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# Children's housework – Are girls more active than boys?

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## Abstract

This paper examines boys' and girls' housework in a Nordic welfare state which is characterized by both high labor market participation rates for mothers and fathers and a narrow income distribution which makes it expensive for ordinary parents to hire paid household help. We use data from the European Community Household Panel Survey 1998 and run tobit-regressions to take the number of children reporting no housework into consideration. The results show that children do only a minor part of the total housework, and that boys participate less than girls. There is a positive impact of mothers' full time work on children's housework, while mothers having a higher education level decrease boys' participation in housework. Finally, the time children spend on paid work is found more positively correlated with girls' than with boys' contributions to housework.

**JEL-Codes:** D13, J13, J16, J22

**Keywords:** Household production, intra-household allocation, children, economics of gender, time allocation, labor supply

# 1 Introduction

There is extensive literature on children's demand for housework focusing on how much time children require to have spent on them, and the extent to which children thus restrict women's supply of time to the labor market (Bianchi et al., 2006). However, children not only demand housework, they also supply housework within the family.

Furthermore, the study of the gender dimension is usually reserved for adults – mothers and fathers – although children's demand for supply of housework is presumed to be gendered as well. That is to say, parents do not necessarily spend equal amounts of time on their sons and their daughters, and girls and boys do not necessarily participate equally in housework (Hofert, 2009).

In the following the focus is on children's supply of housework. Besides descriptions of the amount of time spent on housework, the paper analyzes different reasons for children to devote different amounts of time to household production. The paper distinguishes between girls' and boys' supply of housework, and explanations for the gendered behavior are given. Finally, it is argued that the different amounts of time girls and boys spend on housework may contribute to the as yet not fully documented unequal distribution of time spent by mothers and fathers.

# 2 Background

A common feature of both economic and sociological theories on the division of labor within the family is the focus on the division of labor between adults – women/mothers and men/fathers – excluding the work of children. If children enter into the theories at all, then they are usually regarded as individuals requiring expenditures and care, and thus appear as restrictions upon their parents' – especially their mothers' – labor supply. However, some children do contribute to housework, either because their parents need their help in doing everyday chores or because the parents believe that it helps to build character and develop a sense of responsibility in their children, or both (Goldscheider and Waite, 1991).

According to resource theories, women and men have or acquire different work characteristics, the implication being that there are differences between the genders in levels of productivity in both paid and unpaid work (Parson and Bales, 1955; Becker, 1981; Browning, 1992). Applied to children, the implication is that girls perform more housework than boys, and that children's contribution to the housework is smaller than that of their parents because they are not as physically developed as adults and because they have less work experience. Neither biological reasons nor different levels of experience are reasonable explanations of efficiency differentials, however, since ordinary housework no longer requires special skills, thanks to

new and more user-friendly household equipment, which younger generations are found more keen to operate. Long ago, Ferber and Birnbaum (1977) claimed that specialization theory was not able to predict either the differences in girls' and boys' supply of housework or the level of that work relative to their parent's work.

Theories dealing with the relationship between parents' and children's use of time often focus on the impact of maternal employment on outcomes for the children (Würtz, 2008). The assumption is that the mother's employment means that the children will have poorer cognitive skills and educational achievements, because less of the mother's time is devoted to social and human investment in the children, e.g. in helping with school homework, and, similarly, on shared leisure time and shared time doing housework. However, Bianchi and Robinson (1997) find no relationship between the employment of the mother and her children's outcomes, because, they argue, quantity of time is substituted by quality of time, fathers become more involved in child care, the time spent together with children is short anyway, and, finally, children require only a small amount of parents' time to achieve good outcomes. Furthermore, if working mothers give priority to child-related activities, spending a higher proportion of their available time taking care of and doing homework together with their children, as Bryant and Zick (1996) show, it could mean that children do more housework the more the mother works on the labor market. This is in line with the availability theory arguing that offspring of full-time working mothers are more responsible for household tasks than offspring of part-time or non-working mothers (Peters and Haldeman, 1987), a conclusion which is partly supported by the findings of Blair (1992a, 1992b) showing that growing up with a mother in full-time employment increases the time girls spend on housework, whereas the relationship for boys is found to be more ambiguous (Blair, 1992b; Benin and Edwards, 1990). Without distinguishing between boys and girls, Raley (2006) finds that the mother's employment has no impact on the time children devote to housework.

Parents' educational level also supposed to have an impact on their time allocation, especially in the case of mothers, who do less housework the more highly educated they are even when labor supply is controlled for (Leibowitz, 1975; Hill and Stafford, 1974; Lausten and Deding, 2006). This does not hold for all household tasks, however, as more time is devoted to caring by educated mothers – and fathers – than by less-educated parents (Bonke and Esping-Andersen, 2009; Bianchi et al., 2004; Sayer et al., 2004; Sandberg and Hofferth, 2001), which Leibowitz (1974) explains by educated women's prioritization of coaching and other forms of socialization – a high income effect – and the understanding of themselves as more qualified to give care – a low substitution effect – than is the case for less highly educated women. Furthermore, a higher educational level not only enhances productivity on the labor market – the wage-rate – but it is also assumed that it increases the return to care, which "... enhances productivity in acquiring schooling more than it does productivity in the labor market" (Leibowitz, 1974) i.e. the quality of children's upbringing is due to a high degree to substitution in production (Peters, 1995). Thus parents show altruistic behavior, as the profit goes to the children, i.e. time spent on child-caring "... measures the parents' altruistic investment in the

human capital embodied in their children” (Hill and Stafford, 1974). See also Becker and Murphy (2008) for a theoretical argumentation suggesting that return to education in households, including the impact of educating one's children, has increased in comparison with returns in the market sector during recent decades.

It follows from this argument that not only more highly educated parents but also their children spend more time on education, and consequently less time is available for housework and leisure activities than for children of less highly educated parents. Whether it is the one or the other activity which is given a lower priority depends on the importance the parents ascribe to the two activities, which is also the case concerning the question of whether boys and girls are treated equally in this respect. Add to the presence of differing priorities among older children concerning paid work, and we see the complexity of children's time-allocation and its relationship to their parents' educational level. For this reason the amount of time children from different social backgrounds spend on a specific activity, such as housework, becomes an empirical question; Stafford and Yeung (2005) find that children of highly educated working mothers spend more time on weekdays and less time on weekend days on housework relative to children of less highly educated mothers, while no such variation occurs with children of non-working mothers.

The number of children and their birth order are also assumed to have impacts on the supply of work, as additional children mean less intellectual stimulation being given and, conversely, only children and first-born children gain more by intense interaction with their parents (Blake, 1989). Devoting time to reading to children and monitoring homework thus becomes more difficult the more children there are in the family, and this might also hold for the supervision of children's time spent on housework. The implications are that the housework per child decreases with the number of children, and that the first child contributes more than the last child. Sollberg (1994), however, only confirms the first hypothesis, while birth order gave no housework differentials among siblings. Bianchi and Robinson (1997) report, on the contrary, a positive relationship between the number of siblings in a family and the time a child spends on housework.

There are likely to be differing parental values and practices with regard to boys and girls, and this might also be the case for the bargaining processes and the power-balances influencing allocation of time. Arguments put forward by boys on the amount of time to be spent on different activities might be found more convincing than the very same arguments made by girls. Parents' demands for children to do housework might also be sex typed, in that they may expect girls to do more housework than boys. A plausible explanation for this is that parents find it more obvious that boys will make a career on the labor market, for which reason it would be natural that boys should spend more time investing in their human capital through school homework, school time, socializing activities, sports etc., while activities preferred for girls might be oriented towards those which are more traditionally female. This means that the “doing” gender thesis also applies to children (Berk, 1985). The basic assumption here would be that a traditional role-model still prevails even in modern, double-career families, and,

thus, the upbringing of children becomes sex typed even though many parents nowadays are in favor of equal opportunities (Bonke, 1999). This is confirmed by Lundberg (2005), Lundberg et al. (2007), Mammen (2005), Yeung et al. (2001), and by Bonke and Esping-Andersen (2009), who show that in Denmark only less educated fathers spend more care time with their sons than with their daughters, while more highly educated fathers and mothers in general do not distinguish in this.

Norwegian and Swedish investigations prove that there are significant differentials in the time that girls and boys devote to housework (Sollberg, 1994) as girls spend approximately twice as many hours as boys do on this activity. For the US, Bianchi and Robinson (1997) and Raley (2006) come to the same conclusion, though another American study Hofferth and Sandberg (2001) finds only minor differentials in girls' and boys' housework. Only the last study, however, is based on a representative national study which includes all child age-groups, and as the sampling techniques for the different investigations are also different, the results are not completely comparable.

The expectation here is that *Danish children are sex typed in the performance of housework, but this typing is believed to be less pronounced than in the other Nordic countries and in the US*. The reasoning is that Danish women and men spend nearly equal amounts of time on the labor market, i.e. fewer Danish women work part-time relative to Swedish women, and that the preference for equal family models is most pronounced in Denmark (Ellingsæter, 1998).

The absolute *amount of housework performed by Danish children is also assumed to be lower than is the case for children in other countries*, because adult Danes spend considerably less time on housework than do parents in other Nordic countries and in the US (Bonke, 1999). Furthermore, the amount of time children spend on housework is assumed to vary with the demand for that work – i.e. the labor supply of the mother for household tasks and the standard of housing and living required by the family – and the number of substitutes in the performing of housework – i.e. the father's contribution to housework, paid help and the stock of household appliances. The mother's education is also presumed to have an impact on the amount of children's housework, as more educated women spend more time together with their children doing school homework and other activities that increase human capital investments, thus allowing the children to participate less in housework. Another possibility is that the parents are even more ambitious for their children, prioritizing not only skills valuable on the labor market but also those dedicated to home production, so that their child(ren) can do better on the marriage market. Finally, the mother's education and preferences for gender equity are assumed to have a gender-neutral effect on the upbringing of her children, including their contribution to housework.

These hypotheses are tested in the following; however, the results cannot necessarily be generalized internationally, as there are only a limited number of investigations and even fewer carried out on national representative samples, exceptions being the studies by Hofferth and Sandberg (2001) and Hofferth (2009).

### **3 Data and methodology**

The data used are from the European Community Household Panel (ECHP), which is a panel survey study conducted between 1994 and 2001 in nearly all EU member states. The ECHP includes a joint household interview with all members of the household aged 16 or over and individual interviews with the same persons. In 1998 the Danish part of the joint interview included some additional questions on adults and children's time use. Thus, the households were asked about the participation by the different household members – both adults and children – in nine explicitly named tasks: shopping, visiting public offices etc., food preparation, washing up and table clearing, cleaning, washing, gardening, repair and maintenance, and bringing and collecting children. Questions were asked about the aggregate time spent on these tasks – not the time spent on every individual activity – and for every child time spent in regular leisure-time activities – the definition to be decided by the household – was given. The definition of housework is in line with practice in other time-use surveys and follows the recommendations for future European time-use surveys (Eurostat, 1997). The number of co-habiting/married couples with children living at home – lone parents are left out because of the focus on intra-household allocation – used here is 761, and within these families there are 1,328 children.

The questions were asked in the household interview when all the household interviewees (those members of the household aged 16 or over) were present, and, in some cases, also children below that age. It was the parents who filled out the questionnaire, so that the information about children's housework relies on their parents' information. However, a comparison between two Swedish studies (Qvortrup, 1994) shows that no significant differences are found between information from children and information from parents with respect to children's workloads in the distribution of the workloads between girls and boys.

Another point to be considered is that the information comes from a questionnaire and not from a diary, which means that the housework is measured as a given number of hours per week. Bonke (2005) and Robinson and Gershuny (1994), who did a methodological investigation, found that for paid work short-term involvement is recorded as taking a shorter time when measured by survey questions than when measured by diary entries, and the opposite holds true for long-term involvement. Thus, the time children spend on housework might be underestimated in this paper.

Because not all children contribute to household production – the number of zero-information is relatively high – we run a tobit-regression model, which allow us to take care of that problem. Besides the ordinary coefficients we also present the marginal effects on the expected value of HW for the subpopulation with non-zero observations for HW. For continuous variables the marginal effects are calculated at the median values and for dummy variables at the 0 values. The specification of the model applied is:

$$(1) \quad HW = \alpha + \beta \text{ DEMAND} + \gamma \text{ SUPPLY} + \delta \text{ SUBSTITUTION} + \varepsilon,$$

where HW is children's housework, DEMAND is a vector of variables influencing the demand for children's housework (total hours of housework, mother's education, household income, mother's age at birth of 1<sup>st</sup> child), SUPPLY is a vector of variables of importance for the supply of children's housework (number of siblings, sex and age of child), and *SUBSTITUTION* is a vector of variables functioning as substitutes for children's housework (father's share of parents' housework, paid housework, household appliances, child's paid work and regular leisure activities).  $\varepsilon$  is the error term.

Because we have transformed a household sample into a child sample where every child constitutes a separate case, the family characteristics of siblings are similar. This implies that the variance of all the variables is underestimated, for which reason we control for partitioning of the children into clusters of families with multiple children.

Obviously, the total amount of housework is an important demand variable, as this is the issue for the bargaining in the family and/or the background for what the parents request their children to do in the home. The total income of the family indicates the presence of possible housework alternatives, including paid help and appliances. The mothers' educational background is included as a proxy for her priority for helping with children's school homework relative to other activities as well as her equal opportunity aspirations requiring the same amount of housework to be performed by sons as by daughters. Another proxy for the latter phenomenon is the age of the wife when she gave birth for the first time, as younger mothers are found to be more home-oriented and less equity-minded than are older mothers (Bonke and Esping-Andersen, 2009).

Whether the father's contribution to the housework is substituting that of children is tested by including a variable for his use of time in household production. The same holds for the functioning of household appliances. In other words, fathers' share of parents' housework, help in the home by others, including paid work, and the presence of a dishwasher and/or a microwave oven are all conceived as substitution variables in the empirical models.

