UNITED NATIONS SECRETARIAT
Statistics Division

ESA/STAT/AC.79/16
17 October 2000

English only

Gender issues in the measurement of paid and unpaid work

Expert Group Meeting on
Methods for Conducting Time-Use Surveys
23-27 October 2000
New York

Use of context in time-use research

This paper, prepared by Andrew Harvey and Martin royal of Time Use Research Program, Saint Mary's University (Halifax, Nova Scotia), has been reproduced as submitted. It has been issued without formal editing.

Use of Context in Time-Use Research*

by
Andrew S. Harvey and Martin Royal
Time-use Research Program
Saint Mary's University
Halifax, Canada

Knowledge of the daily activities of individuals can provide significant insights for measuring, understanding, and planning the social and economic well being of society. Hence, it is paramount that valid and reliable methods of capturing and reporting daily activities be perfected. There are a number of approaches to capturing activities including observation, structured questions, activity logs and diaries. Each approach offers certain advantages and can be useful in specific cases. However, there is wide spread agreement that time-diaries, capturing the flow of daily activity, are the theoretically optimal approach for capturing activity data. Aside from the benefits offered by their completeness of activity reporting they provide an opportunity to capture multiple dimensions of behaviour. This both facilitates the capture of the data and enhances the subsequent analysis. Great attention has been paid to the definition and collection of activities and yet little attention has been paid to the definition and collection of supplementary contextual dimensions. This paper identifies and examines dimensions of the context in which activities are carried out and issues related to their capture in time-diary surveys.

Context in Time-use Research

Time-diary research was initiated early in the 20th century by researchers interested in exploring how time was allocated to various daily activities. It is only in the last three decades that national statistical offices have realized the potential of time-diary methodologies to acquire rich and useful information. The acquired data can provide an understanding of how people allocate time to activities and of the context within which activities occurs. Activity context

* Work on this paper was funded by the Social Sciences and Humanities Research Council of Canada as part of the project "Activity Settings, sequencing and the measurement of time allocation patterns."

refers to the physical, psychological, social, and temporal features of the environment in which a specific activity is taking place. While research tends to focus on the primary activity being performed, other key aspects of activity have also been investigated.

Early accounts of comprehensive diary data collection are provided in the Multinational Time Use Study (Szalai, 1972). In addition to asking respondents what they were doing as a primary activity and its starting and ending time, researchers asked respondents to report what else they were doing, where the primary activity was being done, and with whom it was being done. Additionally, supplemental information was collected using facultative codes. Facultative codes provided information to clarify specific activities such as the nature of TV programs viewed or books read. Such codes can facilitate distinguishing work and leisure episodes.

Following the multinational study, researchers have made a number of extensions to the information collected on the diary. One study asked participants to specify precisely where the activity was being done (Elliot, Harvey, & Procos, 1976), so that it could be coded on a (1/10km) map. Another reported dual primary and dual secondary activities that were being performed concurrently (Kinsley & O'Donnell, 1983). Others have collected subjective information, i.e. level of tension associated with each daily activity (Michelson, 1985; Spinney and Harvey, 2000a). In general, these modifications were made in special purpose surveys outside national statistical offices. For the most part, national time-diary surveys typically collect and report information on what is being done, what else is being done, where it is being done, and with whom it is being done Table 1. In the early 1990's, however, the statistical office in Germany introduced information on "for whom" activities were done (Federal Statistical Office, 1995). Recently the "for whom" category has been added to other national surveys.

Report Objectives

The analysis of time allocated to activities generates a large amount of valuable and appealing information. Yet, in the analysis stage, fascination with time allocation to activities has dominated research and the context of action has largely been ignored. The lack of comparability, the complexity, and the inadequacy of collection methods for capturing contextual information are somewhat responsible for the lack of use of such data. Additionally, analysis methods for handling such data are lacking. This report explores the importance of

context in past time diary research and the experiences in collecting contextual information with a view to identifying issues to be considered in its collection.

Table 1. Cross-National Survey Comparison

Country	Format**	Primary	Secondary	Location	With whom	For whom	Other
Australia (1997)	O	✓	✓	✓	✓	✓	✓
Austria (1992)	F	✓	✓	✓	✓	✓	
Canada (1998)	O	✓		✓	✓	✓	
Eurostat (1996)	F	✓	✓		✓	✓	
France (1999)	F	✓	✓	✓	✓	✓	
Germany (1991-92)	F	✓	✓	✓	✓	✓	
New Zealand (1998-99)	F	✓	✓	✓		✓	✓
Norway (1990-91)	F	✓	✓		✓		
*Dominican Republic (1995)	F	✓	✓	✓		✓	✓
*Columbia (1985)	M	✓	✓	✓	✓		
*Mexico (1998)	O	✓	✓	✓	✓		
*South Africa (2000)	F	✓	✓	✓			

* Developing Countries
** O = Open format; F =Fixed format; M = Mixed format

Importance of Studying Context

. The focus of time-use studies is to understand human behaviour, what is being done and when, during a specified period of time. Hence, the key focus in each time period is "what were you doing?" The response to this question is typically deemed the primary activity. As a unit of analysis, the activity is an observable unit of behaviour displayed by an individual that has observable or determinable temporal beginning and end points. Any activity occurs in time, space, and under a set of circumstances which constitutes its context. To understand the significance of any activity, one needs to understand the context in which the activity took place.

First, context provides meaning to activities and groups of activities. For an individual, the same activity may be considered as work or leisure depending on the context. Likewise, an activity may be viewed one way by the individual and another by the researcher. For example, an individual may see baking as a leisure activity and the researcher view it as a productive work activity. Eating in a restaurant alone is just that, eating in a restaurant with someone else may be socializing or a work activity as determined by the context variables.

Second, in itself, context is meaningful. Scheuch (1972) proposed a more formalized definition of the term activity. While the notion of 'activity' appears clear enough for common usage, Scheuch recommended the inclusion of certain aspects of activity. "Activity was defined as any behaviour in time as long as any one of the following remained unchanged: the common sense term used by the respondent either for primary or secondary activity; the location; the instrument; and the interaction partner." If any of these aspects were to change, a new activity would be recorded. For example, a person is talking on a cellular phone in the house before leaving for work, then the person maintains the conversation while driving to work in the car, and finally the conversation is further pursued at the work site. According to Scheuch these would be considered as three separate activities or episodes.

