the lack of *active* participation involved in the act of waiting? In this example, should ordering and collecting each item be regarded as discrete activities, without the waiting time, for waiting is not an active act; should waiting be recorded as a secondary activity; or should waiting be recorded as a primary activity, if it is the act of purchasing photographs and sushi were the primary purpose of the individual’s journey to the shopping mall?

The other activities mentioned in AS (2) are active activities. But to what extent are they undertaken simultaneously and to what extent are they consecutive, albeit consecutive in rapid succession? Here, the authors’ definition of multitasking as being activities that are undertaken “*during the same clock block of time*” becomes crucial.

The definition of multitasking as being during a block of time (rather than truly simultaneous as discussed in Section 4) is taken for granted in the majority of papers reviewed in the course of this study. The nature of the block of time, specifically, its duration, is not defined by Lindquist and Kaufman-Scarborough. Different surveys record different blocks of time, ranging from “activity time”, using undefined time blocks (Kenyon, 2008), to 5 minute (ABS, nd), 10 minute (CTUR, 2000; ONS, nd), 15 minute (Gershuny and Smith, 1995; Hunt, nd) and 30 minute time blocks (Estadística de la Ciudad, nd) (HETUS guidelines recommend 10 minute time slots (Eurostat, 2001)). To what extent is this affecting our understanding of multitasking, specifically, the number of activities that an individual can engage in at one time? And, is it appropriate to record multitasking in clock blocks of time when, by its nature, multitasking defies the definition of time as clock time (Bryson, 2007), because of clock time’s inherently linear nature, as opposed to the multiple dimensions of time identified by multitasking behaviour?

From the above discussion, we have identified the following topics, which influence the meaning and therefore recording of multitasking:

- When does an *act* become an *activity*?
- What unit of measurement is appropriate for a “block of time”?

6.2 Lyons and Urry (2005)

Lyons and Urry present a discussion of travel time use, with the purpose of challenging the dominant approach to the appraisal of transport schemes in which travel time is seen as wasted, unproductive, time. They list 12 activities as examples of time use that exist on a journey by train. Each of these can be deemed „activities“: acts in which the individual is actively (through physical, cognitive or affective effort) involved. However, the extent to which travelling *by public transport* can itself be deemed an act or an activity is brought into question.

Ironmonger (2004) states that travel is an over-riding activity, one that is always coded as a primary activity, for travel is the main *purpose* in all simultaneous activity sequences involving travel. In addition, travel acts as a constraint upon participation in other activities, in terms of both the scheduling of activities and the activities that can be undertaken at the same time⁸. In this sense, perhaps travel could be defined as the *dominant* activity: activities undertaken during travel are likely to be incidental to the act of travel. But are those involved in travelling by train, as in the above examples, *actively* travelling? Clearly, their presence is required, which may suggest that travel is an activity, not an act (Section 6.1) and we would not wish to challenge the active nature of travel as a car driver, cyclist or pedestrian, or as a passenger who is actively involved in the act of travel by, for example, reading directions. But travel is, in the case of travel by train as described by Lyons and Urry, a *passive* act. With the excep-

⁸ I am grateful to Kimberly Fisher for highlighting the constraining role of travel upon time use.

tion of boarding and alighting, which require physical effort and finding a seat and locating the interchange, which require cognitive effort, the traveller is not actively engaged in any act to facilitate their travel. Should the active or the passive activity be recorded as primary or secondary? That is, should intensity of engagement influence primacy, or should purpose and/or dominance indicate this? And is travel *always* the primary purpose in simultaneous activity sequences, as Ironmonger (2004) suggests? Should working become the primary purpose within an activity sequence when it is the more active activity, as in the example above? Would this result in travel varying in its classification, according to the type of activity undertaken alongside it? Finally, should travel ever be regarded simply as the *context* for the conduct of other activities, rather than as a separate activity?

Analysis of multitasking as described in Lyons and Urry has therefore identified the following questions, which influence our understanding of the meaning of multitasking:

- When should an activity be classified as a primary activity and when a secondary activity?
- How should travel be classified, when it is multitasked?

6.3 Baron (2008)

Baron discusses multitasking as a cognitive and physical function of everyday life:

“For example, in driving a car, we must look three ways (ahead, in the rear view mirror, and peripherally), while controlling the speed and direction of the vehicle, and perhaps conversing or listening to the radio. Another real – world example is playing the piano or organ, for which we need to read multiple lines of musical notation and control two hands, along with one or two feet.”

Baron’s examples break activities down into their multiple bodily functions. In this sense, it is suggested that we all multitask constantly as part of our daily activities. Thus, in writing this paper, I am simultaneously reading, thinking and typing. Taken to the extreme, we could further add the physical function of breathing and digesting to this example, alongside the multiple thoughts in which I am engaged (of the paper, my daughter’s well-being, tonight’s supper).