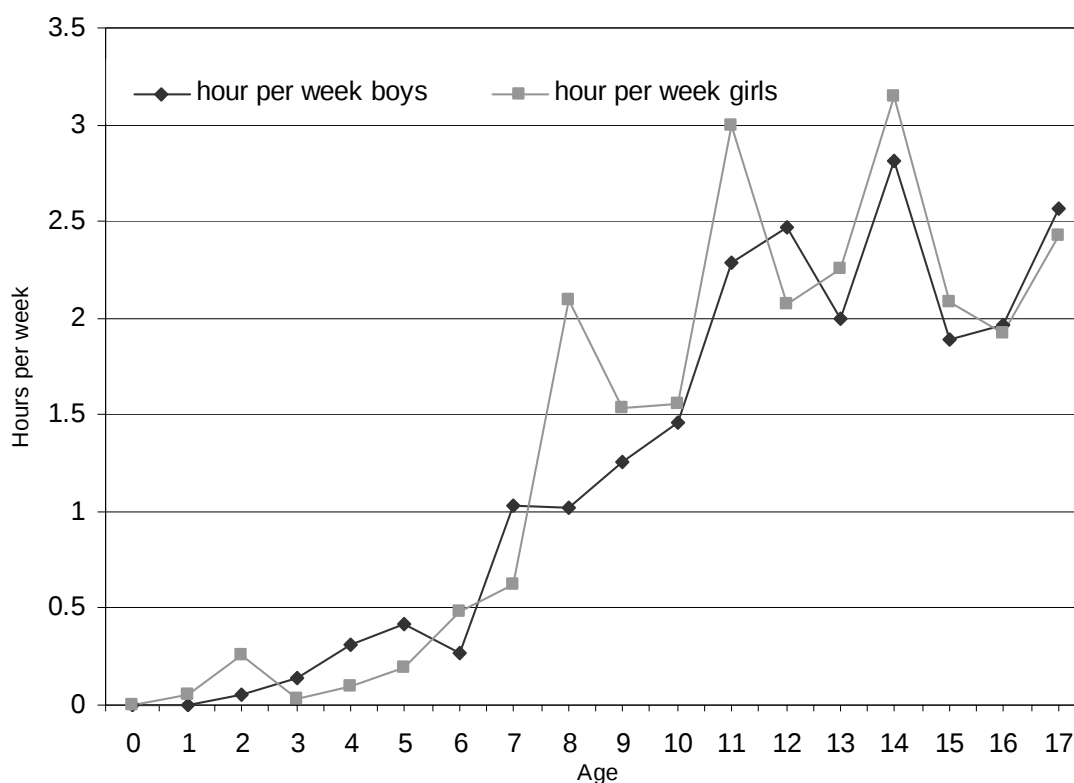
Finally, the number of siblings and the sex and age of the child(ren) are included as supply variables in the general model, where the number of children in the general model refers to the findings by Blake (1989) showing that children in small families perform better academically than those in larger families, probably because more time and resources are devoted to only children than to siblings – who again are assumed to get the same amount of attention at any point of time, cf. the "equity heuristic" (Price, 2008) – and, thereby, the latter are supposed to have more time available – even per person – to do housework than the former (Bianchi and Robinson, 1997). That children's age is another determinant of the amount of time children spend on housework is explained by the fact that older children are more capable of sharing work at home, and, presumably, feel more responsibility for family affairs than do younger children (Gager, Cooney and Call, 1999).

## 4 Results

### 4.1 Children's housework

Children not only demand parents' and other people's time, they also supply time in the family by participating in the household production. However, as Figure 1 shows the contribution of children is very small even when they become teenagers. Thus, older pre-school children's spend around zero to one hour a week doing housework, which increases until they reach the age of 10-11. From that age on school children spend around 2 to 2½ hours a week doing housework.

**Figure 1**  
**Children's housework distributed by age of the child, child sample (n=1335), 1998**



Note: Including children with zero-time contributions.

Source: European Community Household Panel Survey.

Even though children contribute only marginally to the household production, there is evidence that girls supply more housework than boys. This is confirmed in Figure 1 for school age children, while for preschool children there is no difference in the time boys and girls spend on housework. If we distinguish between the participation in housework and the supply of housework by participating children, see table 1, only the participation rate for school chil-

dren is different for girls and boys. That is, while three out of four girls contribute to the household production, this is the case for only two out of three boys. For participating boys and girls the supply of housework amounts to 2¾ hours per week for each group, which is somewhat more than for participating preschool girls and boys, who spend around 1¾ and 1½ hours respectively. It is only the minority of preschoolers, however, that participate in the household production, around 9-10% of both girls and the boys.

**Table 1**  
**Children's housework distributed by age and sex,**  
**hours: minutes per week, child sample, 1998**

|                               | <7 years | 7-17 years |
|-------------------------------|----------|------------|
| <b>Girl</b>                   | (n=274)  | (n=365)    |
| Participation rate            | 9.1      | 75.1 **    |
| Hours:minutes by participants | 1:48     | 2:44       |
| <b>Boy</b>                    | (n=299)  | (n=397)    |
| Participation rate            | 9.7      | 66.5 **    |
| Hours:minutes by participants | 1:36     | 2:40       |

Note: Sex differential + p < .1. \* p < .05. \*\* p < .01. \*\*\* p < .001.

Source: European Community Household Panel Survey.

The work differentials between girls and boys found here are smaller than those found in other Nordic studies, even when taking into consideration the different years of investigation (Qvortrup, 1994; Solberg, 1994), and the same holds for a comparison with US studies (Bianchi and Robinson, 1997; Hofferth and Sandberg, 2001; Hofferth, 2009)<sup>1</sup>. Furthermore, the participation rate and the household labor supply by participating children are found to be higher for American children than for Danish children<sup>2</sup>, the difference being partly due to the fact that young American children tend to accompany their parents when shopping (Hofferth and Sandberg, 2001). If these differentials between the countries are statistically significant, however, is not proven here simply because the information stem from different and not fully comparable data – sources.

That the time children spend on housework increases with the number of children in the family is confirmed in Table 2, which also shows that the time spent per child increases if there are more than two children in the family, i.e. from around 1 hour to 1½ hours per child. Also the number in the birth sequence matters, as the first-born child spends more time on housework than the second-born child, who again works more hours than the third-born child, followed by the fourth-born child, who works the fewest number of hours in the home; the ex-

1 The work differential between US girls and boys aged 6-12 years was 54 minutes per week in 1997 (41 minutes in 2003) and 17 minutes between Danish girls and boys aged 7-17 years in 1998.

2 The participation rate of American children aged 6-12 years was 73 and 71 for Danish children aged 7-17 years and the supply of household work for participating children in the two countries were 3:11 and 2:42 hours and minutes, respectively, see Hofferth (2009) for the American figures. These differentials are supposed to be bigger if comparing.

planation for this is partially found in age differentials and in variations in the parents' demand for housework according to the child's placement in the child sequence. Thus, parents do not necessarily expect the same contribution to the household production from the second and third child as they did from the first child, whether they are conscious of this or not.

**Table 2**  
**Children's housework distributed by the number in the child sequence and the number of children, in the family hours: minutes per week, household sample, 1998**

|                  | 1st child | 2nd child | 3rd child | 4th child | All children | Per child |
|------------------|-----------|-----------|-----------|-----------|--------------|-----------|
| 1 child (h: min) | 1:04      | .         | .         | .         | 1:04         | 1:04      |
| n                | 335       | .         | .         | .         | 335          | 335       |
| 2 child (h: min) | 1:14      | 0:53      | .         | .         | 2:07         | 1:04      |
| n                | 305       | 305       | .         | .         | 610          | 610       |
| 3 child (h: min) | 2:07      | 1:32      | 0:37      | .         | 4:16         | 1:25      |
| n                | 101       | 101       | 101       | .         | 303          | 303       |
| 4 child (h: min) | 1:42      | 1:45      | 1:15      | 0:33      | 5:15         | 1:19      |
| n                | 20        | 20        | 20        | 20        | 80           | 80        |

Note: Including children with zero-time contributions.

Source: European Community Household Panel Survey.

**Table 3**  
**Children's housework in two – Children families distributed by sex, hours: minutes per week, household sample, standard deviations in parentheses, 1998**

|                      | Boy                                   | Girl                                 |
|----------------------|---------------------------------------|--------------------------------------|
| <i>Younger child</i> |                                       |                                      |
| <b>Boy</b>           | 0:53/0:38***<br>(1:17/1:01)<br>(n=92) | 1:28/1:02**<br>(2:14/1:56)<br>(n=75) |
| <b>Girl</b>          | 1:07/0:58<br>(2:06/1:52)<br>(n=74)    | 1:35/1:00*<br>(2:03/1:32)<br>(n=64)  |

Notes: Sibling differential: +  $p < .1$ . \*  $p < .05$ . \*\*  $p < .01$ . \*\*\*  $p < .001$ .

Including children with zero-time contributions.

Source: European Community Household Panel Survey.

## 4.2 Analyses of children's housework

To analyze the amount of children's housework and the existence of gender differentials in this work, a tobit-regression model is applied to test the validity of the hypotheses listed in the

background section of this paper<sup>3</sup>. Because the individual child is the analytical unit even in families with more than one child, we control for any clustering effect due to siblings' common background and characteristics.

The conditions are divided into those influencing the demand for housework and those which are assumed to substitute the housework of children and parents. In addition, conditions of importance for the supply of housework are introduced to make it possible to measure the isolated effect of the other conditions, e.g. the number of children and their sex and age. In the paper only reduced models are presented, as many of the variables were found to be highly correlated, and furthermore the analyses were only performed for 7- to 17-year-old children, because of the many zero observations among younger children. We also carry out analyses for girls and boys separately in order to determine whether different conditions influence their housework in different ways, i.e. if there is any sex typing.

Firstly, we find that if the mother works full-time, this significantly increases the likelihood of children participating in housework, and when the sample is split into boys and girls the effect is the same for both sexes.

This is what we would expect cf. Bryan and Zick (1996), Peters and Haldeman (1987), Blair (1992a, 1992b), Benin and Edwards (1990) and Raley (2006), one reason being that the demand for help in doing housework is increased the more hours the mother spends on the labor market. However, we find no significant impact of the mother's and father's aggregated housework on children's housework per se – neither for boys or for girls – for which reason the positive impact of the mother's full-time work is either due to her being away at times during the day where housework has to be done (by her kids) or to other norms and preferences about children's participation in housework among full-time working mothers than among part – time working mothers.

The parents' education, and especially that of the mother, is a factor of importance for the time children spend on housework, because educated parents are assumed to give children's school attendance a higher priority. This means that these children have less time available for other activities, including housework; in other words, the education of women obstructs their children from doing housework, so that they can give more time to schooling and/or leisure activities. Table 4 confirms that children's housework decreases with the mother's education – around 5% per year of extra education of the mother. This impact, however, is only found for boys not for girls, which indicates that different strategies can be assumed to be practiced by educated mothers – and their husbands – in the way that they free their sons from doing housework, giving them a favorable opportunity to spend more time on homework and other

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<sup>3</sup> We also ran a two-step regression model distinguishing between the conditions influencing children's participation in housework and those measuring the effect of these conditions on the supply of participating children's housework, controlling for selection biases. However, as we do not know if parents' decision on their children's participation in housework can be seen as a two-step procedure and it was hard to find a good instrument, we decided only to run tobit-regressions, although the overall results were not very different from each other.

activities appropriate for increasing their human capital and, thereby, improving their labor market opportunities.

**Table 4**  
**Tobit Regressions of time spent for housework,**  
**7 to 17 year old children, boys and girls,housework in families with couples, 1998**

|                                                         | All children<br>(n=571) |              |         | Boys<br>(n=298) |              |          | Girls<br>(n=273) |              |       |
|---------------------------------------------------------|-------------------------|--------------|---------|-----------------|--------------|----------|------------------|--------------|-------|
|                                                         | Coeff.                  | Robust<br>SE | Mfx     | Coeff.          | Robust<br>SE | Mfx      | Coeff.           | Robust<br>SE | Mfx   |
| <i>Demand variables</i>                                 |                         |              |         |                 |              |          |                  |              |       |
| Mother's work >30 hours<br>a week                       | .028**                  | .009         | .020**  | .027 *          | .010         | .018*    | .028*            | .012         | .021* |
| Total hours of housework <sup>1</sup>                   | -.491                   | .409         | -.354   | -.636           | .449         | -.463    | -.474            | .573         | -.364 |
| Mother's education in years                             | -.090+                  | .052         | -.062+  | -.183 **        | .064         | -.125**  | .022             | .063         | .016  |
| Log(Household income)                                   | .749+                   | .448         | .515+   | .927 +          | .531         | .633+    | .628             | .580         | .464  |
| Mother's age at 1 <sup>st</sup> child                   | -.107**                 | .033         | -.073** | -.172 ***       | .045         | -.117*** | -.037            | .042         | -.027 |
| <i>Supply variables</i>                                 |                         |              |         |                 |              |          |                  |              |       |
| Siblings (in number)                                    | -.204                   | .303         | -.143   | -.658           | .439         | -.479    | .337             | .384         | .242  |
| Sex (female=1)                                          | .329                    | .206         | .234    | ..              | ..           | ..       | ..               | ..           | ..    |
| Age of child                                            | .151***                 | .043         | .104**  | .166 **         | .054         | .113**   | .134*            | .060         | .099* |
| Having siblings >17 years                               | .198                    | .341         | .139    | .488            | .499         | .350     | .221             | .401         | .166  |
| <i>Substitution variables</i>                           |                         |              |         |                 |              |          |                  |              |       |
| Father's share of parents'<br>housework                 | -.382                   | .753         | -.262   | -.489           | .907         | -.334    | -.155            | .910         | -.155 |
| Having others' help in the<br>home, including paid work | .163                    | .345         | .114    | .371            | .384         | .263     | -.122            | .490         | -.089 |
| Dishwasher + microwave<<br>oven                         | .404                    | .290         | .266    | .234            | .336         | .156     | .700+            | .363         | .483+ |
| Child having paid work                                  | .877**                  | .300         | .655**  | .575            | .421         | .416     | 1.102*           | .457         | .887* |
| Regular leisure activities                              | .389                    | .339         | .256    | .275            | .399         | .182     | .652             | .504         | .452  |
| Constant                                                | -.331                   | 1908         |         | 2462            | 2202         |          | -3500            | 2639         |       |
| Sigma                                                   | 2479                    | .172         |         | 2451            | .212         |          | 2436             | .182         |       |

Note: Standard errors (SE) corrected for cluster effect, i.e. 359 clusters. Mfx: marginal effects on the expected value of "hours of work" for the subpopulation with non-zero observations, see Chapter 3.

+ p < .1. \* p < .05. \*\* p < .01. \*\*\* p < .001.

<sup>1</sup> Hours housework done by the mother and the father.

Source: European Community Household Panel Survey.

The fact that the age of the mother when she gives birth for the first time has a negative impact on children's supply of housework might be explained by a positive correlation between late parenthood and a strong labor market orientation: a view that the mother wishes to transfer to her child by sparing him/her from doing housework and focusing more on school work and leisure time activities. In that respect, this corresponds to the impact of female education on children's housework.

Other conditions thought to influence the demand for housework include household income, which allows higher income groups to own more things and household appliances increasing

the need for housework on the one hand, and making it easier to perform even for children, on the other hand. Hence, we find that household income is positively correlated with children's housework although the impact is only significant for boys and not for girls.

Furthermore, the father's share of the parents' housework is found to have a negative impact on children's housework. That is to say, we find that the more equal the sharing between the parents, the less housework children do, as we control for the amount of parental housework. The impact is not significant, however, for boys and girls taken together, and this holds even when we look at boys and girls separately (Table 4).

Another substitute for children's housework is paid work supplied by persons from outside the household, but this does not affect children's housework in general. However, for boys the first effect is found to be positive while negative for girls – none of them are significant – implying that paid work might be complementary to sons' housework. Therefore, if the household hires paid help to relieve the father from his contribution, the consequences are that boys do more housework, but for girls their contribution decreases. Moreover, if the household owns both a dishwasher and a microwave oven, this also increases the girl's participation in housework, while there is no impact on boys' participation.