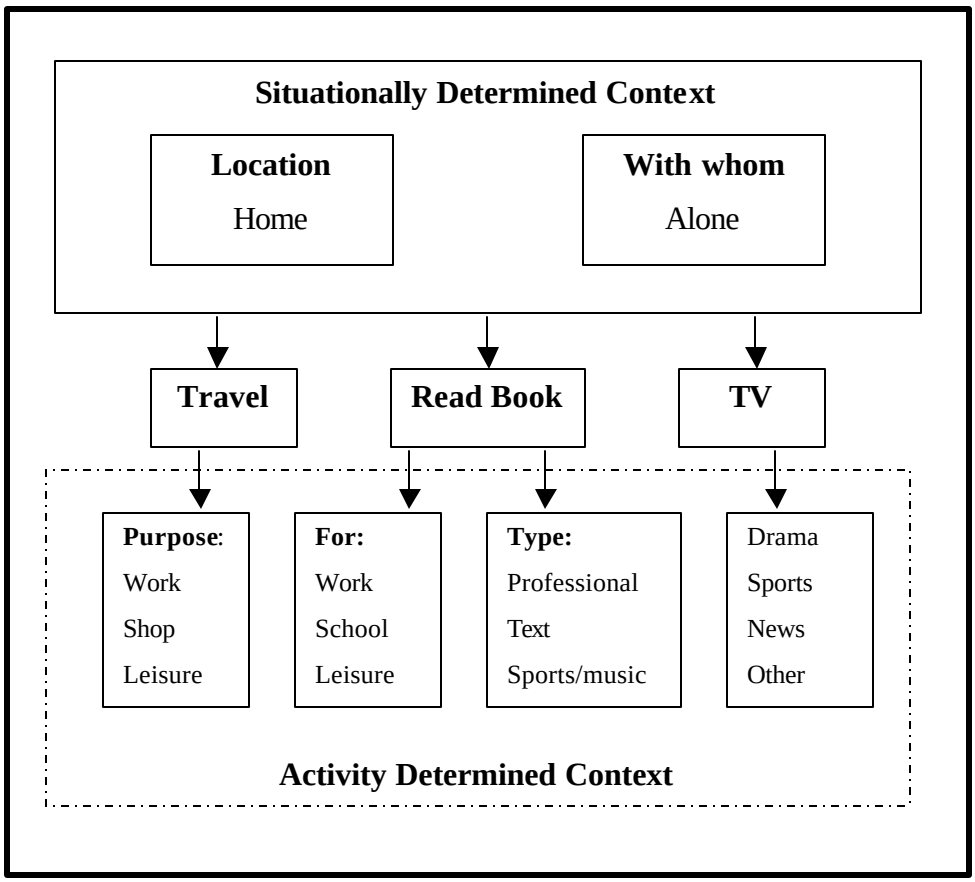
Third, context facilitates data acquisition by aiding recall. Considering where they are, or who they were with, helps people put what they were doing into perspective. Dagfinn Aas, a leading time-use researcher, at one time argued for organizing the collection of time use data in terms of location. He would argue that you should first ask the respondent where they were and then ask what they were doing there.

Defining Context Variables

There is a broad range of relevant context variables that can be examined both in terms of their nature and in terms of the relationship they bear to activities. Among them, one can clearly distinguish two broad categories objective and subjective dimensions. Objective dimensions refer to quantitative factors that have physical or temporal aspects, while subjective ones refer to qualitative factors that measure psychological well-being.

It is important to identify two different genres of contextual variables. Some variables apply to all activities without exception. Location, social-contact, even feelings of tension or enjoyment are examples. These dimensions provide the situationally-determinied context of activities, Figure 1. Additionally, many activities have contextual dimensions that flow from the activity itself. For example, purpose for reading, type of book read, type of TV program watched. These dimensions are the activity determined context of activities. The distinction is important since the collection method will generally depend on whether they are situationally internal contextual variables. Externally determined context variables can be captured in columns which offer the same options for each and every activity. Activity-determined context variables differ across

activities and hence must be captured as part of the activity or in a column allowing varied response depending on the activity.



Objective Dimensions

Time

Time has several dimensions relevant to activity (Harvey & Wilson, 1998): position, the point in time at which actions occur (e.g. weekday or weekend, morning or evening, or between 9am and 10am); duration, the period during which action occur (e.g. 45 minutes, 3 hours); and sequence (before or after, past, present or future). Several subtle changes can be observed in regards to when activities are performed (Robinson, 1999). Research has shown that late afternoon shopping is different from evening and weekend shopping (Gronmo, 1978). Hence, it is not enough to know how much time is allocated to activity, it is also important to know when activities are being performed. The ability to provide this dimension and sequence information

is a major strength of the diary format. It is primarily this dimension that is lost by collecting time-use data through stylized questions.

Secondary activity

Humans are multitasking beings. An individual can be watching hockey on TV, taking notes, drinking a beer, all in the presence of a group of friends. All of these activities are concurrently engaged in, and it makes little sense to try to allocate each activity a small chunk of time to sequentially arrange them. The nature of this interaction helps us to understand why respondents may find it difficult when ask to report what one activity they were doing at one point in time. This concept of secondary activity was established in the Multinational Time Use Study (Szalai, 1972).

The Canadian Time Use Pilot Study further extended this approach and captured up to four concurrent activities, dual primary and dual secondary activities (Kinsley and O'Donnell, 1983) . This approach facilitated capture of activity involvement such as musical participation as first primary, and religious activity as second primary for an event like a church choir practice; or helping adults as first primary, and shopping as second primary. These provided great flexibility in coding.

Secondary activities are often concentrated in a few activities. In the 1997 Australian survey (McLennan, 1997), we found that the top five most frequent secondary activities accounted for about 80 percent of all such episodes. All five activities were concurrent in the very sense of the word, e.g. listening to radio, watching TV, minding children, etc. However, additional and important activities also appear as secondary activities. For example, nine of the 32 secondary activities captured in the Australian survey were productive activities, four child-related and five child-unrelated.

Recording secondary activities has practical advantages. Multitasking individuals generally have a hard time to report what they do if they have to report only one activity. The respondents must either distort what is happening or ignore the instruction to record only a single activity. In addition, some activities are virtually missed in the absence of a secondary activity option, minding children being on top of the list. It was recorded 1400 times more frequently as a secondary activity than as a primary activity in the 1997 Australian time-use study. While time spent in childcare can be measured in alternative ways, other productive activity can be missed

altogether. The importance of measuring secondary activities has been especially highlighted in a recent study by Harvey and Spinney (2000a). They found that one-fifth of a teacher's paid work time was accounted for as a secondary activity, 10.2 hours per week out of a total 52.4 hours. For example, grading work while watching TV as the primary activity.

In general, whether an activity is considered primary or secondary is left to the judgement of the respondent. Hence, the respondent's choice of primary activity may exclude activities important for the investigation being undertaken. For some, reading may be viewed as primary and watching TV as secondary. For others, watching TV is considered primary and reading secondary. More importantly for the valuing of non-market production some may view ironing as primary and watching TV as secondary while others reverse the two. If ironing is done during a regularly watched program it may seem incidental to the respondent who is focused on the show.