Baron’s example illustrates the fluidity of the boundaries between activities. Whilst it is unlikely that we wish to record such intricate physical functions in our diaries, it is possible to envisage the utility of the recording of cognitive functions, for example, in understanding the burden of work, or the parental burden, each linking to stress. Baron’s understanding of the meaning of multitasking therefore raises an interesting issue: to what extent should activities be broken down into their multiple components? When do *participants* perceive themselves to be engaged in more than one activity? When are *composite* activities seen by our participants to be *singular* activities? Related to this, when are activities seen to be background activities, part of life, rather than activities that we are actively conscious of? Thus, Budig and Folbre

(2004) ask: is secondary childcare time underreported because it is seen to be “just part of being a parent”, rather than being seen as an activity in its own right?

We conclude this section with the following questions, which we must consider in our search for the meaning of “multitasking”:

- What are composite activities?
- The recording of multitasking requires that we break down composite activities into their component parts. How natural is this for our participants?

7 Concluding remarks

Knowledge about multitasking is essential to the understanding of time use. How we *record* multitasking influences the conclusions that we can draw about its prevalence and importance. How we *define* multitasking influences how multitasking is recorded. Therefore, the question “what do “we”, as academics, survey authors and participants, mean by multitasking?” is of vital importance to our understanding of time use.

Multitasking research to date has focused primarily upon the quantification of multitasking behaviour. However, the research reported in this paper suggests that there is also a need for research into its definition and experience. The absence of understanding of the meaning of multitasking and even, as suggested in the introduction, on the naming of the phenomenon, may be hampering our abilities to understand its influence upon time use and activity participation.

It is beyond the scope of this paper to offer a concrete definition of multitasking. The above sections have demonstrated the variability in meaning of multitasking, in the time use community and amongst the public. To develop a single definition would necessitate the selection of a single “correct” definition from those offered above. The field of study is not yet advanced enough to enable such a judgement to be made. Indeed, to take such an approach suggests that there is a single meaning of multitasking, which is appropriate across disciplines and across culture, gender, occupation, household structure, etc. It is not clear, at this stage, whether or not this is the case, or whether a selection of meanings, each with different theoretical (and policy) impacts, would be appropriate.

In addition, we do not yet know the impact of different definitions upon how participants recording multitasking – that is, what they record and why. We can only hypothesise, at this stage, that different definitions of multitasking, either those given in time use surveys or those held by our participants, influence what people record. Equally, we are as yet unaware of the relative influence of instructions, examples and participant beliefs upon data recorded. It may be that instruction and/or examples are ineffective in guiding data recording, which will be determined by beliefs, rather than guidance. Finally, we do not know enough about the differing disciplinary demands to know whether or not a single definition would deliver meaningful

data for all disciplines. It may emerge that different studies, for example those with an activity focus such as that described in Section 6.2, have different objectives and purposes to those focused upon other activities, or to general time use surveys such as those discussed in Section 5, which warrant different definitions (or the absence of definition) of “multitasking”.

Therefore, at this stage, we are unable to answer the question, “what do “we” mean by “multitasking”?” A large number of questions have been raised in this paper, which are likely to prove to be vital to our understanding of multitasking and therefore to our understanding of time use. Only by exploring these questions can we hope to progress our understanding of multitasking, such that we can understand the influence of the definition of multitasking upon the recording, analysis and application of time use research.

Qualitative research could give valuable insights into the definition of multitasking in use in society. Participants’ time use behaviour could be clarified and explored through discussion, addressing many of the questions raised above and a common consensus on the concept could be developed, if one exists, with potential for stratification of views if a consensus cannot be reached. Participants could be encouraged to consider their and others’ use of the term “multitasking” and to consider when they perceive themselves and others to be multitasking; and scenarios could be employed to develop a classification of multitasking behaviours. Such research could also seek to uncover the relative influence of instructions, examples and beliefs, exploring the efficacy of instructions in the face of strongly held beliefs about multitasking, exploring ways to improve compliance and potentially enabling classification of participants, which could be factored into analysis. Quantitative research, comparing datasets with different definitions of multitasking, could help to uncover the influence of different definitions upon recorded behaviour, if indeed given definitions influence reporting behaviour, overriding participants’ beliefs, which could be quantitatively measured and factored into statistical analyses. Through these investigations, we could move closer to a definition of multitasking that could confidently be used in time use surveys, furthering the comparability and reliability of our research.

The author is aware that the paper may appear overly critical of existing time use studies. In his 1998 paper, Axhausen highlights the dilemma that transport researchers face, suggesting that survey instruments, which are based upon the time use diary format, will never be able to collect all of the information that is necessary for a complete understanding travel behaviour. This observation can equally be applied to the time use community. It is not the intention of this paper to condemn existing survey instruments for not doing the impossible. Rather, the paper aims to present an agenda for research. We need to be clear about what we are trying to find out – how *we* define “multitasking” – and we need to understand whether or not we are achieving this with our existing survey instruments – if our instruments support, or subdue, participants’ beliefs. The value of existing surveys could be supplemented if details of definitions and examples given to participants were given and full discussion of the importance of these for comparability, reliability and validity were included when reporting.