The time children themselves devote to paid work and regular leisure time activities are complementary to their contribution to housework. Paid work thus increases children's participation in housework, and the same holds for their being engaged in leisure activities, although only the first correlation is significant. One interpretation of this is that paid work and the participation in leisure activities per se are found in the time-allocation negotiations to be no argument for not also doing housework; another is that there simply are "lazy" children and "busy" children. This time-allocation pattern varies somewhat, however, between girls and boys, as no significant correlation is found between boys' participation in neither regular leisure time activities or paid work while girls paid work is significantly correlated with their contribution to the housework, and that the correlations for girls are more than double the size of those for boys. This might support the thesis that in the bargaining process on the allocation of children's time, girls are in a weaker position than boys, the effect being that girls pay a higher price for being allowed to participate in leisure time activities outside the family.

The age of the mother is expected to have an impact on children's supply of housework, either because older mothers attach less importance to children's contributions, or because they have more difficulty in getting children involved, and, thus, become less likely to ask for a contribution from their children to housework. Unfortunately, the age of the mother and the age of the child are highly correlated, for which reason the hypothesis cannot be tested.

Finally, the number of brothers and sisters – siblings – has no impact on children's supply of housework, whether the siblings are below or above 18 years old. The supply of boys' housework, however, is influenced negatively by having a sister or brother, while the opposite is found for girls, who increase their supply of housework when having a sisters or brothers – none of the correlations being significant, however. The implication is that girls and boys

might not benefit equally from economies of scale as far as housework is concerned, i.e. being a brother is more favorable than being a sister if considering only the “risk” of being engaged in housework. As the initial levels of girls’ and boys’ housework are different, too, and more housework is done in families with girls than in families with boys both in relative and absolute terms, girls contribute more than boys the more housework there is to be done in the family.

## **5 Concluding remarks**

A feature commonly found in time-allocation studies is that they refer to the division of labor between adults – women/mothers and men/fathers – leaving not only children’s work out of consideration but also the distinction between girls’ and boys’ work. This means that in order to create a full picture of housework, plausible explanations for children’s work have to be invented and tested empirically by introducing conditions of importance for the demand for housework, conditions assumed to substitute that work, and, finally, conditions important for the supply of housework, making it possible to calculate partial effects in different models.

The analyses show that children’s contributions to housework are modest. The contribution of pre-school children is negligible, but after this stage the contribution increases until they reach the age of 10-11, where they spend around 2 to 2½ hours a week doing housework. Furthermore, boys’ contribution to housework is less than that of girls. Thus, boys and girls participation rates are different, while the supply of participating girls’ housework is similar to that of boys.

We also find that the mother working full-time increases the children’s housework, and that this appears for boys as well as for girls. The interpretation given is that full-time working mothers are more time-pressed demanding more support from their children in doing housework. There is no impact, however, of the mother’s and the father’s aggregated housework on participating children’s contribution.

The fact that parents’ education and especially that of the mother is negatively correlated with children’s housework supports the hypothesis that children’s school attendance, and, thereby, their chances on the labor market, is given a higher priority the more educated the parents are themselves; for which reason less time is available for other purposes, including housework. Thus we see that for boys their housework decreases with the mother’s education, while there is no impact for girls. A possible explanation is that educated mothers and their husbands practice different strategies for boys than for girls, giving boys more favorable opportunities to spend time on school homework and other activities appropriate for increasing their human capital and, thereby, improving their labor market opportunities.

The time children themselves devote to paid work is found to be complementary to their contribution to housework. For girls as well as for boys, having a paid job thus increases their supply of housework, but the effect is greater for girls than for boys. The interpretation might

be that in the bargaining process on the allocation of children's time, girls are in a weaker position than boys, the effect being that girls pay a higher price for being allowed to participate in activities outside the family.

In conclusion, the results confirm the thesis of a gendered bias in school-children's housework; however, it does seem to be smaller in Denmark than in other countries. The level of Danish children's housework found is not exceptionally low, but it appears surprising that children are sex-typed concerning housework; the implications of this should be taken into consideration in the debate on equal opportunities and rights.

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# Value of housework time and changes in traditional economic well-being in Finland in 1979-2000

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## Abstract

The paper looks at the change, the level and the structure of income distribution and distribution of consumption possibilities at the individual and at the household level between the years 1979 and 2000. I also pay attention to the development of low incomes when the concept of income is expanded to include a monetary measurement of household production. The paper uses Time Use Data, collected by Statistics Finland in 1979, 1987-1988 and 1999-2000. I find that consumption possibilities are more equally distributed than money income. Household production increases the consumption possibilities of all income groups but its effect is most significant in the low income decile groups. As a share of consumption possibilities, household production forms a significantly more important part for low income households than for high income households. By looking at consumption possibilities we can see a different distribution of economic well-being compared to distribution offered by money income measurement alone.

**JEL-Codes:** D1, D3, D6, I3

**Keywords:** Value of housework time, consumption possibilities, economic well-being, inequality, poverty

# 1 Introduction

The Finnish economy was growing and economic well-being increased steadily for all population sub-groups until the end of 1980s. However, the economic depression of the early 1990s led to a substantial decline in a household's income. After the depression, income inequality rose rapidly between 1994-2000. At the same time the number of individuals below the low income line increased rather constantly (Table 1). This latest development suggests faster increases in real incomes and larger gains in terms of economic well-being in high income decile groups compared to low income decile groups (Aaberge et al., 2000; Riihelä et al., 2001; Mattila-Wiro, 2006).

The inequality and poverty measures drawn to describe the economic development and development of well-being in Finland are based primarily on observed money income alone. The applied measures do not fully depict the large changes in population structure, in household composition and in patterns of labor force participation, especially the fast increase in unemployment Finland has experienced since the end of the 1970s. It follows that the figures based only on money income may over- or understate changes in the distribution of economic resources and the economic well-being of individuals and households.

Valuing the time spent on productive household activities – using shadow and/or market prices – and adding this value to money income allows us to examine the distribution of *consumption possibilities*. This is particularly useful when examining changes in the distribution of economic well-being over time, since household production can adjust the level of well-being when income fluctuates. This means that changes in the distribution of income may show changes in well-being that are not observed if the development of household production is included in the analysis<sup>1</sup>.

The paper looks at the change, the level and structure of income distribution and distribution of consumption possibilities at individual and at household level as well as in various sub-groups between years 1979 and 2000. Another interest is to look at the changes in low incomes when the concept of income is expanded to include a monetary measurement of household production. I anticipate that by looking at consumption possibilities we can see a different distribution of economic well-being compared to distribution offered by money income measurement alone. The paper uses Time Use Data, collected by Statistics Finland in 1979, 1987-1988 and 1999-2000. The analysis is carried out for fall data (September-November) in 1979, 1987 and 1999 and for full year data in 1987-1988 and 1999-2000.

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<sup>1</sup> Economic well-being is not an easy concept to measure or define. In the present paper I define *economic well-being* as a household's or individual's total access to goods and services. This definition enables the comparability of *household production* - producing goods and services within a household - and *money income* - providing means to either buy or produce goods and services. Omitting out the value of household production means that empirical estimates of economic well-being can be biased (see for example Bryant and Zick (1985)).

**Table 1**  
**Unemployment rate, Gini coefficient and poverty rate**  
**in Finland from 1979 to 2001**

| Year | All unemployed<br>(in 1000) | Unemployment<br>rate | Gini x 100 | Poverty rate |
|------|-----------------------------|----------------------|------------|--------------|
| 1979 | 143                         | 6.0                  | .          | .            |
| 1980 | 114                         | 4.7                  | .          | .            |
| 1981 | 121                         | 4.9                  | 20.5       | 5.7          |
| 1982 | 135                         | 5.4                  | .          | .            |
| 1983 | 138                         | 5.5                  | .          | .            |
| 1984 | 133                         | 5.2                  | .          | .            |
| 1985 | 129                         | 5.0                  | .          | .            |
| 1986 | 138                         | 5.4                  | .          | .            |
| 1987 | 130                         | 5.1                  | 19.7       | 3.7          |
| 1988 | 116                         | 4.5                  | 20.2       | 3.7          |
| 1989 | 80                          | 3.1                  | 20.5       | 3.4          |
| 1990 | 82                          | 3.2                  | 20.2       | 3.4          |
| 1991 | 169                         | 6.6                  | 20.1       | 3.7          |
| 1992 | 292                         | 11.7                 | 19.9       | 3.2          |
| 1993 | 405                         | 16.3                 | 21.1       | 3.0          |
| 1994 | 408                         | 16.6                 | 21.1       | 3.0          |
| 1995 | 382                         | 15.4                 | 21.7       | 3.1          |
| 1996 | 363                         | 14.6                 | 22.3       | 3.5          |
| 1997 | 314                         | 12.7                 | 23.7       | 3.7          |
| 1998 | 285                         | 11.4                 | 24.8       | 4.3          |
| 1999 | 261                         | 10.2                 | 25.9       | 4.3          |
| 2000 | 253                         | 9.8                  | 26.7       | 4.5          |
| 2001 | 238                         | 9.1                  | 25.8       | 5.0          |

Note: The Gini coefficient is calculated between individuals by using equivalent disposable income. The poverty line is set to 50% of the equivalent median income.

Modified OECD equivalence scale used in both cases.

Source: Statistics Finland (several years); Statistics Finland (2003).

## 2 Literature

### 2.1 Trends in income inequality and poverty

Income inequality in Finland, measured in disposable income, fell from 1966 to 1976 and changed little until the early 1990s. Atkinson et al. (1995) recorded that in the late 1980s Finland had one of the most equal distributions of income among 15 OECD countries measured by the Gini coefficient and 90/10 ratio. The Lorenz curve for Finland dominated those for all other countries included in the study.<sup>2</sup>

The depression did not increase income inequality at the beginning of 1990, partly because there was a substantial drop in the average real income. Since 1994, however, inequality has

<sup>2</sup> This is at least partly due to the welfare state structure in these countries; high taxes and public expenditure aimed at equalizing economic outcomes (Atkinson et al., 1995; Aaberge et al., 2000).

risen considerably (Table 1). After the depression, average real incomes and capital incomes grew substantially - particularly income from dividends. At the upper end of the distribution incomes have risen faster than average real income. There has been little or no increase at all in real incomes at the bottom of the income scale. High income households have benefited also from reductions in progressive taxation (Statistics Finland, 2000a; Statistics Finland, 2000b; Riihelä et al., 2001b; Statistics Finland, 2003).

Riihelä et al. (2001a) and Riihelä et al. (2003) examined trends in poverty in Finland using the Household Budget Survey and Income Distribution Statistics. From the early 1970s to the mid 1990s, the relative poverty rate declined, and rose during the latter part of the 1990s. Table 1 shows similarly that the proportion of the population below 50% of median income increased towards the end of the 1990s. Furthermore, there has been an absolute drop in mean real disposable income for all unemployed households during the 1990s, which suggests that unemployed households are the most vulnerable group of the population (Riihelä et al., 2001a; Riihelä et al., 2003; Riihelä et al., 2001b).

## 2.2 Structure and time use of households

The average number of individuals in Finnish households has decreased over time, being 2.6 in 1979 and 2.16 in 1999 (Table 2). This proves that the number of single person and lone parent households has increased and the number of large households has declined. Changes in labor force participation over the time period studied has also been substantial. Women's labor force participation is high in Finland, being normally between 70-80% but, during the depression, this rate dropped, especially for those with children below school age. The increase in unemployment and the introduction of the home care subsidy at the end of the 1980s may account for why women stayed at home taking care of their children and household (Statistics Finland, 1994).

**Table 2**  
**Changes in household size and time spent in housework, hours and minutes/day**

| Year of the data | Number of households | Persons on average household | Time spent on housework |       |      |
|------------------|----------------------|------------------------------|-------------------------|-------|------|
|                  |                      |                              | All                     | Women | Men  |
| 1987-1988        | 2 082 000            | 2.3                          | 3.04                    | 3.50  | 2.15 |
| 1999-2000        | 2 365 000            | 2.16                         | 3.10                    | 3.47  | 2.27 |
| fall 1979        | 1 831 000            | 2.6                          | 2.46                    | 3.39  | 1.50 |
| fall 1987        | 2 082 000            |                              | 2.47                    | 3.35  | 2.01 |
| fall 1999        | 2 365 000            |                              | 2.51                    | 3.36  | 2.03 |

Note: The time use on housework includes 10-64 years of age in fall 1979, 1987 and 1999 and over 10 years of age in 1987-1988 and 1999-2000.

Source: Statistics Finland (several years); Pääkkönen and Niemi (2002); Niemi and Pääkkönen (2001).

Despite these changes, the overall time use did not changed very much between the end of 1970 and 2000, measured in time use studies. Changes in the labor market and the expansion of the information society show their effects in Time Use Data but do not remarkably alter the main structure of time use. On average, employment, housework, sleeping and free time take

a little more than 20 hours of the average day of people of 10-64 years of age. The structure of time use has become more similar throughout the years between various social groups and between men and women. However, there can be considerable variation in time use between individuals or sub-groups (Juntto, 2002). Housework is still divided according to traditional gender roles. Men spend more time on work outside the home than women do and women do more housework compared to men (Table 2).

### **2.3 Earlier studies on households production and extended income**

In empirical studies it is assumed that household production adds to the economic well-being of household members. Evidence shows that full income, extended income or imputed income (income including the value of household production) is more equally distributed among households than the traditionally measured disposable income. There are only a very few (one published) studies on extended income in Finland but in other countries the topic has gained much greater attention.

Heikkilä and Piekkola (2003) used Finnish Time Use Data from years 1987-1988 and 1999-2000 collected by Statistics Finland, and examined how the inclusion of the value of household production in household income affects income inequality in Finland. The study was based on Becker's notion on comparative advantage to explain why men specialize in paid work and women in unpaid work. The main conclusion was that the value of household production has a decreasing effect on income inequality, as measured by Gini coefficient and income decile groups.

Bryant and Zick (1985) studied how rural and urban income distributions change if the value of household production is added to money income. They used U.S. data from the Panel Study of Income Dynamics, PSID, in 1975-1976 and 1979-1980. Only white, married-couple households with working husbands were included in the study. Bryant and Zick (1985) noticed that household production significantly raised the average family's access to goods and services. Furthermore, husbands contributed more in terms of earnings and wives in terms of household production in both rural and urban households. The Gini coefficient suggests that poor rural households make greater use of household production in order to increase their access to goods and services than do urban households.

Gottschalk and Mayer (1997) used the U.S. Panel Study of Income Dynamics (PSID) for the years 1976 and 1988 and studied household production and its effect on trends in income inequality in the USA. Households headed by people aged from 25 to 64 years were included. The paper applied three methods to measure income. Regardless of the income measure used, the results showed that housework reduced the observed inequality among households, even when inequality increased between 1976 and 1988.

Jenkins and O'Leary (1994) and Jenkins and O'Leary (1995) examined the distribution of extended income in the U.K. The paper estimated models of household time use with data from the 1987 Social Change and Economic Life (SCEL) time-budget survey, and applied the estimates to impute time use to respondents to the 1986 Family Expenditure Survey (FES).

The paper modified the assumptions of the traditional full-income concept and subdivided time spent at home into two activities: household production and 'pure' leisure. Due to difficulties in distinguishing genuine leisure activities from other leisure activities, which led to valuation problems, Jenkins and O'Leary (1994) decided not to incorporate pure leisure activities within the calculations of income. The results showed that extended income is more equally distributed than money income for non-elderly one-family households. The result holds, regardless of which method is used to value household production. Broadening the income definition increases the income shares of the poorest tenths and decreases those of the richest tenth.