Further complications arise if we consider that activities which on the surface are leisure-like may in fact contribute to productive capacity. Hence, socializing may in fact be intentionally undertaken to enhance ones capabilities and hence productivity. In fact, some socializing may be simply a chore and hold little enjoyment for the individual doing it. In at least one instance spouses of diplomats sought payment from their governments in recognition of the services they provided their spouses and country through formal entertaining and such activities. Conversely, what is considered a productive activity may in fact be a leisure activity. Shopping for needed household items is considered productive and would be included in non-market production. However, if the purpose of the shopping is recreational it would fail the production criterion. Finally, the number of secondary activities may also be considered as an indicator of data quality (Juster, 1985).

Location and means of transportation

Location, also, is an important dimension of activity context, one uniquely associated with each activity. Hence it is situationally-determined contextual variable. Location has been defined in various ways, from generic locations (e.g. home, work, other places, and mode of travel) to more elaborate variants (e.g. rooms in the home). Across existing studies, one can identify a wide range of identified locations, Table 2. Australia offered the widest range of choices in the

studies examined and Mexico the least. Some studies have coded the actual geographic location of each activity in what are denoted as time-space studies (Elliot, et al. 1976; Chapin, 1974).

Typically, activity location is calculated by asking respondents, for each activity, where it took place. An alternative approach to this, initiated by Statistics Finland, has been to ask where the respondent started and ended the diary day and code location based on changes of place stated or implied in the diary. As a general rule if the respondent is not travelling location is given as a generic description of where they are (home, work, school etc.). If they are travelling location is defined in terms of how they are travelling (car, walking, bus). Trip purpose in time diaries is typically defined by the destination if one is going any place other than home and the origin if one is returning home. Hence rather one goes from home or work to a store, the trip purpose is shopping. However, if one comes home from work, trip purpose is work. If one comes home from shopping, the trip purpose is shopping. Travel behavior researchers, however, have a category, going home. Hence, in this case trip purpose will always be determined the destination.

While an individual can perform several tasks at once, with several contacts, it has generally been assumed that these activities can only take place in one location at a time. However, with the expansion of virtual worlds the adequacy of the concept of unique location needs to be reevaluated. While the Walkman allowed people to access radio anywhere and the VCR allowed people to time shift television programs, the Internet facilitates certain kinds of work at one location being undertaken from anywhere. Additionally a person in one place may effectively be in another via conferencing technology. This suggests a need for a where and where else.

The identification of work locations is particularly important for coding activities with respect to paid work. While traditionally paid work time appears has been adequately captured in a paid work code what has been captured may be problematic. There is no one definition of paid work time (Mata, 2000: Drago et al.,1999). Contextually, one definition of paid work time reflects all time spent at the workplace. Hence it is important that allowance be made for its proper identification. Drago, et al. discuss how teachers work invades their home and family life showing the importance of being able to capture paid work at home. Considering the increase in tele-commuting, it may be more problematic to capture certain activities as paid work if they are not being performed at the workplace. Consider the example of using a cellular phone to call a business contact. If the activity is performed in the car while travelling from home to the school

to drop off the children, it may be missed as paid work; unless provision is made for capturing it, for example as a secondary activity, and with designation of the recipient or nature of the call.

Table 2. Location and Means of Transportation*

Categories	Australia	Austria	Canada	France	Germany	New Zealand	Columbia	Mexico	South Africa
Own household	✓		✓	✓		✓			✓
Someone else's household	✓		✓			✓	✓		✓
Workplace	✓		✓	✓		✓	✓		✓
Public area – street, town, hall, public garden, church	✓						✓		
Commercial or service area – bank, shop, office	✓						✓		
Recreational establishment for leisure, culture, sport activities	✓						✓		
Eating and drinking locale	✓						✓		
Educational establishment	✓								✓
Country, bush, beach	✓					✓			
In household (general)		✓			✓			✓	
Not in household (general)		✓			✓			✓	
Workplace or place of study									
Public or commercial or service area						✓			
Marae and other sites of cultural significance to Maori						✓			
Recreation establishment and others									
Field farm or other agricultural workplace									✓
Own household (outside)							✓		
Own household (inside)							✓		
Neither home nor workplace				✓					
Neither home, workplace, nor school									✓
Neither home, other home, nor workplace			✓						
Train	✓								
Bus	✓								
Ferry, tram	✓								
Taxi	✓								
Car, van, truck: as driver	✓		✓						
Car, van, truck: as passenger	✓		✓						
Bicycle	✓		✓						
On foot, walking	✓		✓						
Not specified	✓					✓			
On foot or bicycle						✓			
Private transportation						✓			
Public transportation						✓			
Transit									✓
Transit (home to work; work to home)				✓					
Transit (excluding home-work)				✓					
Other (train, airplane, motorcycle)			✓						
Bus, subway, street cars, commuter trains, or other public transportation			✓						

* Eurostat, Norway, and Dominican Republic were omitted

Table 2. shows the location and mode of transportation categories used in various national surveys. No location was common across the nine surveys examined and only 3 were common across five or six of the surveys. These were own household, someone else's household, and location.

With whom (Social contact)

Social interactions are a part of people's lives, hence most studies included social contact as a source of contextual information. Social contact has been shown to impact on travel behaviour (Harvey and Taylor, 1999). Individuals spend the greatest amount of time with non-family members at the workplace. This was true across all countries examined. If people work at home, that contact is lost and hence generates travel to replace it (Harvey and Taylor, 1999). When and where people get together are important dimensions of daily activity and can both impact on activity content and be impacted by it. However, there has been relatively little reporting or analysis of social contact.

The nature of social contact and the respondent's interpretation of what is sought has made it difficult for researchers to collect information for this variable. One could spend time with friends, family relatives, or spouse. Yet, one could also spend time with friends, family relatives, AND spouse, all of these interactions happening concurrently. Some of the problems involved in measuring with whom coding have been illustrated by Blanke (1993). Some studies (i.e. Sweden study) asked respondents to report the name (or nature of the relationship) of the people involved (e.g. children), while others report social contact generically (e.g. Australia, Austria, and Eurostat).

Problems with the use of the "with whom" coding suggest that certain issues must be clarified. Blanke (1993) observed the need to evaluate these questions:

1. Which objectives do we have concerning the use of the "with whom" coding?
2. Do people understand the meaning of our text in the same way?
3. What kind of available data can we get?