There is a recognised need for a greater understanding of multitasking behaviour and its influence upon popular time use. For this to be realised, we need to understand what “multitasking” means. This paper has sought to raise the questions that are necessary if we are to progress towards this goal.

References

- ABS (Australian Bureau of Statistics) (Nd), Time use diary 2006, [http://www.ausstats.abs.gov.au/ausstats/subscriber.nsf/0/01AC26F86E989B2FCA2573F5001528F1/\\$File/41500%20tus%202006%20diary.pdf](http://www.ausstats.abs.gov.au/ausstats/subscriber.nsf/0/01AC26F86E989B2FCA2573F5001528F1/$File/41500%20tus%202006%20diary.pdf) (accessed 19 June, 2009).
- Adam, B. (2006), *Time and social theory*, Cambridge, Polity Press.
- Anderson, B. and K. Tracey (2002), Digital living – The impact (or otherwise) of the Internet on everyday British life, in: Wellman, B. and C. Haythornthwaite (eds.), *The internet in everyday life*, Oxford, Blackwell Publishing Ltd, Oxford, 139-163.
- Axhausen, K. (1998), Can we ever obtain the data we would like to have?, in: Garling, T., Laitila, T. and K. Westin (eds.), *Theoretical foundations of travel choice modelling*, Oxford, 305-323.
- Baron, N. (2008), Adjusting the volume – Technology and multitasking in discourse control, in: Katz, J.E. (eds.), *Handbook of mobile communication studies*, Cambridge, MA, MIT, 117-194.
- Bittman, M. and J. Wajcman (2000), The rush hours – The character of leisure time and gender equity, in: *Social Forces*, Vol. 79, No. 1, 165-189.
- BLS (Bureau of Labor Statistics) (2009), American time use survey questionnaire, <http://stats.bls.gov/tus/tu-questionnaire.pdf>, (accessed 16 June, 2009).
- Bryson, V. (2007), *Gender and the politics of time – Feminist theory and contemporary debates*, The Policy Press, Bristol.
- Budig, M.J. and N. Folbre (2004), Activity, proximity or responsibility? – Measuring parental childcare time, in: Folbre, N and M. Bittman (eds.), *Family time – The social organization of care*, Routledge, New York, 51-68.
- Carrasco, C. and A.A. Recio (2001), Time, work and gender in Spain, in: *Time & Society*, Vol. 10, No. 2-3, 277-301.
- CTS (Centre for Transport and Society) (Nd, a), Internet – Investigating new technology’s evolving role, nature and effects for transport, <http://www.transport.uwe.ac.uk/research/projects/internet/index.asp>, (accessed 15 June, 2009).
- CTS (Centre for Transport and Society) (Nd, b), Accessibility diary, <http://www.transport.uwe.ac.uk/research/projects/internet/diary%20picture.pdf>, (accessed 03 February, 2010).
- CTS (Centre for Transport and Society) (Nd, c), Internet second national survey, February 2006, <http://www.transport.uwe.ac.uk/research/projects/internet/survey-wave2-questions.pdf>, (accessed 03 February 2010).
- CTUR (Centre for Time Use Research) (2000), National survey of time use, <http://www.timeuse.org/information/links>, (accessed 04 October, 2010).
- Estadística de la Ciudad. Form D. (Nd), <http://www.timeuse.org/information/studies/data/downloads/argentina/2005/diary.pdf>, (accessed 16 June, 2009).
- Eurostat. (2001), Guidelines on harmonised European time use surveys, <https://www.testh2.scb.se/tus/tus/doc/Circa%20Principal%20Document.doc>, (accessed 16 June, 2009).
- Fisher, K., Bennett, M., Tucker, J., Altintas, E., Jahandar, A. and J. Jun (2009), Technical Details of Time Use Studies, <http://www.timeuse.org/information/studies/>, (accessed 15 June, 2009).
- Floro, M.S. and M. Miles (2001), *Time use and overlapping activities – Evidence from Australia*, The Social Policy Research Centre, Sydney.
- Floro, M.S. and M. Miles (2003), Time use, work and overlapping activities – Evidence from Australia, in: *Cambridge Journal of Economics*, Vol. 27, No. 6, 881-904.