Bonke (1992) explored what implications the inclusion of household production has on the distribution of economic resources in Denmark. The data were drawn from the Time Use Survey for the year 1987, which is a random sample of about 5000 individual adult Danish people. The economic information was taken from the register of income taxation for the respondents in the Time Use Survey. Bonke (1992) found that housework increases the access to goods and services as much as working in the labor market. The income inequality diminishes when household production is measured by the Gini coefficient. This suggests that low income households compensate their low earnings by relatively large household production.

### 3 Research strategy

#### 3.1 Defining consumption possibilities

Consumption possibilities are assumed to supply well-being directly or indirectly to individuals or households. We must accept that monetary income, *here* money income, and the output of household production are comparable and substitutable in terms of consumption possibilities. It does not matter for an individual or a household whether the consumption possibilities are generated by money income or by household production. Consumption possibilities refer here to money income (which is either consumed directly or used as inputs in the household production process) plus the value of productive household activities. Other sources of income, wealth, borrowing or savings are not taken into consideration (due to data restrictions). Consumption possibilities are

$$(1) \quad C_i = M_i + RH_i,$$

where  $C$  is the consumption possibilities of an individual  $i$ ,  $M$  is the income before taxes and nontaxable income transfers, and includes wages, taxable income transfers and income from capital,  $H$  is the hours of productive housework and  $R$  is the wage of a municipal housekeeper. For the household the same function becomes

$$(2) \quad C_h = \sum_{i=1}^n M_i + R \sum_{i=1}^n H_i,$$

where  $C$  is the consumption possibilities of a household  $h$ . Here  $n$  is the total number of household members. The particular income was chosen because it was included in all of the datasets used and therefore comparison between years was made possible. Due to data restrictions other figures for income, like disposable income, were not available. The chosen housekeeper wage level was considered to be the most reliable estimate for the purpose of the study<sup>3</sup>.

### **3.2 The data**

Ideal data to study consumption possibilities would each year include the time use of all household members, income, transfers, taxes, wealth, savings and borrowing at the individual and household level plus household characteristics. This would report the total available income of a household and total productive housework carried out. Furthermore, an ideal measure of the value of household production would include both primary activities and productive secondary activities.

The data required to study consumption possibilities at the individual level need to include at least the amount of time spent on primary activities and money income information plus background characteristics. The Time Use Data used by the present paper, collected by Statistics Finland in 1979, 1987-1988 and 1999-2000 covering the time period of interest, satisfy these requirements. Secondary activities are included only as a sensitivity analysis in Appendix 2 for one dataset, 1987-1988<sup>4</sup>. The data used provide us with a rich picture of the changes across time in the distribution of economic well-being.

The Time Use Data, gathered through detailed time-diary surveys and augmented with interviews, are combined with money income, which has been linked at the person level to the Time Use Data. The datasets are representative sample surveys and are considered to be of high quality, while the income information is similar to that available in the typical income distribution survey in Finland that relies heavily on register information. The survey includes persons 10-64 years of age not living in institutions. The respondents were advised to record in ten minute intervals their primary and secondary activities.

The data in 1979 cover a total of 12,057 days. In 1979 only the months from September to November were included. The time use study in 1987-1988 included the whole year, not just the fall as in 1979. The survey is based on individual samples, as in 1979, and the respondents kept a diary for two successive days. The third Time Use Data used was carried out in 1999-2000. The data were collected at both the household and individual levels by using interviews and diaries, similarly with the two other time use studies. The respondents kept a diary for two days, one being a weekday and the other either a Saturday or a Sunday. The respondents were all 10 years or older household members (Niemi and Pääkkönen, 1989; Väisänen, 2002).

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<sup>3</sup> The housekeeper wage is an average figure for each year studied and it is calculated from regular monthly wage which includes regular compensations.

<sup>4</sup> Secondary activities could not be included for the whole dataset for reasons of availability.

The sample includes individuals aged 25-64, who are either employed, unemployed or taking care of their own household. Students, pensioners and the unemployable are excluded from the main analysis, as their time use patterns are likely to be quite different from others, meaning those included in the sample. The focus of the paper is on individuals for whom both labor market work and household production are important (see Jenkins and O'Leary, 1995). Therefore those population categories not meeting these requirements are not included. Those who kept a time use diary only for one day are excluded due to the anticipated bias these results would create. From the 1987-1988 data, one outlier is dropped due to the excessively high income of this observation. Household level comparison is possible for money income only, because the data of 1987-1988 do not include time use information on all the members of the same household. Unlike the individual level analysis, household level analysis considers all age groups.

When comparing the full time period the data from September to November are included each year since the data in 1979 were gathered only during these months (September-November). This analysis is labeled fall 1979, 1987, 1999. When the data collected during the whole year are included, the two latest data sets, years 1987-1988 and 1999-2000, are used. Most of the results are at the individual level and when possible also at the household level.

### **3.3 Measuring household production**

In the present paper, values of time use inputs are chosen for the unit of measurement of household production. In order for it to be comparable with national accounts, household production should be valued on the basis of outputs. This would allow for the assessment of productivity. However, the output-based method of valuation requires data which are not readily available (see Taimio, 1991; Eurostat, 1999). The Eurostat (1999) report recommends that household production is valued through the inputs (meaning the costs of inputs) used in the production.

The productive activities are the so-called main functions of a household: providing housing, providing nutrition, providing clothing, providing care and education, and volunteering<sup>5</sup>. Ancillary activities like animal care, gardening and shopping are included as well, similarly with the categories 'helping other households' and 'travel related to household production'.

For the valuation of these productive activities (the value of labor), we need to choose an appropriate wage level. We can either assume that the time spent on unpaid work reduces the time spent on paid work. This suggests that time spent on unpaid work is a cost and we should apply so called opportunity cost method. The opportunity cost method values an hour of housework on the basis of the opportunity cost of that time – normally the market wage of an individual. The main problem with the opportunity cost method is that it yields different values for similar products depending on who performed the task. Furthermore, people are often

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<sup>5</sup> In this study children enter as a kind of consumer goods for their parents. The well-being is not looked upon from the perspective of children. This approach is chosen so that the equivalence scale can be kept the same throughout the study.

not free to choose the number of their working hours. The method has not been recommended to be used for the valuation of household production. It may be relevant only for studying utility maximization at the individual level (Eurostat, 2003).

On the other hand, we can assume that households save money by doing housework themselves instead of buying market goods and services or hiring someone else to perform the required tasks. This method of valuation is called the market replacement cost method (Eurostat, 2003; Becker, 1965). The replacement cost method provides several options. First, we can use the wages of specialized workers in market enterprises. Second, we can apply the wages of specialized workers at home and third, we can use the wages of generalist workers. Using the wages of a specialized worker in market enterprises is complicated, as an example because several wages have to be examined in order to find an appropriate combination of wages for different tasks. Furthermore, there are some activities for which no specialized market substitute can be found (Eurostat, 2003; Merz and Kirsten, 1999).

The method with a polyvalent substitute's or generalist's wage seems to be the more appropriate basis for valuing household labor. The advantages are that the working conditions are similar to those of household work and the content of the work is similar to housework. However, some of the potential problems are that even a generalist worker does not perform all the tasks occurring in households (as an example money management), wages for housekeepers are not always available and wage differential between women and men in a labor market are reflected in the housekeeper wages which is an occupation dominated by women (Eurostat, 2003; Merz and Kirsten, 1999; Taimio, 1991).

I choose to use the housekeeper cost method (generalized wage method) where time spent in housework is multiplied by the hourly wage of a person in an equivalent job. Here I use the hourly wage of a municipal housekeeper. The housekeeper cost method is chosen because it is widely used and the valuation method is straightforward. The method gives the same value for household production whether carried out by an individual earning high wage or an individual earning low wage. The opportunity cost method is used only as a sensitivity analysis in Appendix 1. I use Heckman's selection correction method which is widely applied when calculating the value of household production by the opportunity cost method. One important implication is that the consumption possibilities have to be calculated on both partners' market contribution and housework contribution. This is necessary in order to make the distributional analysis of consumption possibilities at an individual level.

Still another question is the choice of a wage concept used in determining the wage level of a housekeeper. In fact, the appropriate wage concept is much debated in the international literature. The main question is, should we use gross wages or net wages? The fact is that the value of labor is highly dependent on the valuation method. However, this is not a disadvantage as such (Varjonen et al., 1999).

It has been argued that different wage concepts might be used depending on the end-use of the results. Gross wages show what the total costs to households would be of employing others to produce goods and services. On the other hand, net wages reflect the real conditions of

housework. Net wage might be an appropriate choice if the purpose is to describe changes in the household's disposable income when it produces a service instead of buying that service (Varjonen and Aalto, 2006). Furthermore, according to German Federal Statistical Office, basic conditions of household production do not comply with those of usual paid work. There are no taxes to be paid in neither household nor national insurance, nor does a claim exist for paid days of illness or vacation leave (Merz and Kirsten, 1999). Based on these claims it is taken here that net wages are more appropriate for the purposes of this study than gross wages. Therefore, the average net wage of a municipal housekeeper is chosen to represent the value of housework time.

### **3.4 Inequality and poverty measures**

Levels and changes of inequality are analyzed by applying half the squared coefficient of variation,  $GE(2)$ , and the Gini coefficient. The  $GE(2)$  belongs to the class of Generalized Entropy  $GE(\alpha)$  indices which are very useful due to their additive decomposability. Decomposition by subgroups provides a picture of inequality profiles. Decomposition of Gini coefficient by income source is also presented for the main results. In order to examine levels of and changes in low incomes, the head count ratio (H) and poverty gap ratio (PGR) are used. An individual (or household) is regarded as having low incomes if her/his income or consumption possibilities remain below the predetermined low income line. This means that low income measures reflect poverty which is related to access to economic resources determined via money income and consumption possibilities. Comparative results are calculated by excluding parts of the data and by taking all population groups including students, pensioners and unemployable.

All the figures used in calculations of inequality and low income measures are annual figures. The monetary measures are altered to correspond to euro values in the year 2000 by using the Cost of Living Index. This conversion is done in order to make the figures comparable between various years. Finally, a simple household equivalence scale is applied in household level calculations:

$$(3) \quad \frac{W}{S^{0.5}}$$

where  $W$  is the total income of a household and  $S$  is the number of household members.

## **4 Results**

### **4.1 Aggregate trends**

Table 3 reports the decile group means of money income and consumption possibilities of individual data in 1987-1988 and 1999-2000. Individuals between 25 and 64 years of age are included and students, pensioners and unemployable are excluded. The decile group means of

consumption possibilities are considerably higher than the corresponding means of money income. The percentage change from money income to consumption possibilities is greatest in low income decile groups and respectively smallest in high income decile groups. The same trend is seen when consumption possibilities are divided by money income (times 100). The ratio between the highest and the lowest income decile groups drops significantly when moving from money income to consumption possibilities. The corresponding results for fall 1979, 1987 and 1999 are presented in Appendix 3. The C/M figures are smaller (in almost all deciles) in 1999-2000 than in 1987-1988. This is not an indication of diminished importance of household production over time. Instead it shows that money income has increased faster than household production.

**Table 3**  
**Decile group means in euros of money income (M) and consumption possibilities (C) and consumption possibilities divided by money income (C/M x 100) in 1987-1988 and 1999-2000, individual data**

| Decile groups | 1987-1988 |         |           | 1999-2000 |         |           |
|---------------|-----------|---------|-----------|-----------|---------|-----------|
|               | M         | C       | C/M x 100 | M         | C       | C/M x 100 |
| 1             | 3541      | 13003   | 367       | 5157      | 14749   | 286       |
| 2             | 9790      | 20229   | 207       | 10260     | 22782   | 222       |
| 3             | 13543     | 23528   | 174       | 14709     | 26739   | 182       |
| 4             | 15682     | 26203   | 167       | 18068     | 29803   | 165       |
| 5             | 17681     | 28793   | 163       | 20397     | 32650   | 160       |
| 6             | 19610     | 31503   | 161       | 22728     | 35367   | 156       |
| 7             | 21931     | 34623   | 158       | 25458     | 38359   | 151       |
| 8             | 25176     | 38356   | 152       | 29080     | 42208   | 145       |
| 9             | 30088     | 44030   | 146       | 35212     | 48686   | 138       |
| 10            | 46041     | 59495   | 129       | 59961     | 72760   | 121       |
| Mean          | 20306.7   | 31976.1 |           | 24093.2   | 36400   |           |
| Std. Dev.     | 12003     | 13192.8 |           | 17452.4   | 17906.2 |           |

Source: Own calculations based on the Finnish Time Use Data.

The figures suggest that, as a share of consumption possibilities, household production is more important for low income earners than for high income earners. For high income earners, money income dominates the composition of consumption possibilities. For the lowest decile group, household production is approximately 70% of the total value of consumption possibilities when the same ratio for the highest decile group is around 20%. Household production increases the consumption possibilities of all income groups but its effect is by far the greatest in low income decile groups. Household production thus equalizes consumption possibilities.

The Finnish Time Use Data indicate that, on average, the amount of time spent on household production drops when income increases and/or when hours of market work rise. High income households may also do less housework compared to low income households since it

can be assumed that high income earners own a greater number of household durable (domestic appliances) and save time required in housework or hire outside help to carry out various activities. Many of the household productive activities are time-consuming and if these can be bought from the market the time saved is spent on, as an example, leisure activities. High income earners can also be assumed to spend money on ready prepared food or eat out in restaurants and thus spend less time on food preparation than low income earners.

Table 4 shows "transition matrices" of individual data. Money income and consumption possibilities are divided into five decile groups (quintiles). Each of the figures,  $p_{ij}, i = 1, \dots, n, j = 1, \dots, k$  in the table represents the possibility that an individual in group  $i$  (the money income group) is also in group  $j$  (consumption possibilities group). That is, we can see whether individuals move or not from one quintile group to another when money income is altered to consumption possibilities. The sum of each row equals 1.00 (there are small differences due to rounding) because each individual either has to stay in the original location or move to another one. It seems that an individual either stays in the same quintile group as before or moves one quintile group up or down compared to the original one. Those either in the first money income quintile group or in the fifth money income quintile group tend to remain in their original quintile groups. Individuals in the middle quintile groups have the greatest variation between different locations. It must be noted that individuals in the highest money income quintile group never move to the lowest consumption possibility quintile group and very rarely even to the second one. However, individuals in the lowest money income quintile group do make their way rather often to higher quintile groups in consumption possibilities and on some occasions even to the highest one.

## **4.2 Changes in inequality**

The overall trends in inequality are shown by Lorenz curves in Figure 1. The Lorenz curves for individual data each year, first for the whole year 1987-1988, 1999-2000 and then for fall 1979, 1988, 1999, are drawn for money income and consumption possibilities. These Lorenz curves do not cross. The results verify that economic well-being is more equally distributed when calculated by using consumption possibilities than when calculated by using money income. This trend is as would be expected based on decile group means (Table 3). The Lorenz curve for the year 1987 or 1987-1988 is closer to the diagonal than in other years which means that both money income and consumption possibilities are more evenly distributed in 1987 and in 1987-1988 than in 1979, 1999 or in 1999-2000.