Harvey (1990) indicated that reporting of this variable varies from person to person. It may be considered as 'pure presence' or as 'carrying out an activity together'. Given this differing understanding of the "with whom" coding, it can be difficult to interpret data and make cross-national comparisons.

Table 3. With Whom Comparisons*

Categories	Australia	Austria	Eurostat	France	Germany	Norway	Columbia	Mexico
Alone (no one)	✓	✓	✓	✓	✓	✓	✓	✓
Crowd							✓	
Spouse	✓							
Own children		✓	✓		✓		✓	
Family 1: spouse and own children							✓	
Family 2: children only (spouse not applicable)								
Household members (anyone living under own same household): spouse, children, and other household members				✓		✓		✓
Other household members (excluding spouse and children but living under own household)							✓	
Relatives (family members not living under own household, including children)						✓		
Friends	✓					✓		
Work colleagues						✓	✓	
Schoolmates								
Neighbors (members of other households including children)							✓	
Neighbors children (excluding children)								
Acquaintances (other people that you know)			✓					
Service personnel							✓	
Ex household members (including spouse, children, and other ex household members)								
Family								
Other household members (adults including spouse)		✓	✓		✓			
Relatives/neighbours/friends		✓			✓			
Work colleagues/schoolmates		✓			✓			
Other (excluding children, other household members, relatives/neighbours/friends, work colleagues/schoolmates)		✓			✓			
Other (excluding household members, friends/work colleagues/relatives/neighbours)					✓			
Friends/work colleagues/relatives/neighbours					✓			
Non-household members								✓
Household members and non-household members								✓
Other (excluding household members, friends, work colleagues, relatives)						✓		
Relatives and friends							✓	
Members of organizations							✓	

* Canada, New Zealand, Dominican Republic, and South Africa are not included in this comparison

The 1991/92 German study suggests the extent of the problems associated with interpreting what is being asked (Blanke, 1993). The respondents were asked to report how they interpret the question: With whom did you spend your time? Twenty-one percent of the interviewers observed that they understood the question as pure presence in the building, house, etc. Another 50%

declared that they interpreted it as a presence in the same room. The other 29% could not find any tendency at all. These results suggest the ambiguity of the variable. Other problems noted included the distinction among relationships, especially between the work colleague and friend relationship. The same person could be considered as a co-worker and a friend, depending on the social situation in which they are involved at the moment.

In the American Time-use Pilot Study (ATUS), respondents used multiple interpretations of the "with whom" question if no direction or definitions were given(Stinson, n.d.). They generally focused on those persons with whom they (1) were communicating (e.g. doing the same activity at the same time while talking and interacting), (2) had an intentional or deliberate relationship, and (3) were in the same physical location (e.g. being in the same area, being in the house with you). Respondents in the ATUS described some reasons why someone may be "present" but not "with them". For example, you may not know the person, each person is doing his or her own thing, you leave to go somewhere alone and others just happen to be using the same mode of transportation to go to their own place. The authors suggested that the question "who was with you" comprises two separate questions: "who was present, but not participating?" and "who was participating?" They, like Blanke, noted the importance of clarifying the meaning of the question being asked.

For whom

The context variable 'for whom' was first introduced in the 1991 German study (Federal Statistical Office, 1995). In that study, respondents indicated for whom the primary activity was performed: (1) for their own household, (2) for another household, (3) for their own household and for another one at the same time, and (4) voluntary work, Table 4. A much expanded for whom categorization with 19 values was used in an Australian study (McLennan, 1997). Categories included self, family, friends, community, etc. In a study conducted in France, four categories were used, one's self or household, work, other household, and organizations. In a Canadian study on school teachers, the for whom variable explicitly identified types of individuals the teachers could be expected to be performing tasks for, such as students, administration, classroom teachers, spouse, household children, etc. (Harvey & Spinney, 2000a). This data was then used to determine paid work activities. It showed that paid work occurred

across a wide range of activities. For example, some shopping episodes were work related in that the teachers were getting things for class.

Table 4. For Whom Comparisons*

Categories	Australia	Austria	Canada	Eurostat	France	Germany
Self	✓					
Children	✓					
Family (own household)	✓					
Family (other household – well)	✓					
Family (other household – sick, frail, disabled)	✓					
Pet	✓					
Group household – well	✓					
Group household – sick, frail, disabled	✓					
Friend/neighbour – well	✓					
Friend/neighbour – sick, frail, disabled	✓					
Work	✓					
Community – sports	✓					
Community – arts	✓					
Community – health and welfare	✓					
Community – education/youth	✓					
Community – religious	✓					
Community – emergency services	✓					
Community – other	✓					
Other person/group n.e.c.	✓					
Own household		✓				✓
Other household		✓			✓	✓
Own and other household		✓				✓
Social service/honorary office		✓				✓
Self or own household					✓	
Professional					✓	
Association					✓	
Someone outside own household				✓		
Parent (s) or parent (s) in-law			✓			
Own children living outside the household			✓			
Other member(s) of the family outside the household			✓			
Friend(s)			✓			
Neighbour(s)			✓			
Co-workers(s)			✓			
Others			✓			
Organization concerned with seniors			✓			
Organization concerned with children			✓			
Organization concerned with persons with disabilities			✓			

* New Zealand, Norway, Dominican Republic, Columbia, Mexico, and South Africa were excluded from the comparison

Data on helping activities collected in the 1998 Canadian data demonstrates the importance of collecting helping or for whom data (Statistics Canada, 1998). First, while helping activities

accounted for two-thirds of the episodes in the activity group "Organizational/ Volunteer/Religious," the main group used to identify work for others, the group only accounted for 55.20% of all helping activities, Table 5. Hence, nearly half of all helping activities fell out side the main group designed to capture them. Housework and shopping activities together accounted for about 25% while each of the activity groups contributed to the remainder. However, for three of the activity groups helping was confined to travel. These findings clearly indicate that unpaid work, also, occurs across a wide range of activities and in all activity groups.

Table 5 -Helping Activities, Canada 1998

By Activity Group and Total Helping

Activity	Percent of Activity Group	Percent of Helping
Employed work	0.22%	4.00%
Domestic work	1.44%	11.62%
Care of children	3.41%	2.24%
Shopping & Services	3.76%	13.19%
Personal care	8.60%	3.24%
School & Education	2.78%	1.00%
Organizational/Volunteer/Religious	66.89%	55.20%
Entertainment (Attending)	7.26%	6.58%
Sports and Hobbies (Participation)	6.35%	2.89%
Media and Communications	2.56%	4.04%
Total Helping		100.00%

Source: Canadian General Social Survey, Cycle 12, 1998

For whom or helping is emerging as the most important variable for identifying purpose (motivation) of activity for economic accounting. It helps to differentiate work and non-work activities particularly since work is increasingly undertaken in non-traditional places. A helping column was used in the EUROSTAT diary. Its inclusion generated considerable concern in many countries (Rydenstam and Wadeskog, 1998). Both the wording in the column heading and the instructions were questioned. However, in seven of the 12 EUROSTAT countries included in the harmonized pilot surveys evaluation the helping designation used to identify activities done for others provided reasonable results. Four countries, Greece, Hungary, Slovenia and the UK

provided no quality data and Italy provided only a little. Quality diaries from persons helping others showed helping activities in all major groups with household and family care activities accounting for 56 percent of all helping activities while civic and religious activities accounted for only four percent (Rydenstam and Wadeskog, 1998). This is in stark contrast to the Canadian results and suggests serious methodological differences.