- Folbre, N. (2008), *Valuing children – Rethinking the economics of the family*, Harvard University Press, Cambridge.
- Gershuny, J. and R. Smith (1995), Report to the Central Statistical Office on the development of a simple time diary schedule, <http://www.timeuse.org/information/studies/data/downloads/uk/1995/a3951uab.pdf>, (accessed 15 June, 2009).
- Hungerford, T.L. (2001), *Just how productive are elderly adults? – Evidence from Australia*, Office of Policy, Social Security Administration, Washington DC.
- Hunt, E. (Nd), Survey of adolescent time use and well-being, <http://www.timeuse.org/information/studies/data/downloads/ireland/2007/DiaryInstrument.pdf>, (accessed 16 June, 2009).
- Ironmonger, D.S. (2003), There are only 24 hours in a day! – Solving the problematic of simultaneous time use, The 25th IATUR Conference on Time Use Research, Brussels, Belgium.
- Ironmonger, D.S. (2004), Bringing up Bobby and Betty – The inputs and outputs of childcare time, in: Folbre, N. and M. Bittman (eds.), *Family time – The social organization of care*, Routledge, New York, 93-109.
- Kenyon, S. (2008), Internet use and time use – The importance of multitasking, in: *Time & Society*, Vol. 17, No. 2, 283-318.
- Kenyon, S. and G. Lyons (2007), Introducing multitasking to the study of travel and ICT – Examining its extent and assessing its potential importance, in: *Transportation Research Part A*, Vol. 41, No. 2, 161-175.
- Kitterod, R.H. (2007), Does the recording of parallel activities in time use diaries affect the way people report their main activities?, in: *Social Indicators Research*, Vol. 56, No. 2, 145-178.
- Levy, J. and H. Pashler (2001), Is dual-task slowing instruction dependent?, in: *Journal of Experimental Psychology – Human Perception and Performance*, Vol. 27, No. 4, 862-869.
- Levy, J. and H. Pashler (2008), Task prioritization in multitasking during driving – Opportunity to abort a concurrent task does not insulate braking responses from dual-task slowing, in: *Applied Cognitive Psychology*, Vol. 22, No. 4, 507-525.
- Lindquist, J.D. and C. Kaufman-Scarborough (2007), The Polychronic Monochronic Tendency Model – PMTS scale development and validation, in: *Time and Society*, Vol. 16, No. 2-3, 253-285.
- Lyons, G. and J. Urry (2005), Travel time use in the information age, in: *Transportation Research Part A*, Vol. 39, No. 2-3, 257-276.
- Mullan, K. and L. Craig (2009), Harmonising extended measures of parental childcare in the time-diary surveys of four countries – Proximity versus responsibility, in: *electronic International Journal of Time Use Research*, Vol. 6, No. 1, 48-72.
- Nie, N.H., Hillygus, D.S. and L. Erbring (2002), Internet use, interpersonal relations, and sociability, in: Wellman, B. and C. Haythornthwaite (eds.), *The Internet in everyday life*, Oxford, Blackwell Publishing Ltd, 215-243.
- ONS (Office for National Statistics) (Nd), Omnibus survey: Short one day diary of time use, <http://www.timeuse.org/information/studies/data/downloads/uk/2005/ONS2005diary.pdf>, (accessed 7 December, 2009).
- ONS (Office for National Statistics) (2000), *National survey of time use: One-day diary*, <http://www.data-archive.ac.uk/doc/4504/mrdoc/pdf/4504userguide2.pdf>, (accessed 03 February, 2010).
- ONS (Office for National Statistics) (2003), *The United Kingdom 2000 time use survey: Technical report 2003*, http://www.statistics.gov.uk/downloads/theme_social/UKTUS_TechReport.pdf, (accessed 4 June 2010).
- Robinson, J.P. and G. Godbey (1997), *Time for life – The surprising ways Americans use their time*, Pennsylvania, Pennsylvania State University Press.
- Ruthruff, E., Pashler, H. and E. Hazeltine (2003), Dual-task interference with equal task emphasis – Graded capacity sharing or central postponement?, in: *Attention, Perception & Psychophysics*, Vol. 65, No. 5, 801-816.
- Ruuskanene, O.P. (2004), More than two hands – Is multitasking an answer to stress?, in: Ruuskanene, O.P. (2004), *An econometric analysis of time use in Finnish households*, Unpublished PhD thesis, Helsinki School of Economics, Acta Universitatis Oeconomicae Helsingiensis.
- Southerton, D. and M. Tomlinson (2005), Pressed for time – The differential impacts of a 'time squeeze', in: *The Sociological Review*, Vol. 53, No. 2, 215-239.

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- Sullivan, O. (1997), Time waits for no (Wo)Man – An investigation of the gendered experiences of domestic time, *Sociology*, Vol. 31, No. 2, 221-239.
- Sullivan, O. (2008), Busyness, status distinction and consumption strategies of the income rich, time poor, *Time & Society*, Vol. 17, No. 1, 5-26.
- Szalai, A. (1972), The use of time – Daily activities of urban and suburban populations in twelve countries, Mouton, The Hague.