In line with the results drawn by looking at the Lorenz curves, the evidence in Table 5 shows that consumption possibilities are more equally distributed than money income. The estimated inequality measures are smaller for consumption possibilities than for money income in all the years whether one compares the whole year in 1987-1988, 1999-2000 or fall 1979, 1987, 1999. Thus, the extended money income changes our impression of the income inequality. When the changes between years are compared, the inequality measures first drop, from 1979

to 1987, and then rise from 1987 to 1999 or from 1987-1988 to 1999-2000, regardless of whether one looks at individual figures or household figures.

**Table 4**  
**Transition matrices, whole year 1987-1988, 1999-2000 and fall 1979,**  
**1987, 1999, individual data**

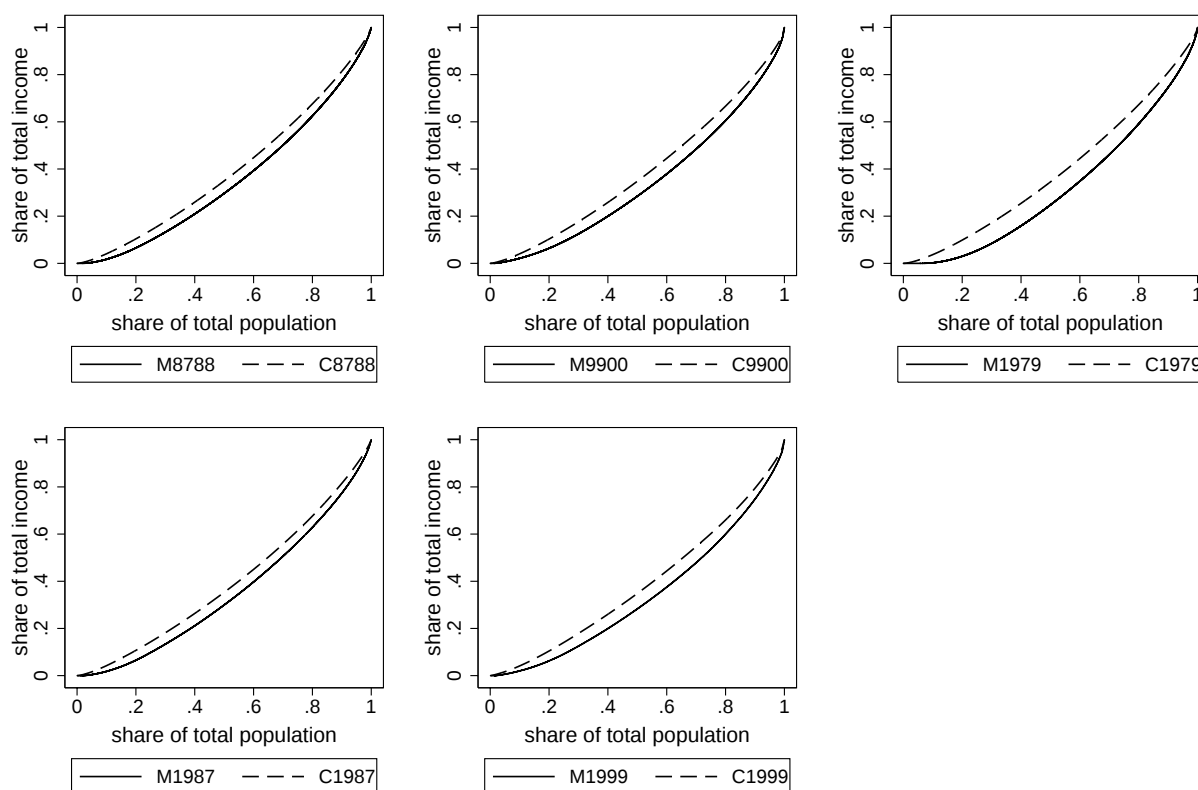
| Year      | Money income | Consumption possibilities |      |      |      |      |
|-----------|--------------|---------------------------|------|------|------|------|
|           |              | 1                         | 2    | 3    | 4    | 5    |
| 1987-1988 | 1            | 0.54                      | 0.19 | 0.13 | 0.09 | 0.05 |
|           | 2            | 0.31                      | 0.28 | 0.18 | 0.15 | 0.08 |
|           | 3            | 0.13                      | 0.32 | 0.26 | 0.20 | 0.08 |
|           | 4            | 0.02                      | 0.21 | 0.36 | 0.27 | 0.14 |
|           | 5            | 0.00                      | 0.00 | 0.08 | 0.28 | 0.65 |
| 1999-2000 | 1            | 0.54                      | 0.20 | 0.13 | 0.09 | 0.04 |
|           | 2            | 0.35                      | 0.27 | 0.21 | 0.12 | 0.05 |
|           | 3            | 0.11                      | 0.34 | 0.29 | 0.18 | 0.08 |
|           | 4            | 0.01                      | 0.19 | 0.31 | 0.33 | 0.16 |
|           | 5            | 0.00                      | 0.00 | 0.06 | 0.27 | 0.67 |
| 1979      | 1            | 0.47                      | 0.18 | 0.16 | 0.13 | 0.06 |
|           | 2            | 0.36                      | 0.25 | 0.16 | 0.13 | 0.10 |
|           | 3            | 0.15                      | 0.30 | 0.26 | 0.20 | 0.09 |
|           | 4            | 0.02                      | 0.26 | 0.29 | 0.25 | 0.17 |
|           | 5            | 0.00                      | 0.01 | 0.13 | 0.29 | 0.58 |
| 1987      | 1            | 0.53                      | 0.17 | 0.15 | 0.12 | 0.04 |
|           | 2            | 0.33                      | 0.26 | 0.16 | 0.15 | 0.10 |
|           | 3            | 0.13                      | 0.32 | 0.29 | 0.17 | 0.09 |
|           | 4            | 0.01                      | 0.25 | 0.32 | 0.30 | 0.12 |
|           | 5            | 0.00                      | 0.00 | 0.08 | 0.27 | 0.65 |
| 1999      | 1            | 0.58                      | 0.18 | 0.13 | 0.08 | 0.02 |
|           | 2            | 0.30                      | 0.33 | 0.23 | 0.11 | 0.04 |
|           | 3            | 0.12                      | 0.33 | 0.28 | 0.19 | 0.08 |
|           | 4            | 0.00                      | 0.16 | 0.33 | 0.42 | 0.10 |
|           | 5            | 0.00                      | 0.00 | 0.04 | 0.21 | 0.76 |

Source: Own calculations based on the Finnish Time Use Data.

However, the order of years changes when moving from money income to consumption possibilities. The year 1987 has the smallest measures for GE (2) and the Gini coefficient in all the cases but the years 1979 and 1999 switch places so that the year 1979 has the highest figures of income inequality measures in the case of money income and the year 1999 has the highest figures in the case of consumption possibilities. This means that in 1979 (fall data only) household production equalizes consumption possibilities in a greater degree than in 1999. As a general trend, the income inequality measures for consumption possibilities are closer to each other between years than are the corresponding figures for money income. This proves that consumption possibilities equalize economic well-being between years as well.

In order to examine whether changes in the tails and/or extreme observations account for differences across years, I analyzed three reduced samples. I first excluded the lower 5%, then the upper 5% and finally both upper and lower 5% of the data (Table 6). In all the cases, either individual data or household data and in every year, the estimated inequality measures drop systematically compared to those calculated with the original sample (Table 5).

**Figure 1**  
**Lorenz curves, whole year 1987-1988, 1999-2000 and fall 1979, 1987, 1999 for money income (M) and consumption possibilities (C), individual data**



Source: Own illustrations based on the Finnish Time Use Data.

**Table 5**  
**Individual and household inequality results, whole year 1987-1988, 1999-2000 and fall 1979, 1988, 1999, money income (M) and consumption possibilities (C)**

|                   | Individual |          |          |          | Household |          |
|-------------------|------------|----------|----------|----------|-----------|----------|
|                   | 100xGE(2)  |          | 100xGini |          | 100xGE(2) | 100xGini |
| <i>Whole year</i> | <i>M</i>   | <i>C</i> | <i>M</i> | <i>C</i> | <i>M</i>  | <i>M</i> |
| 1987-1988         | 17.47      | 8.51     | 30.33    | 21.90    | 11.48     | 25.30    |
| 1999-2000         | 26.23      | 12.10    | 32.50    | 22.77    | 19.92     | 30.29    |
| <i>Fall</i>       | <i>M</i>   | <i>C</i> | <i>M</i> | <i>C</i> |           |          |
| 1979              | 29.72      | 10.38    | 37.34    | 22.73    |           |          |
| 1987              | 17.29      | 8.19     | 29.94    | 21.47    |           |          |
| 1999              | 26.79      | 12.89    | 32.95    | 23.00    |           |          |

Source: Own calculations based on the Finnish Time Use Data.

The least changes are caused when the lower end is cut (Table 6). This is probably explained by the large number of zero or very small money income values in the data. Compared to figures in Table 5 the cut in the lower end keeps the direction of changes in the inequality measures the same between years and between money income and consumption possibilities within years. This means that cutting the lower end of the data does not alter the trend of inequality.

**Table 6**  
**Individual and household aggregate inequality results, whole year 1987-1988, 1999-2000 and fall 1979, 1988, 1999, when A 5% of the data is cut from both ends; B 5% of the data is cut from the lower end; and C 5% of the data is cut from the upper end, money income (M) and consumption possibilities (C)**

|                                    |           | Individual |          |          |          | Household |          |
|------------------------------------|-----------|------------|----------|----------|----------|-----------|----------|
|                                    |           | 100xGE(2)  |          | 100xGini |          | 100xGE(2) | 100xGini |
| <i>A 5% cut from both ends</i>     |           | <i>M</i>   | <i>C</i> | <i>M</i> | <i>C</i> | <i>M</i>  | <i>M</i> |
| Whole year                         | 1987-1988 | 8.30       | 5.78     | 22.90    | 18.87    | 5.93      | 19.58    |
|                                    | 1999-2000 | 9.03       | 5.14     | 23.92    | 17.87    | 8.27      | 22.86    |
| Fall                               | 1979      | 13.32      | 6.23     | 29.32    | 19.72    |           |          |
|                                    | 1987      | 7.88       | 5.56     | 22.35    | 18.51    |           |          |
|                                    | 1999      | 9.56       | 5.53     | 24.41    | 18.30    |           |          |
|                                    |           |            |          |          |          |           |          |
| <i>B 5% cut from the lower end</i> |           | <i>M</i>   | <i>C</i> | <i>M</i> | <i>C</i> | <i>M</i>  | <i>M</i> |
| Whole year                         | 1987-1988 | 14.55      | 7.93     | 27.15    | 21.08    | 9.69      | 22.93    |
|                                    | 1999-2000 | 23.35      | 11.44    | 29.85    | 21.84    | 17.68     | 27.96    |
| Fall                               | 1979      | 25.82      | 10.13    | 34.12    | 22.34    |           |          |
|                                    | 1987      | 14.45      | 7.73     | 26.82    | 20.82    |           |          |
|                                    | 1999      | 23.81      | 12.60    | 30.25    | 22.59    |           |          |
|                                    |           |            |          |          |          |           |          |
| <i>C 5% cut from the upper end</i> |           | <i>M</i>   | <i>C</i> | <i>M</i> | <i>C</i> | <i>M</i>  | <i>M</i> |
| Whole year                         | 1987-1988 | 11.04      | 6.36     | 26.44    | 19.77    | 7.63      | 22.20    |
|                                    | 1999-2000 | 11.39      | 5.78     | 26.95    | 18.95    | 10.20     | 25.50    |
| Fall                               | 1979      | 16.78      | 6.53     | 32.99    | 20.18    |           |          |
|                                    | 1987      | 10.53      | 6.03     | 25.84    | 19.25    |           |          |
|                                    | 1999      | 12.01      | 5.84     | 27.49    | 18.84    |           |          |
|                                    |           |            |          |          |          |           |          |

Source: Own calculations based on the Finnish Time Use Data.

The most substantial changes are caused when both of the tails are cut or only the upper tail of the data is cut. In contrast to results in Table 5, the trend of income inequality measures calculated using consumption possibilities now changes. Cutting both ends or the upper tail of the data leads to decreasing GE (2) and Gini coefficient figures between years, for both the whole year data and fall data. In the original data we had a decreasing trend for consumption possibilities only when moving from fall 1979 to fall 1987. From the results drawn we can see that the inequality results obtained from the original sample are sensitive to deletion of observations from either end or both ends.

As a comparison, if I also include the initially excluded population groups in the sample, i.e. rather than including only the employed or unemployed I also include students, pensioners and the unemployable, the inequality measures increase, apart from one case in 1999 (Table 7). It seems that inequality measures for consumption possibilities rise less than those for money income, evidencing the importance of housework as a consumption possibilities equalizer and as an equalizer of economic well-being. The trend between years stays the same; inequality measures first drop from 1979 to 1987 and then rise from 1987 to 1999 and from 1987-1988 to 1999-2000.

### 4.3 Changes in low incomes

Low income indices are relative measures where the poverty line (here *the low income line*) is chosen to be 50% of the median income or median consumption possibilities. The estimates of the head count ratio (H) and poverty gap ratio (PGR)<sup>6</sup> are given in Table 8. The overall trend (H) indicates that the proportion of individuals below the low income line drops considerably when moving from money income to consumption possibilities. When comparing the development over time the proportion of low income individuals increases from 1987-1988 to 1999-2000, measured each by money income or by consumption possibilities.

**Table 7**  
**Individual and household, aggregate inequality results, whole year 1987-1988, 1999-2000 and fall 1979, 1988, 1999, when students, pensioners and the unemployable are included in the data, money income (M) and consumption possibilities (C)**

|                   | Individual |          |          |          | Household |          |
|-------------------|------------|----------|----------|----------|-----------|----------|
|                   | 100xGE(2)  |          | 100xGini |          | 100xGE(2) | 100xGini |
| <i>Whole year</i> | <i>M</i>   | <i>C</i> | <i>M</i> | <i>C</i> | <i>M</i>  | <i>M</i> |
| 1987-1988         | 19.84      | 9.08     | 32.15    | 22.49    | 14.55     | 28.24    |
| 1999-2000         | 27.95      | 12.30    | 33.75    | 23.19    | 24.24     | 33.31    |
| <i>Fall</i>       | <i>M</i>   | <i>C</i> | <i>M</i> | <i>C</i> |           |          |
| 1979              | 33.95      | 11.06    | 40.48    | 23.79    |           |          |
| 1987              | 19.05      | 8.49     | 31.61    | 21.92    |           |          |
| 1999              | 28.16      | 12.77    | 34.07    | 23.18    |           |          |

Source: Own calculations based on the Finnish Time Use Data.