In studies of teachers time use respondents were asked to indicate for each activity for whom it was carried out (Harvey and Spinney, 2000b). In studying the teachers there were two separate data collection exercises. The main study, carried out for the Nova Scotia Teachers Union, entailed 8 for whom codes. The second study, carried out for the ILO to explore contextual coding contained 14 for whom codes. For the ILO study the diary instruction read as follows "If the activity was done primarily or partially for someone else's benefit, please indicate 'for whom' it was done, using the appropriate code." If the activity is not done for someone else, use code 21 for self. "Essentially the same instruction was used in the main study. Nearly one-third of the time spent on teaching activities for was coded with contextually derived activity codes (Harvey and Spinney, 2000b). That is for whom for the activity indicated a job related recipient.

The lesson of these examples is that one can only accurately capture helping activity by means of an stiuationally-determined contextual variable such as helping or for whom, a diary column which applies to all activities.

INSTRAW (1995) recommended that the minimum "for whom" categories that should be collected in a survey included the followings:

1. Self
2. Other household members; including those not currently at home
3. Employer
4. Self-employment/household business
5. Other individuals, households or the community

Subjective Dimensions

The aforementioned objective approaches to the assessment of context provide greater analytic power but offer little or no understanding of how respondents perceive their behaviour (Michelson, 1993). Adding subjective dimensions to the typical objective ones for each episode

of activity may help to tap into the emotional and psychological side of behaviour. Michelson believed that such dimensions have been largely ignored because they are felt less essential to agency objectives, time-consuming and costly, less justifiable in traditional practice and with increasing potential for sensationalism in the public press. The understanding of people's inner experiences of their daily activity patterns and how they view those contexts should be of great interest to any researchers interested in time-use data for applied purposes. Past research has demonstrated positive evidence for the use of subjective dimensions in time-use surveys. The two main aspects studied include how tense people are when performing an activity (tension), and how people enjoy what they are doing (enjoyment).

Tension

An early example of the application of subjective dimensions in time-use research comes from a study on maternal employment (Michelson, 1985). Michelson was interested in the extent to which women felt tense or relaxed when engaging in various behavioural episodes. For each episode, the respondents were asked to rate on a 7-point scale the extent to which they felt tense or relaxed and also the extent to which they felt they had from no choice to free choice in performing the activity.

The Michelson (1993, p.10) study led to a number of additional analyses that would not normally be possible, including:

1. The identification of daily activities in which respondents feel relatively tense;
2. The illumination of travel as sensitive and potentially tense for women, depending on detailed conditions, because it falls between two involuntary, high-salience activities: child care and paid employment;
3. The role of gender in accounting for differences in how increasingly similar time-use patterns are subjectively experienced (i.e. between two employed spouses);
4. Identifying differences in perception of tension accompanying use of different travel modes;
5. Determining weighted aggregate amount of daily tension and how contributing activities vary by gender;
6. Identifying differences in feelings of tension between women with and without partners;
7. Identifying variation in daily tension according to employment and age of children.

Similarly, Harvey and Spinney (2000a) also used a measure of tension to determine what work activities school teachers perceive to be most and least stressful. Employed work and personal development (e.g. education) were rated as the most stressful activities. Specifically, student discipline was the number one stressful individual work activity, while waiting and idle time were the least stressful. Surprisingly, shopping was rated the third most stressful activity, undoubtedly reflecting the time demands it placed on already overburdened teachers.

Enjoyment

A second subjective aspect considered in past research is the notion of enjoyment. How people feel about various activities may form a basis for studying the population's quality of life. Some studies using affective dimensions, such as enjoyment, have asked respondents to rate a general list of activities while others have sought a rating on each specific diary episode. A study conducted in 1965-66 asked respondents to rate 18 facets of their everyday life on a five-point satisfaction scale (Robinson, 1977). Of these 18 facets, 14 dealt directly with activities, two with possessions central to everyday life (i.e. housing and automobiles), and two with basic family structures. Likewise, respondents were asked to identify the highlights and low points of a particular day.

As part of another study conducted in Jackson, Michigan, 1973, 140 respondents were asked to report their feelings for each activity in the diary provided (Robinson, 1977). A five-point scale was used, ranging from feeling "Terrible or unhappy" to "Delighted or pleased". The 1975 national survey is the U.S. conducted by the Survey Research Center asked respondents to rate 28 activities on a scale ranging from –3 (dislike a lot) to +3 (like a lot). The new scale was developed to provide more sensitivity to affective differences. This scale was then used to develop what were called process benefits, a subjective measure of utility derived from various activities, (Juster, 1985)

A different and yet highly useful approach was used by Statistics Canada in 1992 and 1998. As part of the time-diary information collected respondents were asked to identify the most enjoyable activity of the day. It identifies the most enjoyable activity and reveals the context in which activities are found to be enjoyable. The investigation of enjoyment provides answers to what people like to do and when enjoyable activities occur.

Activity Determined Context

Technology used

Another variable of emerging interest is the use of technology in performing various activities. In contrast to the situationally-determined context variables discussed above, technology used is an activity-determined context variable. It varies by type of activity. Typically, the types of technology examined in national surveys have been limited to mode of travel (e.g. car, bus, train, etc) and some media activities (e.g. radio, TV). A study conducted in Australia (McLennan, 1997), collected data on communication technology, Table 6. Communication was reported in 7.4% of all episodes. Face-to-face communication accounted for nearly half (48%), followed by fixed phone (23%), written communication (21%), and personal computers (6%). Considering the growing interest in communication and the impact of new technologies on people's lives, there is increasing need to collect such information. For example, one key area of need is to identify work activities carried out through tele-working or when away from the work place. Additional research could examine how the use of cellular phones, electronic mail, and World-Wide Web are omnipresent in our daily lives and the consequences associated with the use of this technology.

Table 6. Other Aspects Comparison

Categories	Australia	New Zealand	Dominican Republic
Paid		✓	✓
Not paid		✓	✓
Paid Secondary			✓
Not paid Secondary			✓
In person	✓		
Mobile phone	✓		
Fixed phone	✓		
Written	✓		
Fax	✓		
Personal computer	✓		

Paid versus Not Paid

A growing interest in determining the extent to which people allocate time to paid and unpaid work activities has been pursued by time-use researchers. This body of research has been concerned with examining the dimension of paid and unpaid work, i.e. composition, location, and timing (Harvey & Spinney, 2000a).

Traditionally, paid work has been associated with activities performed at the workplace. Respondents were simply asked to report the starting and ending time of paid work (Harvey and Spinney, 2000a). However, there is increasing evidence that certain paid work activities are virtually missed unless more details are sought (Harvey, 2000). For example, ATUS researchers suggested that asking participants to report paid work would help to identify all paid work activities of the self-employed, work that people do outside the workplace and may look like personal activities (e.g. reading, using a computer), and any informal activities that are remunerated, (ATUS). The reporting of all paid work activities can provide greater insights into the interaction of work and family life. In addition, it was recommended that reporting work-related activities may help to distinguish non paid activities that are performed for work. In the ATUS, many self-employed persons reported doing various activities that were important for their business but were not formally remunerated, such as socializing, (ATUS)

Harvey and Spinney (2000b) found, using responses to a for whom dimension, that a wide range of activities coded elsewhere were actually related to paid work. Coaching, travel by car as a driver and meetings were the top three activities captured as paid work activities by contextual coding of teachers diary information. This added additional work time to the diaries. They found, using contextual coding, primarily the for whom dimension, that the number of work activity codes rose from 16 to 58; 27% of respondents used “contextually derived” activity codes; the top 10 codes represented 69% of all the contextually derived teaching activities and the contextually derived activities represented 1.7 additional hours of paid work per respondent per week (Harvey and Spinney, 2000b).

Other Coding

In other cases also there exist dimensions that are unique to one or a few activities. For instance, the multinational study included eight sets of facultative codes to provide context to specific activities, (Szalai, 1972). These are activity determined context variables. They included

waiting time associated with work and purchasing, means of transport, kind of shop for purchasing, nature of reading material, nature of radio or TV programs followed, and the nature of plays and movies attended. Such information is important because it can facilitate the distinction between work and leisure aspects of activities, i.e. reading professional journals versus novels. The latest Hungarian study has collected information on meals.(????)

Issues to Consider

The collection of contextual information is crucial for a better understanding of time diary data (Robinson, 1999). The basic diary format (i.e. time spent per activity during a 24-hour period) usually limits the full context in which the activity takes place. Such activities as work, childcare, watching TV can take place at any point in time, at any location, and with anybody during the day and this information will not be picked up unless specifically provided for. However, a number of issues must be considered in attempting to maximize the outcomes associated with the collection of contextual information.

Criteria for Evaluating Methods and Data

The nature of the objectives for collecting context information, the contextual information being collected, and the methods used to collect, code, and analyze the data will have an impact on its usefulness. Harvey and Macdonald (1976) suggested two criteria sets for evaluating data and methodologies: input criteria, and output criteria. They recommended that the following criteria at least be considered for evaluation:

Input Criteria	Output Criteria
• Respondent cooperation	• Validity
• Respondent knowledge	• Reliability
• Cost (time and money)	• Usability
• Processability	• Flexibility

Respondent cooperation directly impacts on the survey response rate and the quality of the data. Recently it appears that an increasing number of non-cooperative respondents has been

generating higher non-response rates. Respondent knowledge, i.e. whether respondents possess the ability to report the information sought, will affect the response rate, particularly item responses, and indirectly the quality of data collected. Costs are self-explanatory and include both time and money. Processability refers to the ease of manipulation, handling, coding, etc. With respect to output criteria, validity refers to the fact that the information collected means what it purports to mean. Reliability refers to the temporal and spatial replicability of the data collected. Usability evaluates how the information collected is relevant to the objectives for which it is sought. Finally, flexibility refers to the ability of the data collected to be used for a wide variety of purposes or in a variety of contexts. Hence, the more flexible the data the greater the opportunity to address issues of comparability.

Comparability is a particularly important aspect of time-use research. Researchers clearly recognize the need for increased comparability of time use statistics. Rydenstam and Wadeskog (1998) presented a report on a series of pilot surveys conducted for the purpose of assessing data comparability. While they proposed a general design to collect diary information, the following issues should be specifically addressed in order to make further collection of contextual data more comparable across national surveys.

Content Issues

Content

The first context-related decision that must be made is what contextual data to collect (e.g. objective and/or subjective dimensions). For classification purposes, it is proposed that the main situationally-determined and objective context variables should be used: primary activity, secondary activity, location, with whom, and for whom. Diary columns should be provided for each of these. Fortunately, these are the most often collected variables in national surveys. For the collection of subjective contextual data, the stakeholders should be identified to determine who needs what. At this point, statistical agencies may not be interested in pursuing such information but other stakeholders may be (e.g. time-use researchers, policy makers, and private organizations).

Likewise, it is necessary to specify the level of details desired. It is important to determine and how much detail is required. The nature of the questions being asked and the amount of

information sought are likely to influence respondents cooperation, costs, processability, usability, and flexibility.

Despite being very useful to the researcher, the amount of contextual data collected is limited to the capacity and willingness of respondents to provide quality information (Robinson, 1999). Robinson warned that asking more than two or three questions per activity might lead to burdensome reporting tasks, and affect the quality of respondent reporting. Lingsom (1979) also declared that asking respondents to report the details of each episode was a demanding task. Consequently, the reporting of contextual information may have an adverse impact on the level of details reported (e.g. number of episodes). However, these authors have not identified any concrete evidence relating to the question of how much is too much.

Likewise, special difficulties may be associated with the nature of the questions being asked. The American Time-Use Survey (ATUS) reported that asking participants to report time and location of activities may generate certain concerns, such as fear, concerns for privacy, memory problems, activity overload, etc. Respondents may be less willing to cooperate and the non-response rate is likely to suffer (ATUS). Hovever, no evidence was offered to support this assumption.

Increasing interviewing time and complex tasks may lower the survey response rate. Filling in diaries generally requires some minimum level of writing skills and a certain ability for self-observation. In non-literate situations graphical options are sometimes used. Clearly, there are serious limits to the amount of activity and contextual data that can be captured in this way. Adding questions to each episode may make the reporting task difficult and tedious. Thus, respondents may be less willing to participate in the interview. However, pilot work in the Netherlands reached the conclusion that respondents are lost at the point of intake not during the collection process. If the information sought is reasonably part of the activity experience it may, in fact, facilitate response.