**Table 8**  
**Low income indices head count ratio, H, and poverty gap ratio, PGR, whole year 1987-1988, 1999-2000 and fall 1979, 1988, 1999, money income (M) and consumption possibilities (C)**

|                   | Individual |          |          |          | Household |          |
|-------------------|------------|----------|----------|----------|-----------|----------|
|                   | H          |          | PGR      |          | H         | PGR      |
| <i>Whole year</i> | <i>M</i>   | <i>C</i> | <i>M</i> | <i>C</i> | <i>M</i>  | <i>M</i> |
| 1987-1988         | 14.03      | 5.95     | 6.65     | 1.76     | 9.90      | 2.96     |
| 1999-2000         | 16.26      | 6.42     | 6.03     | 1.67     | 12.30     | 3.83     |
| <i>Fall</i>       | <i>M</i>   | <i>C</i> | <i>M</i> | <i>C</i> |           |          |
| 1979              | 22.22      | 7.34     | 13.79    | 2.33     |           |          |
| 1987              | 14.64      | 5.15     | 6.71     | 1.53     |           |          |
| 1999              | 15.37      | 6.35     | 6.16     | 1.45     |           |          |

Source: Own calculations based on the Finnish Time Use Data.

The trend from 1979 to 1987 shows that the proportion of low income individuals drops during this period. The extent or severity of low incomes (PGR) also decreases when comparing money income and consumption possibilities. The trend between years implies that, according

<sup>6</sup> The poverty gap ratio or FGT(1) measure expresses the average distances of the poor below the low income line.

to this data, the severity of individual low incomes drops in all cases. The lowest figures for low income indices are in the year 1987 and the highest in 1979. When every population group is included in the sample (also students, pensioners and the unemployable), the low income measures increase compared to results from the original sample (Table 9).

**Table 9**  
**Low income indices, whole year 1987-1988, 1999-2000 and fall 1979, 1988, 1999, when students, pensioners and the unemployable are included in the data**

|                   | Individual |          |          |          | Household |          |
|-------------------|------------|----------|----------|----------|-----------|----------|
|                   | H          |          | PGR      |          | H         | PGR      |
| <i>Whole year</i> | <i>M</i>   | <i>C</i> | <i>M</i> | <i>C</i> | <i>M</i>  | <i>M</i> |
| 1987-1988         | 16.96      | 6.78     | 7.24     | 2.09     | 13.61     | 4.40     |
| 1999-2000         | 18.12      | 7.21     | 6.26     | 1.96     | 15.10     | 4.89     |
| <i>Fall</i>       | <i>M</i>   | <i>C</i> | <i>M</i> | <i>C</i> |           |          |
| 1979              | 26.64      | 8.99     | 16.82    | 3.03     |           |          |
| 1987              | 17.16      | 6.26     | 7.13     | 1.89     |           |          |
| 1999              | 17.95      | 6.81     | 6.59     | 1.69     |           |          |

Note: The low income line is set to 50% of the median.

Source: Own calculations based on the Finnish Time Use Data.

The low income figures in these Tables differ from those presented in the Table 1. The main reason for the difference is the different data and therefore different income concept used in these Tables. However, it is important that the trend over the years is the same in all of the Tables.

#### 4.4 The structure of inequality

The Gini coefficient is decomposed by income source in order to better understand the development of inequality over time. The main source of inequality in this calculation is the consumption possibilities and the two sources of income are the money income and the value of household production. The method that is applied allows the measurement of the impact that a marginal change in a particular income source has on inequality. In Table 10 the decomposition of the Gini coefficient is presented so that the 'share' refers to the contribution that each income source has on inequality and the '% change' refers to the impact that a 1% change in the income source will have on total inequality. The Table is comparable to those Gini coefficient figures presented in Table 5.

The results show that the money income always forms a more significant part of total inequality (calculated by using consumption possibilities) than does the value of household production. Interestingly, in the fall data of 1987 it seems that the money income decreases inequality and household production increases inequality. In all the other cases this effect is the opposite, even when we look at the whole year data in 1987-1988. The most important finding is that when we compare changes over time we notice that in 1999 and in 1999-2000 the money income has a much greater role and household production the minor role in total inequality

than in any other case or in any other year included. Decomposition of the GE(2) measure by subgroups for individual and household level data are shown in Table 11.

**Table 10**  
**Decomposition of the Gini coefficient, whole year**  
**1987-1988, 1999-2000 and fall 1979, 1988, 1999**

| <b>Individual</b> |              |                 |                      |                 |
|-------------------|--------------|-----------------|----------------------|-----------------|
|                   | Money income |                 | Household production |                 |
| <i>Whole year</i> | <i>share</i> | <i>% change</i> | <i>share</i>         | <i>% change</i> |
| 1987-1988         | 0.64         | 0.01            | 0.36                 | -0.01           |
| 1999-2000         | 0.74         | 0.08            | 0.26                 | -0.08           |
| <i>Fall</i>       | <i>share</i> | <i>% change</i> | <i>share</i>         | <i>% change</i> |
| 1979              | 0.64         | 0.05            | 0.36                 | -0.05           |
| 1987              | 0.63         | -0.01           | 0.37                 | 0.01            |
| 1999              | 0.81         | 0.12            | 0.19                 | -0.12           |

Source: Own calculations based on the Finnish Time Use Data.

**Table 11**  
**Decomposition of individual and household income inequality and inequality of consumption possibilities by population sub-groups, whole year 1987-1988, 1999-2000 and fall 1979, 1988, 1999, % is percentage of the corresponding aggregate inequality, money income (M) and consumption possibilities (C)**

| <b>100xGE(2)</b> |                   |                         |            |          |            |                          |            |          |            |
|------------------|-------------------|-------------------------|------------|----------|------------|--------------------------|------------|----------|------------|
| Individual       |                   | Within-group inequality |            |          |            | Between-group inequality |            |          |            |
| <i>Subgroup</i>  | <i>Whole year</i> | <i>M</i>                | <i>(%)</i> | <i>C</i> | <i>(%)</i> | <i>M</i>                 | <i>(%)</i> | <i>C</i> | <i>(%)</i> |
| Household type   | 1987-1988         | 17.26                   | (98.80)    | 7.96     | (93.54)    | 0.21                     | (1.20)     | 0.55     | (6.46)     |
|                  | 1999-2000         | 25.99                   | (99.09)    | 11.81    | (97.60)    | 0.24                     | (0.91)     | 0.29     | (2.40)     |
| Age group        | 1987-1988         | 17.14                   | (98.11)    | 8.40     | (98.71)    | 0.33                     | (1.89)     | 0.11     | (1.29)     |
|                  | 1999-2000         | 25.69                   | (97.98)    | 11.95    | (98.76)    | 0.53                     | (2.02)     | 0.15     | (1.24)     |
| Sex              | 1987-1988         | 15.44                   | (88.38)    | 8.49     | (99.76)    | 2.03                     | (11.62)    | 0.02     | (0.24)     |
|                  | 1999-2000         | 24.64                   | (93.94)    | 12.05    | (99.59)    | 1.59                     | (6.06)     | 0.05     | (0.41)     |
|                  | <i>Fall</i>       | <i>M</i>                | <i>(%)</i> | <i>C</i> | <i>(%)</i> | <i>M</i>                 | <i>(%)</i> | <i>C</i> | <i>(%)</i> |
| Household type   | 1979              | 29.45                   | (99.09)    | 9.88     | (95.18)    | 0.27                     | (0.91)     | 0.50     | (4.82)     |
|                  | 1987              | 17.12                   | (99.02)    | 7.70     | (93.90)    | 0.17                     | (0.98)     | 0.50     | (6.10)     |
|                  | 1999              | 26.31                   | (98.21)    | 12.42    | (96.35)    | 0.48                     | (1.79)     | 0.47     | (3.65)     |
| Age group        | 1979              | 29.28                   | (98.49)    | 10.28    | (99.13)    | 0.45                     | (1.51)     | 0.09     | (0.87)     |
|                  | 1987              | 17.01                   | (98.38)    | 8.12     | (99.15)    | 0.28                     | (1.62)     | 0.07     | (0.85)     |
|                  | 1999              | 26.27                   | (98.06)    | 12.74    | (98.84)    | 0.52                     | (1.94)     | 0.15     | (1.16)     |
| Sex              | 1979              | 25.85                   | (86.98)    | 10.37    | (99.90)    | 3.87                     | (13.02)    | 0.01     | (0.10)     |
|                  | 1987              | 15.25                   | (88.20)    | 8.18     | (99.76)    | 2.04                     | (11.80)    | 0.02     | (0.24)     |
|                  | 1999              | 25.30                   | (94.47)    | 12.82    | (99.46)    | 1.48                     | (5.53)     | 0.07     | (0.54)     |
| Household        |                   | Within-group inequality |            |          |            | Between-group inequality |            |          |            |
| <i>Subgroup</i>  | <i>Whole year</i> | <i>M</i>                | <i>(%)</i> |          |            | <i>M</i>                 | <i>(%)</i> |          |            |
| Household type   | 1987-1988         | 10.62                   | (92.51)    |          |            | 0.86                     | (7.49)     |          |            |
|                  | 1999-2000         | 19.00                   | (95.43)    |          |            | 0.91                     | (4.57)     |          |            |

Note: HOUSEHOLD TYPES, 1. living with parents, unmarried, no children under 18 years of age; 2. unmarried, divorced or widowed, no children under 18 years of age; 3. married or cohabiting, no children under 18 years of age; 4. married or cohabiting, children under 18 years of age; 5. single parent, children under 18 years of age.

AGE-GROUP, 1. 25-34; 2. 35-44; 3. 45-54; 4. 55-64.

Source: Own calculations based on the Finnish Time Use Data.

Decomposition by household type, age group and sex are documented at the individual level and by household type at the household level. The measure GE (2) is divided into within-group inequality and between-group inequality. These categories are further divided into two in the case of individual data: money income and consumption possibilities. In general, within-group inequality dominates the between-group inequality both at the individual level and at the household level. Money income has the highest values in the within-group component in the household type decomposition and the between-group component in the case of sex decomposition. Consumption possibilities have the highest values in the within-group component in the sex decomposition and the between-group component in household type decomposition. The trend over years of within group inequality follows the general development; inequality first drops and then rises again towards 1999-2000. Between-group inequality does not have a consistently similar trend to within-group inequality since there are some deviations of general development in the data in 1999 and 1999-2000.

On the grounds of the decomposition results by household type, it is clear that within-group inequality dominates the between-group inequality for each year. The between group component is 8% or less of the total inequality for both money income and consumption possibilities. This means that there are striking differences and variation in income and in consumption possibilities within household types. There is no clear trend as to which of the household types has the greatest within-group variation, since the domination of the household type varies between years.

The decomposition by age-group shows that the within-group component dominates the between-group one. The greatest within-group differences in both cases, in money income and in consumption possibilities and in every year, are found in the highest age-group, 55-64 years of age. In the decomposition by sexes the between-group inequality of money income has higher figures than any of the other decompositions but this effect vanishes when looking at the decomposition of consumption possibilities where the share of between-group inequality has dropped. This suggests that, since men earn higher wages than women, women compensate lower income by carrying out more household production activities than men do. This is evidenced also by time use studies. One interesting result in sex decomposition is that within-group inequality of money income has an increasing trend between years and between-group inequality a correspondingly decreasing trend. This reflects many things, among which are the increased labor force participation of women and a slight drop in gender differences in wages.

## **5 Conclusions**

The paper analyzed the changes in the distribution of economic well-being and changes in income inequality in Finland between 1979 and 2000, when the value of household production (as a time input) was added to money income. This new measure, consumption possibilities, was then used to calculate income inequality indicators and low income indices. The

level, trend and structure of money income distribution and the distribution of consumption possibilities were all studied.

The results indicate that consumption possibilities are more equally distributed than money income is. Similarly, the number of individuals below the low income line drops when moving from money income to consumption possibilities. Thus, widening the traditional money income concept by including the value of productive household activities alters our understanding of the distribution of economic well-being.

Household production increases the consumption possibilities of all income groups but its effect is most significant in low income decile groups. As a share of consumption possibilities, household production forms a significantly more important part for low income earners than for high income earners. For high income earners money income dominates the formation of consumption possibilities.

The decomposition of the Gini coefficient by income source shows that when looking at the consumption possibilities inequality the money income forms a greater share of the total inequality compared to household production. This effects strengthens in time. The decomposition of the GE (2) measure by sub groups indicate that the within-group inequality dominates the between-group inequality both at the individual level and at the household level. Even when the structure of households changes and labor force participation alters it is obvious that work carried out in households clearly raises an individual's access to consumption goods and services and therefore increases economic well-being at all times. It is also obvious that since men earn higher wages than women, women compensate lower income by carrying out a greater number of household production activities than men do. This is also evidenced by time use studies.

## **Appendix 1 – Opportunity cost method**

As a comparison to earlier obtained results, opportunity cost estimates by taking individual wage rates are applied to value housework time by using 1987-1988 individual data only. In the data there is no wage information for all individuals. Some of the individuals are not working or they are taking care of their households and thus have missing wage values. Therefore, opportunity cost estimates are derived by applying Heckman's selectivity correction method (Heckman, 1979). Jenkins and O'Leary (1994) explain the method as follows; the model estimates a regression model of the hourly wage rates observed for those having a value for the hourly wage, and uses this estimate to impute wage rates to all adults in the sample.

The Heckman model eliminates bias due to missing data. It is a two equation model including both a wage equation (a sample selection) and an equation of primary interest (called here hours equation). The variables in the wage equation are assumed to determine whether the

dependent variable in the hours equation is observed or not. Separate regressions are run here for women and men.<sup>7</sup>

In the wage equation the difference between a person's market wage (what she/he could earn in the labor market) and her/his reservation wage (the wage rate needed to make a person choose to participate in the labor market), is a function of characteristics such as age, education and where a person lives. In the hours equation, the number of labor hours supplied depends on the wage, home characteristics etc. The actual figure for hours equation is observed only if a person is working (market wage exceeds the reservation wage) (Greene, 2008).<sup>8</sup>

The wage equation is of the form,

$$(1) \quad z_i^* = w' \gamma_i + u_i$$

and the hours equation is of the form,

$$(2) \quad y_i = x_i' \beta + \varepsilon_i$$

The  $y_i$  is observed only when  $z_i^*$  is greater than zero. It is also assumed that  $\varepsilon_i$  and  $u_i$  have a bivariate normal distribution with zero means and correlation  $\rho$  (Greene, 2008). The exogenous variable  $w$  in the wage equation includes age-cohort dummies, dummy for educational level and marital status, dummy for age of children and region of living. The exogenous variable  $x$  in the hours equation are age-cohort dummies, dummy for educational level and region of living. Table 13 shows the estimation results first for the hours equation secondly for the wage equation.

**Table 12**  
**Aggregate inequality and low income results, whole year 1987-1988,**  
**by using opportunity cost method to value household production,**  
**individual data, money income (M) and consumption possibilities (C)**

|            | Individual |       |          |       |
|------------|------------|-------|----------|-------|
|            | 100xGE(2)  |       | 100xGini |       |
| Whole year | M          | C     | M        | C     |
| 1987-1988  | 17.47      | 12.36 | 30.33    | 25.56 |
|            | H          |       | PRG      |       |
| Whole year | M          | C     | M        | C     |
| 1987-1988  | 14.03      | 7.80  | 6.65     | 2.26  |

Source: Own calculations based on the Finnish Time Use Data.

The results show that the inequality indices GE(2) and the Gini coefficient as well as low income indices H and PGR for consumption possibilities rise compared to results where house-

<sup>7</sup> Estimated opportunity wage rates differ between individuals, unlike the wage value of a municipal housekeeper. Due to wage differences between individuals the inequality results obtained for consumption possibilities by using a housekeeper's average wage are likely to be smaller than those obtained by individual wage rates.

<sup>8</sup> Hourly wage rates are calculated here by exploiting reported regular weekly working hours and salary obtained from register data (already including benefits in kind).

hold production was valued by using the wage of a municipal housekeeper (Tables 12, 5 and 8).

**Table 13**  
**Estimation results of the Heckman model**

| <b>Hours equation</b>               | <b>Women</b> | <b>Std.Err</b> | <b>Men</b> | <b>Std.Err</b> |
|-------------------------------------|--------------|----------------|------------|----------------|
| Constant                            | 5.57*        | 0.18           | 7.21*      | 0.29           |
| Age, 0 class < 35:                  |              |                |            |                |
| 35-44                               | 0.90*        | 0.13           | 1.50*      | 0.16           |
| 45-54                               | 0.68*        | 0.14           | 1.75*      | 0.19           |
| 55-64                               | 0.43*        | 0.12           | 0.66*      | 0.30           |
| Secondary schooling                 | 0.88*        | 0.12           | 1.62*      | 0.15           |
| University                          | 4.56*        | 0.21           | 6.38*      | 0.26           |
| Region of living, 0 class Helsinki: |              |                |            |                |
| Other Matropolitan area             | 0.08         | 0.26           | -0.05      | 0.40           |
| Other Southern Finland              | -1.76*       | 0.17           | -2.47*     | 0.30           |
| Central Finland                     | -2.13*       | 0.18           | -3.35*     | 0.31           |
| Northern Finland                    | -1.73*       | 0.22           | -3.00*     | 0.34           |
| <b>Wage equation</b>                | <b>Women</b> | <b>Std.Err</b> | <b>Men</b> | <b>Std.Err</b> |
| Constant                            | 1.74*        | 0.12           | 1.68*      | 0.21           |
| Age, 0 class < 35:                  |              |                |            |                |
| 35-44                               | 0.10         | 0.73           | -0.06      | 0.11           |
| 45-54                               | -0.10        | 0.09           | -0.26*     | 0.12           |
| 55-64                               | -0.59*       | 0.10           | -0.21      | 0.15           |
| Secondary schooling                 | 0.08         | 0.06           | 0.10       | 0.90           |
| University                          | 0.34*        | 0.10           | 0.41*      | 0.17           |
| Married or cohabiting               | -0.13*       | 0.07           | 0.95*      | 0.10           |
| Children under 7 years of age       | -0.70*       | 0.07           | -0.19      | 0.12           |
| Region of living, 0 class Helsinki: |              |                |            |                |
| Other Matropolitan area             | 0.03         | 0.12           | 0.00       | 0.27           |
| Other Southern Finland              | -0.23*       | 0.09           | -0.33*     | 0.21           |
| Central Finland                     | -0.30*       | 0.09           | -0.64*     | 0.21           |
| Northern Finland                    | 0.03         | 0.12           | -0.76*     | 0.22           |
| n                                   | 4326         |                | 4214       |                |
| rho                                 | -0.186       |                | -0.34      |                |
| Wald test of independent equations: |              |                |            |                |
| chi2(1)                             | 29.84        |                | 33.43      |                |
| Prob>chi2                           | 0.0000       |                | 0.0000     |                |

Note: \*Significant at 1% level.

Source: Own calculations based on the Finnish Time Use Data.

## Appendix 2 – Secondary activities

Since I was not able to include secondary activities for all the years, I ran the analysis for the whole year of 1987-1988 with both primary activities and secondary activities. This was done in order to check how much, if at all, the results would alter, had secondary activities been included in the total time spent on household production. In 1987-1988 the secondary activities are divided into 9 classes and I use two of them: housework and childcare. Secondary activities, in this Time Use Data, are those activities carried out simultaneously and not in turn with the primary activity. How big a part of the total amount of secondary activities the

Time Use Data capture is another story and it is strictly dependent on the quality of the data. In addition, the respondents do not always mark down all the secondary activities. Tables 14, 5 and 8 show that the income inequality indicators and low income indices alter only slightly when including secondary activities at the value of household production.

**Table 14**  
**Aggregate inequality and low income results, whole year 1987-1988, when secondary activities are included in the household production individual data, money income (M) and consumption possibilities (C)**

|            | Individual |      |          |       |
|------------|------------|------|----------|-------|
|            | 100xGE(2)  |      | 100xGini |       |
| Whole year | M          | C    | M        | C     |
| 1987-1988  | 17.47      | 8.35 | 30.33    | 21.96 |
|            | H          |      | PRG      |       |
|            | M          | C    | M        | C     |
| Whole year |            |      |          |       |
| 1987-1988  | 14.03      | 5.88 | 6.65     | 1.77  |

Source: Own calculations based on the Finnish Time Use Data.

## Appendix 3 – Decile group means

**Table 15**  
**Decile group means in euros of money income (M) and consumption possibilities (C) and consumption possibilities divided by money income (C/M x 100) in fall 1979, 1987 and 1999, individual data**

| Decile groups | 1979  |       |           | 1987  |       |           | 1999  |       |           |
|---------------|-------|-------|-----------|-------|-------|-----------|-------|-------|-----------|
|               | M     | C     | C/M x 100 | M     | C     | C/M x 100 | M     | C     | C/M x 100 |
| 1             | 425   | 10825 | 2547      | 3595  | 13111 | 365       | 5123  | 15128 | 292       |
| 2             | 4741  | 17973 | 379       | 9455  | 20136 | 213       | 10836 | 23238 | 214       |
| 3             | 9307  | 21455 | 231       | 13547 | 23093 | 170       | 15939 | 27396 | 172       |
| 4             | 12815 | 24013 | 187       | 15545 | 25458 | 164       | 18977 | 29871 | 157       |
| 5             | 15223 | 26520 | 174       | 17578 | 27775 | 158       | 21208 | 32382 | 153       |
| 6             | 17244 | 28971 | 168       | 19457 | 30148 | 155       | 23565 | 35101 | 149       |
| 7             | 19349 | 31743 | 164       | 21677 | 33218 | 153       | 26350 | 38001 | 144       |
| 8             | 22317 | 34835 | 156       | 24505 | 36987 | 151       | 30956 | 41451 | 134       |
| 9             | 26477 | 39974 | 151       | 28870 | 43006 | 149       | 37873 | 49577 | 131       |
| 10            | 43594 | 55621 | 128       | 45119 | 57376 | 127       | 64385 | 75814 | 118       |

Source: Own calculations based on the Finnish Time Use Data.

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# 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.

**JEL-Codes:** Z13, J22

**Keywords:** Marriage, time use, Bangladesh, gender, leisure, work introduction

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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 data<sup>1</sup>, 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

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<sup>1</sup> 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)<sup>2</sup>.

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).

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<sup>2</sup> 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 questionnaire<sup>3</sup>. 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 time<sup>4</sup>, 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

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

<sup>4</sup> 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 example<sup>5</sup>.

(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

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<sup>5</sup> 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><br>„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) <sup>6</sup> .                                                                                                                                       | (1) Main activity<br>(2) First activity mentioned |
| <i>Norwegian time use survey, Norway, 1980-81</i><br>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><br>„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 | Longest activity                                  |
| <i>Survey of Adolescent Time Use and Well-Being, Ireland, 2007-2008</i><br>„If you were doing more than two things, decide which two activities demanded most attention.“ (Hunt, nd).                                                                                                                                                                                                                                                        | Most attention                                    |
| <i>UK National Survey of Time Use, UK, 2000-2001</i><br>„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-

<sup>6</sup> 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 =  $\sqrt{}$ ] 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 disciplines<sup>7</sup>. 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”.

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<sup>7</sup> 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 time<sup>8</sup>. 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-

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<sup>8</sup> 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.

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# Sleep as a victim of the “time crunch” – A multinational analysis

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## Abstract

As reflected in many popular and academic writings, there is general concern that contemporary life is becoming ruled by a societal “time crunch”, in which work and family pressures make daily life more hectic. One implication of this condition is that sleep time has been reduced in order to accommodate these pressures. While this view seems supported by recent national surveys in which Americans now claim to get less than 7 hours of sleep a night, it is not supported by sleep times reported in 2003-07 ATUS time diaries. If anything, time-diary sleep hours are higher than in previous decades, approaching 60 hours a week in both the US and Canada. Similar levels of sleep hours are found in 18 European counties, with most of those having trend data also showing no decrease in sleep over recent decades, with the exceptions of Germany and Japan. The major predictors of sleep time in US and Canada are work hours and, increasingly, education. The US-Canada finding that women sleep slightly more than men is mainly a reflection of these two predictors. Higher sleep for women is also found in more Northern and Western European countries, but not in more Eastern and Southern Europe; moreover, men in Japan, the country with by far the least sleep report more diary hours of sleep than women.

**JEL-Codes:**    Z13, J22

**Keywords:**    Sleep time, time-diary sleep hours, men, women

# 1 Introduction

There seems a growing consensus that people in modern societies are “running out of time” because of increasing work and family pressures and demands. This condition of serious “time crunch” is reflected in the titles of several popular books with titles like *Busy Bodies* (Burns, 1993), *Faster* (Gleick, 2003), *In Praise of Slow* (Honoré, 2004) and *Take Back Your Time* (de Graff, 2006), as well as academic texts like *Amusing Ourselves to Death* (Postman, 1985), *The Time Bind* (Hochschild, 1998), *Fighting for Time* (Epstein and Kalleberg, 2007) and *Busier than Ever* (Darrah, Freeman and English-Lueck, 2007). It also seems supported by studies of qualitative experience using the “time crunch” scale developed by Robinson and Godbey (1999). Studies of overworked employees (e.g. Schor, 1991) have further resonated with both underpaid workers and those who sympathize with their plight.

In contrast, scholars who rely more heavily on results from time-diary studies have challenged this thesis, citing not only the lack of evidence of significantly higher workloads, but in terms of increased free time in the working-age population (Aguiar and Hurst, 2009; Bittman, 1998; Gershuny, 2000; Robinson and Godbey, 1999), the lack of empirical evidence for a new “24/7” economy (Glorieux and Minnen, 2009; Hamermesh and Lee, 2007) and the lack of recent increases in subjective feelings of stress or being rushed (Robinson and Godbey, 1999), and the lack of direct diary evidence of sleep decline (van Tienoven, Glorieux and Minnen, 2010)

Besides hours of work, housework and free time, another potential diary indicator of a time-crunched life-style is provided by hours of sleep in time use accounts. If today’s workers and parents are more becoming time crunched by paid or unpaid work obligations, a likely trade-off is in decreased time spent sleeping.

Indeed, recently US media have described sleep as “the new sex”, since Americans are so deprived of it. Americans’ sleep problems have prompted a steady stream of media articles and talk show segments about overcoming or treating sleep deprivation in the population. While low sleeping time has received considerable press and medical attention, it is largely based on anecdotal evidence. Main exceptions come from the press releases from the National Sleep Foundation (NSF). In March 2007, for example, NSF headlined how “Stressed-Out American Women Have No Time for Sleep.”, as reflected in the 57% of their surveyed women who said they only got a good night’s sleep at best a few times a week, and the 67% (of both working mothers and stay-at-home mothers) who had experienced symptoms of insomnia at least a few nights each week (with 8% of working women reporting missing work at least once a month because of sleep problems).

Buttressing these conclusions were data from the NSF’s 2002 poll, in which their respondents estimated that they slept just 7.07 hours a night. Their 2009 report showed a further decline, down to 6.79 hours a night.

However, asking survey respondents direct estimate questions (as in the NSF question, “How many hours do you typically sleep per night?”) may mean different things over different time periods to different respondents - and it may be subject to respondent perceptions of what they think is the most “socially desirable” response in a society in which keeping busy may be taken as a badge of honor.

This article thus:

- (1) Contrasts the diary and NSF estimate approaches to measuring time spent sleeping,
- (2) Shows their divergent historical trends in both the US and Canada,
- (3) Shows that the current small gender differences in sleep time in both countries can be seen as essentially a function of employment and education differences by gender,
- (4) Describes parallel sleep figures for men and women in 21 other (mainly European) countries,
- (5) Shows steady or increasing sleep trends in these other countries by gender.

The article concludes by summarizing these trends across decades and by gender, examines some possible quality-of-life implications of these results and notes another example of how diary sleep data differ from media coverage of sleep.

It needs to be noted at the outset that most of these trend and multinational data are on isolated or unavailable raw data files, so that it was not possible to calculate variance estimates to determine tests of statistical significance for these data, with the exception of the most recent American and Canadian data for gender differences. At the same time, the major aim of the present analysis is to show that reports of *decreased* sleep based on estimate data are not supported by findings of *flat* or increased *sleep* time in time diaries, so that significance tests are not required.

## 2 Time diary evidence

An alternative, more comprehensive, and arguably more accurate, way to measure how much time people spend sleeping is the time diary. It is more direct and straightforward, in that it asks respondents simply to recall what they did “yesterday” – and in chronological order of that day from early morning on one day to early morning 24 hours later on the next day. The most prominent and current US 24-hour daily time diary is the American Time-Use Survey (ATUS) conducted by the US Census Bureau for the Bureau of Labor Statistics (BLS) This open-ended approach means that no single activity or set of activities is highlighted to give respondents any idea about what is expected in their responses.

Social science analysts of the ATUS data can point to the following advantages of its diary approach – and to its predecessor diary studies done at the University of Maryland and the University of Michigan since 1965:

- (1) There is complete coverage of all 24 hours of a specific day, providing a fuller context into which sleep fits with precision.
- (2) There is coverage of all days of the week and all weeks of the year.
- (3) There is coverage of sleep back to 1965 rather than 2002 in NSF.
- (4) The diaries usually take more than 10 minutes to complete rather than direct estimate questions that are usually answered within 10 seconds
- (5) No hint of any particular activity/topic being investigated is mentioned to the respondent.
- (6) There are sample sizes of more than 12,000 per year (rather than 1000 in NSF surveys).

The ATUS has much higher response rates of those selected into the sample (58% in ATUS vs. 28% in NSF), and from a sampling frame that is more comprehensive and inclusive (say in terms of including residents of households without telephones).

More methodological and background and details on the diary method are described in Gershuny (2000), Michelson (2005), Robinson and Godbey (1999) and Ziegler and Michelson (1981).

Not that these diaries are themselves free of limitations. Diaries are collected for only one of the seven days of the week per respondent (although diary interviews are spread out over all 7 days in order to generate the weekly averages shown below). It is also the case that when diary respondents say they “went to bed” (in their own words), that is coded as sleep time even if it took some time to actually fall asleep. The ATUS figures reported below also include time on naps during the day.

In its way, then, the time diary capitalizes on the powerful “zero-sum” property of time, in that everybody has exactly 24 hours per day to spend, so that if time on one activity (say TV) increases, it must be offset by time on some other activity (like decreased sleep or housework). As noted above, time-diary studies across all days of the week have been collected in the United States since 1965 (and across all seasons of the year since 1975), at roughly 10-year intervals (until the now annualized ATUS diary collections).

Canada’s parallel census agency, Statistics Canada, has also collected time-use data on large national samples since 1986, as part of its series of General Social Survey (GSS). Data for its most recent surveys in 1992, 1998, and 2005 were collected throughout the year on increasingly larger samples – 19,597 respondents over age 15 in 2005. (Data in its initial 1986 survey were only collected in the month of November and the first half of December, although these do not seem to be atypical months in terms of sleep).