The amount of contextual information collected will definitely impact the study cost in many ways. Quality data can be expensive. However, elaborated studies provide so much valuable information that the cost may be justified. The study cost could increase in the following ways:

1. Additional interviewer training;
2. Increased interviewing time;

3. Increased coding time and complexity;
4. Increased time spent analyzing data;

However, if activity and contextual codes are clearly defined and captured, there is in fact, a strong possibility that coding and analysis costs can be reduced by increased reliance on machine coding. It is possible to reduce the number of human coding decisions and to increase the flexibility of coding and analysis. For example, the coder does not need to decide where eating took place and assign an appropriate code. That can be determined from location.

Content Meaning

As noted above, respondents appear to have difficulty understanding what is being sought when asked with whom. Similarly, difficulties for respondents to interpret the meaning of what is being asked have been accentuated in leisure studies. Previous research in the study of leisure has asked how respondents define leisure. These studies emphasized the importance of pleasure, relaxation, the absence of obligation, and the absence of pressures (Shaw, 1985). Such studies have shown that whether an activity is work or leisure varies between men and women and for the same person over the day. However, it is often difficult to estimate whether individuals are reporting personal definitions or perceived societal definitions (Shaw, 1985). Furthermore, it is not clear whether individuals make a distinction between work and leisure or by what basis they judge the difference.

Collection Approaches

Open-ended responses are best. While most researchers agree that asking the respondents to record information as open ended responses in their own words is preferable, many national surveys collected contextual data using pre-coded options. Open-ended entries allow more flexibility but may make the respondent task more burdensome and the quality of the data more questionable. Rydenstam and Wadeskog (1998) recommended leaving enough space for recording any contextual information (i.e, secondary activity). Limiting the entry to one activity makes it difficult for respondent to answer, especially if they do more than one thing at a time, for many people, and with many people. Also, it was found that coding secondary activity would necessitate a full activity list because the other categories were too broad (Rydenstam & Wadeskog, 1998).

Open interval response is best. There is an increasing tendency to use fixed time intervals. However, this appears to be less than optimal. If the data is collected by interview it is awkward and unnecessary. If the diary is self completed, confusion arises about how to complete the situationally determined contextual coding columns. With a 10 minute interval diary, an hour long activity uses 6 lines. It is sometimes difficult to interpret the adjacent columns since, in spite of instructions they often are left blank.

Coding Issues

Coding Details

It is argued that the data collected should be relatively disaggregated (Harvey & Macdonald, 1976). The number of coding categories employed will affect the usability and flexibity of the data collected. For instance, it is easier to aggregate data into broad categories then to try to do the opposite. Consider the following example: Respondent A reported that her husband, her two children, and her father (currently living in the household) were present while eating dinner, while respondent B reported that four household members were present at dinner time. For analysis purposes, it will be possible to identify how much time respondent A spent with the spouse, children, or other household members. This detail is lost for respondent B.

Cross-national comparisons are simplified by disaggregated because data can be aggregated into many comparable activities more easily if there is minimal grouping already existing at the national level.

Coding Meaning

It is not sufficient to specify a large number of coding categories to facilitate cross-national comparisons. The meaning of each category must be specifically defined. Cross national survey's context variables have been coded in various ways, some using as much as 10 categories to code context data (i.e. location in the Australian survey) and others as few as 2 categories (i.e. location in the Mexican survey). Accordingly, the meaning associated with some of the coding terms also differ. For example, the individuals comprised in the "other" category for the "with whom" coding will differ according to the other available options. "Other" could imply anyone who is only not a household member, or anyone who is not a household member

or relative, or friend, or neighbour, or colleague. Not only do the coding categories need to be clearly defined, the instructions to interviewers and respondents need to be sufficiently clear so that the intended meaning is achieved. A prime example is the need to clarify the meaning of with whom in terms of either presence or participation.

Multivariate Outliers

The addition of several context variables may lead to occasional ambiguous interpretations. The incidence of multivariate outliers in the data is likely to increase as the number of context variables increase. Multivariate outliers are odd or unlikely relationships among the study variables. Taken individually, the options are possible (e.g. being in Church and swimming), but together they are very unlikely combinations in the normal population. However, care must be taken in evaluating such outliers. For example, in one study, an instance of 7 hours sleep at the workplace, thought to be a mistake, turned out to be on call work on a ship. These issues can be best addressed through appropriate interviewer and coder training. Hence, the greater the number of context variables, the greater the chance for multivariate outliers. While the data should be consistency checked for such cases, care must be exercised in 'cleaning' the data. Outliers may often be just that.

Context as an Object of Study

The foregoing has considered the many dimensions of context in relation to the activity dimension on the diary. However, the study of context stands on its own as an important subject of study. Research dating from the mid-1980's has explored the concept of activity settings which incorporate location, social contact, duration and temporal location (Harvey, 1982). Research shows that one can clearly distinguish home and non-home based settings and that activity settings in general seem to play a role in coercing and shaping activity (Harvey, 1997). For example, the major work setting is "away-morning-long duration-with others." The dominant setting for entertainment is "away-evening-long-friends" and for media "home-evening-long-family." Hence, the presence of friends both diminishes the likelihood of watching TV and increases the likelihood of socializing, a key element of entertainment (Harvey, 1997). Other research, exploring the relationship between social contact and travel, found that persons with

the lowest levels of interaction with others in the workplace and contact with others in other social spaces, make the most trips (Harvey and Taylor, 2000). Hence, contextual data, particularly location and with whom should be collected for the contribution they can make in their own right.

Conclusions

Activity context refers to the physical, psychological, social, and temporal features of the environment in which a specific activity is taking place. Context provides meaning to activities and groups of activities. This report explores the importance of context in past time diary research and the experiences in collecting contextual information with a view to identifying issues to be considered in its collection.

Context variables serve several purposes. First, context provides meaning to activities and groups of activities. Second, in itself, context is meaningful. Finally context aids recall and hence helps increase accuracy in responding. There are at least two ways of thinking about context variables. First there are objective and subjective dimensions. Objective dimensions refer to quantitative factors that have physical or temporal aspects, while subjective ones refer to aspects, while subjective ones refer to qualitative factors that measure psychological well-being. Secondly, there are situationally-determined context variables and activity-determined context variables. The former are relevant to every activity on the diary, for example location and social contact. The latter depend on the activity itself, for example what is being read or what is being watched on TV.

The major objective variables that must be considered are time, secondary activities, location and means of transportation, with whom, and for whom. The major subjective variables are tension and enjoyment. The forgoing, are basically situationally determined context variables. They are directly applicable to each activity. The only, questionable entry is mode of transport which relates only to travel activities. However, at the same time it is the location. Activity-determined context variables include, technology used and paid vs. non-paid activities as well as type of shopping, reading material, television viewed and dimensions of eating.

This paper, as have others, concludes that contextual information is important for understanding time-use data. Evaluation of context-variables should be viewed in the light of both input and output criteria.

Data collection issues relate both to content issues, collection approaches, and coding issues. Key data collection content issues include the choice of contextual variables to include, and the level of detail for each variable. Additionally, considerable attention has to be focused on imparting a clear understanding of the meanings underlying data collected as they are often unclear to participants. It is argued that optimal collection approach for contextual variables requires open-ended vernacular responses and open interval time-diaries. Coding calls for disaggregated variables which require minimal decision making and which provide optimal opportunities for cross-national analysis.

A paramount issue is the need for each coding category to be carefully defined and brought into sync cross-nationally There has been no effort to coordinate contextual codes cross-nationally and hence, as shown above there is virtually perfect lack of comparability.

In closing, it is hoped that this paper will be a wake up call for time-use researchers to start to pay the same attention to contextual variables that they have been paying to activity classification. Activity data without adequate context data will yield little information.

References

Blanke, K. M. (1993, June). The with whom coding. Paper presented at the International Association for Time Use Research Conference, Amsterdam, Netherlands.

Chapin, F. S. (1974). Human activity patterns in the city: things people do in time and in space. New York: John Wiley and Sons.

Dow, G. K. and Juster, F. T. (1985). Goods, time, and well-being: The joint dependence problem. In: Time, Goods, and Well-Being, Ch 16, pp 397-403, Juster, F. T. and Stafford, F. P., eds.

Elliot, D. H., Harvey, A. S. & Procos, D. (1976). An overview of the Halifax time-budget study. Society and Leisure, 3, 145-159.

Federal Statistical Office (1995). Die Zeitverwendung der Bev`lkerung: Methode und erste Ergebnisse der Zeitbudgeterhebung 1991/92 [The time use of the population: Method and first results of the time budget collection 1991/92]. Wiesbaden, Germany: Author.

Grønmo, S. (1978, April). The issue of Saturday retail closing in Norway: Some consumer welfare aspects. Paper presented at the Corporate Social Concerns and Public Policy Conference, Bergen, Norway.

Harvey, A. S. (1990). "Guidelines for Time Use Data Collection." Social Indicators Research, 30: 1 97-228, 1 993.

Harvey, A. S. (2000). All you need is... Time-use research lessons from an international socio-economic perspective. Working Paper. Halifax, Nova Scotia: Saint Mary's University, Time Use Research Program.

Harvey, A.S. (1997). From activities to activity settings: Behaviour in Context. In Ettema, D. and Timmermans H. eds. Activity-based approaches to travel analysis. Tarrytown NY:Elsevier Science Inc.

Harvey, A.S. (1982). Role and Context: Shapers of Behaviour. Studies in Broadcasting. Tokyo:Nippon Hoso Kyokai (NHK).

Harvey, A. S. and Macdonald, W. S. (1976). Time diaries and time data for extension of economic accounts. Social Indicators Research, 3(1), 21-35.

Harvey, A. S. and Spinney, J. (2000a). Time use of teachers: Life on and off the job. Halifax, Nova Scotia: Saint Mary's University, Time Use Research Program.

Harvey, A. S. and Spinney, J. (2000b, June). Activity and contextual codes: Implications for time use coding schemes. Paper presented at the International Association for Time Use Research Conference, Belo Horizonte, Minas Gerais, Brazil.

Harvey, A. S. and Taylor, M.E. (1999). Activity settings and travel behaviour: A social contract perspective. Transportation, 27, 53-73.

Harvey, A. S. and Wilson, C. (1998, July). Evolution of daily activity patterns: A study of the Halifax panel Survey. Paper presented at the International Time-Use Research Association Conference in connection with the International Sociological Congress, Montreal, Quebec.

Hungarian Central Statistical Office (2000). Time use 1986-1999 autumn. Budapest: Hungarian Central Statistical Office.

Juster F.T. (1985). The validity and quality of time use estimates obtained from recall diaries, In: Time, Goods, and Well-Being, Ch 4, pp 63-88, Juster, F. T. and Stafford, F. P., eds.

Kinsley, B. L. and O'Donnell, T. (1983). 'Explorations in Time Use, Volume 1' Marking Time - Methodology Report of the Canadian Time Use Pilot Study - 1981. Ottawa, Ontario: Department of Communications, Employment and Immigration.

Kitterød, R.H. (2000). Does the registration of parallel activities in Time Use Diaries affect the way people report their main activities? Paper to be presented at the National Conference of Sociology, *Sociology in Norway - 50 years after*, Ulvik, Hardanger, 9-12th of November 2000.

Lingsom, S. (1979). Advantages and disadvantages of alternative time diary techniques: A working paper. Oslo, Norway: Statistisk Sentralbyra.

McLennan, W. (1997). How Australian use their time. Canberra, Australia: Australian Bureau of Statistics.

Michelson, W. (1985). From sun to sun: Daily obligations and community structure in the lives of employed women and their families. Totowa, NJ: Rowman and Allanheld Publishers.

Michelson, W. (1993). Towards exploration of meaning and outcomes in connection with time- use data. Kingston, Ontario: Queen's University.

Robinson, J. P. (1977). How Americans use time: A social-psychological analysis of behavior. New York: Praeger Publishers.

Robinson, J. P. (1999). The time-diary method. In W.E. Pentland, A.S. Harvey, M. Powell Lawton, & M.A. McColl (Eds.), Time use research in the social sciences (pp. 47-89). New York: Kluwer Academic Plenum Publishers.

Rydenstam K. and Wadeskog, A. (1998). Evaluation of the European time use pilot studies. Sweden: Statistical Office of the European Communities, Statistics Sweden.

Scheuch, E. K. (1972). The time-budget interview. In A. Szalai (ed.), The use of time (pp 69-87). The Hague: Mouton.

Shaw, S. (1985). 'The meaning of leisure in everyday life', Leisure Sciences, 7(1), 1-24.

Statistics Canada (1998). General Social Survey, Cycle 12. Ottawa, Ontario: Author.

Stinson, L. (n.d.). Cognitive testing phase 1: The American Time-use Survey (ATUS) Summary Questions. Washington: United Stated Government, Bureau of Labour Statistics.

Szalai, A. (1972). The use of time. The Hague: Mouton.

United Nations International Research and Training Institute for the Advancement of Women (INSTRAW). (1995). Measurement and valuation of unpaid contribution: Accounting through time and output. Santo Domingo, Dominican Republic: Institute for Research and Training for the Advancement of Women.