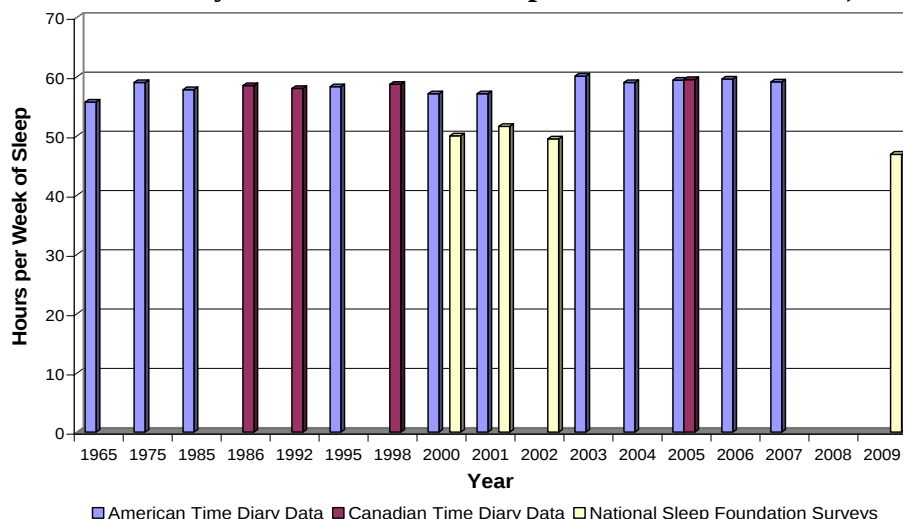
Sleep differences have not attracted much attention from time-diary analysts in either country (nor in the 25+ other countries that have collected time-diary data over the last 40+ years). As will be shown in Table 2 below, the main reason for their inattention has been the lack of evi-

dence of decreased in sleep times (in comparison to far more dramatic changes in housework, childcare and TV since the first 1965 time-diary surveys). Robinson, Converse and Szalai (1972) found that, for an aggregate, sleep is relatively inelastic, though individuals can compress it on working days and extend it on days off (*ibid*, 128-129). Gershuny (2000) noted almost thirty years later that, “time devoted to sleep, washing, and dressing remains remarkably constant over time...” (*ibid*, 116).

### 3 US-Canadian trend results

Figure 1 shows the weekly sleep hours from American time diary data (ATUS from 2003 to 2007 and the earlier university-based diary studies dating back to 1965), from Canadian time diary data (Statistics Canada General Social Surveys 2, 7, 12, and 19 from 1986, 1992, 1998, and 2005), respectively, and from the National Sleep Foundation estimate question asked since 2000. It can be seen that the diary numbers have consistently remained close to the proverbial figure of 8 hours per day (or 56 hours per week) since 1965 – with some increase in 2003 and 2005. This is in contrast to the NSF *per day* estimates, which not only translate to 7-12 hours lower per week, but have shown a *decrease* of 3 hours over the last decade.

**Figure 1**  
**Trends in weekly sleep hours – American and Canadian time diary data vs. National Sleep Foundation Survey estimates (in hours per week, ages 18-64 for time diary data and 18+ for Sleep Foundation estimates)**



Source: Own calculations based on data from ATUS, Statistics Canada and NSF.

Moreover, the recent US diary figures are very close (about 60 hours per week) to the Canadian diary data, even though they employ somewhat different diary procedures, data collection agencies and sampling/field procedures. The virtually flat diary columns in Figure 1 attest to this near constancy, with the slightly higher diary figure reported since 2000.

Indeed, the figures from the most recent 2003-2007 ATUS diary studies, with a sample size over 55,000 respondents aged 18-64, show an increase to just over 59 hours per week (8.2 hours on weekdays, 8.9 hours on Saturdays and 9.5 hours on Sundays). The equivalent Statistics Canada study in 2005 with more than 15,000 respondents aged 18-64 also indicated an increase, to 59.5 hours of sleep per week (reflecting 8.3 hours on weekdays, 8.7 on Saturdays and 9.4 on Sundays). Diary weekly sleep hours in both countries, then, average more than 12 weekly hours greater than the *estimated* sleep time (“How many hours do you typically sleep per night?”) in the NSF sleep surveys. That 12-hour a week gap is rather large (close to two hours per day), and it is growing larger. (It would grow even larger, by about another hour a week, if the ATUS columns were to include those aged 65 and above, as in the NSF surveys).

This constancy of sleep is not adjusted for demographic changes in the population over the 40 year period, although sleep figures do not vary widely by demographic factors other than employment or education. The increase in women’s employment and education should work to decrease their sleep, while their decreased likelihood for being married and having children should work increase their sleep. Whatever these overall changes, there is clearly no indication of decreased diary reports of sleep for those aged 18-64 in Figure 1.

We next turn to gender differences in these data in contrast to the two main demographic predictors of diary sleep in the two countries, which also show remarkably similar results.

## **4 Gender and other demographic predictors of sleep**

One also finds a gender constancy in diary sleep hours, with women consistently sleeping more than men – by about an hour a week in both the US and Canada.. However, there are two simple demographic factors that seem to explain even these small gender differences. One is that men have slightly higher years of education. However, the more important factor is that men, particularly those aged 18-64, are more likely to be employed and to work longer hours on their job. There is the need, then, to examine these gender differences in the context of these other demographic predictors.

(Economists might explain the education-sleep correlation with the fact that higher education increases the expected wage and thus increase the “opportunity cost” of sleep (as in Biddle and Hamermesh 1990. Those with higher incomes do spent less time sleeping in the ATUS data, but these differences are only half as large as those by education).

A statistical program that can adjust for these differences by background factors is the multiple regression program called Multiple Classification Analysis (MCA), originally developed by Andrews et al. (1973). MCA adjusts survey percentages and averages so that “other factors are equal” in calculating the effects of these other factors. In the present analysis, once work hours and education differences are taken into account, the original 1.9-hour gender differ-

ence is reduced to less than half an hour (58.4 hours men and 58.7 hours women) in the US, which is statistically significant ( $t=15.1$ ,  $p<.0001$ ) given the large sample size ( $n> 65,000$ ), but with a correlation coefficient of only .007; for Canada and its smaller sample size, their MCA-adjusted 0.2 hour difference is also significant ( $t= 5.5$ ,  $p<.01$ ), but with a correlation coefficient of only .005. Thus, it still seems best to consider to these as demographic differences than as gender differences; moreover, much the same results obtain if working men and women are analyzed separately.

## **5 Multinational differences**

Table 1 shows that the sleep hour results in the US and Canada are generally consistent with totals and differences in sleep in 21 other (mainly European) countries. It can be seen first that weekly sleep hours in these countries also tend to cluster just under the 60-hour a week level as in the Figure 1 American data. There are exceptions, like the Bulgarian and French being 1-2 hours higher than the 60-hour level, and with Japan and Korea being 6-7 hours lower than that level. Except for the latter two Asian countries, therefore, sleep hours are in excess of the “8 hours of sleep” standard.

In the middle two columns of Table 1, it can be seen that these nearly 60-hour levels are found for women as well as men in their peak working years of 18-64 in most of these other countries. The last column in Table 1 calculates the extent of these gender differences, with the slightly (1-2 hour) higher sleep levels for women in the Americas also in evidence -- but mainly in more Western and Northern Europe than in more Southern and Eastern countries (like Estonia and Slovenia), where there are generally no significant gender differences; and it is reversed slightly in Bulgaria. In Japan, moreover, it is men who gain  $1\frac{1}{2}$  more hours of sleep than women. Thus, the American finding of slightly more sleep for women tends to be confined to more Northern and Western Europe, and here possibly explained again by education and employment as in the US and Canada.

## **6 Multinational trends across decades**

The next question, then, is whether sleep times in these other countries in Table 1 have decreased over the years, as for the US and Canada. Unfortunately, trend diary data from earlier decades are not readily available for most of the countries in Table 1. However, they are available for the five of them (Belgium, Bulgaria, France, Germany and Poland) that were part of Szalai's (1972) initial multinational diary study in 1965, and these comparative 1965 sleep figures are shown in Table 2, alongside the most recent data from Table 1.

**Table 1**  
**Recent (1998-2005) multinational sleep time (in hours per week)**

|             | <b>Total</b> | <b>Men</b> | <b>Women</b> | <b>Women-Men</b> |
|-------------|--------------|------------|--------------|------------------|
| US          | 58.5         | 57.6       | 59.5         | +1.9 Hrs.        |
| Canada      | 58.4         | 57.7       | 59.0         | +1.3             |
| Australia   | 58.9         | 58.7       | 59.2         | +0.5             |
| UK          | 58.8         | 58.1       | 59.5         | +1.4             |
| Netherlands | 59.3         | 57.9       | 60.7         | +2.9             |
| Germany     | 57.3         | 56.8       | 57.7         | +0.9             |
| Belgium     | 58.6         | 57.4       | 59.6         | +2.2             |
| France      | 61.1         | 60.6       | 62.0         | +1.4             |
| Spain       | 59.0         | 59.3       | 58.9         | -0.2             |
| Italy       | 57.3         | 57.2       | 57.4         | -0.2             |
| Norway      | 56.2         | 55.6       | 57.0         | +1.4             |
| Sweden      | 56.5         | 55.8       | 57.2         | +1.4             |
| Finland     | 59.0         | 58.5       | 59.5         | +1.0             |
| Estonia     | 58.5         | 58.5       | 58.4         | -0.1             |
| Latvia      | 59.9         | 59.5       | 60.1         | +0.6             |
| Lithuania   | 58.9         | 58.7       | 59.0         | +0.3             |
| Poland      | 58.7         | 58.0       | 59.4         | +1.4             |
| Bulgaria    | 62.4         | 62.8       | 62.2         | -0.6             |
| Slovenia    | 58.1         | 58.0       | 58.5         | +0.5             |
| Korea       | 54.4         | 54.6       | 54.3         | -0.3             |
| Japan       | 53.7         | 54.5       | 53.0         | -1.5             |
| Brazil      | 56.4         | 54.8       | 57.6         | +2.8             |

Source: Fisher and Robinson (2010).

It needs to be noted in advance that these Szalai data are not exactly comparable with the current Table 1 data for several reasons. Perhaps the most important is that the 1965 Bulgarian and Polish data were only collected in single cities, and the Belgian, French and German data in selected cities, rather than being fully national. Second is that the 1965 data in all 1965 countries excluded rural residents and households in which no one was employed. The third is that different field and field procedures were employed in the initial and latest diary surveys, along with possible differences in diary reporting and activity coding. Moreover, 1965 data were not collected in either Canada or Japan, nor in the other countries, so that the diary studies in these countries began in later decades – 1986 in Canada and 1975 in Japan.

At the same time, there are plausible methodological bases for this comparison. First, there have been multiple efforts to ensure equivalence in basic sample selection, diary procedures and coding and interpretation across countries. Second, the empirical results from single cities were found to match with national diary data results in countries in which both national and single-city data were collected (as in the 7.8 hours of sleep in the US national sample vs. the 7.9 hours in the single city of Jackson (MI), and the 8.4 hours in the West German national sample with the 8.5 hours in the single city of Osnabruck). Thirdly, in the US at least, explicit attempts have been made to ensure that exactly the same Szalai diary and coding procedures were in place; it is also the case that there is evidence from several separate US methods stud-

ies that the diary figures are extremely robust using different procedures and conditions (Robinson and Godbey, 1999). Similarly, the data from Canada and the UK have been monitored closely to ensure cross-time equivalence.

**Table 2**  
**Sleep time trends (1965-2000s) across countries (in hours per week for those aged 18-64)**

|             | <b>Total</b> |        | <b>Men</b> |        | <b>Women</b> |        |
|-------------|--------------|--------|------------|--------|--------------|--------|
|             | 2000s        | 1960s  | 2000s      | 1960s  | 2000s        | 1960s  |
| US          | 58.5+        | 54.8   | 57.6+      | 56.5   | 59.2+        | 56.9   |
| Canada      | 58.4+        | 57.2*  | 57.7+      | 56.5*  | 59.0+        | 58.0*  |
| Australia   | 58.9         | NA     | 58.7       | NA     | 59.2         | NA     |
| UK          | 58.8         | NA     | 58.1       | NA     | 59.5         | NA     |
| Netherlands | 59.3         | NA     | 57.9       | NA     | 60.7         | NA     |
| Germany     | 57.3-        | 59.5   | 56.8-      | 57.9   | 57.7-        | 59.6   |
| Belgium     | 58.6-        | 59.1   | 57.4       | 57.6   | 59.6+        | 58.4   |
| France      | 61.1+        | 58.1   | 60.6+      | 57.2   | 62.0+        | 59.2   |
| Spain       | 59.0         | NA     | 59.3       | NA     | 58.9         | NA     |
| Italy       | 57.3         | NA     | 57.2       | NA     | 57.4         | NA     |
| Norway      | 56.2         | NA     | 55.6       | NA     | 57.0         | NA     |
| Sweden      | 56.5         | NA     | 55.8       | NA     | 57.2         | NA     |
| Finland     | 59.0         | NA     | 58.5       | NA     | 59.5         | NA     |
| Estonia     | 58.5         | NA     | 58.5       | NA     | 58.4         | NA     |
| Latvia      | 59.9         | NA     | 59.5       | NA     | 60.1         | NA     |
| Lithuania   | 58.9         | NA     | 58.7       | NA     | 59.0         | NA     |
| Poland      | 58.7+        | 54.5   | 58.0+      | 53.7   | 59.4+        | 54.3   |
| Bulgaria    | 62.4+        | 54.6   | 62.8+      | 55.3   | 62.2+        | 57.4   |
| Slovenia    | 58.1         | NA     | 58.0       | NA     | 58.5         | NA     |
| Korea       | 54.4         | NA     | 54.6       | NA     | 54.3         | NA     |
| Japan       | 53.7-        | 56.5** | 54.5-      | 57.8** | 53.0-        | 55.5** |

Notes: \* 1986 GSS data (+ = increased sleep), \*\* 1975 NHK data (- = decreased sleep), NA = no data available.

Source: Fisher and Robinson (2010) for latest data and Szalai (1972) Appendix for 1965 data.

However, it again needs to be emphasized at the outset that conclusions from Table 2 are subject to the several important caveats noted above. All this understood, the pattern in Table 2 is somewhat mixed, as noted by the + and – signs in Table 2. In addition to the constancy in the US and Canadian data near constancy across time, it seems also the case in Belgium (with a – minus sign in Table 2 but for less than an hour per week), as further verified by Van Tienoven et al. (2010). Increased sleep times are found for France, and more notably in the Eastern nations of Poland and Bulgaria.

At the same time, Table 2 shows there are two country trends that *do* show less sleep time, and these are for Germany and for Japan, both of which show 2-3 weekly hours of sleep decline. This provides some offset to the lack of sleep decline in the other five countries for which trend data are available. Perhaps, these are forerunner countries for a future time crunch.

## **7 Summary and conclusions**

In contrast to mass media coverage of sleep surveys and related stories about sleep deprivation and insomnia, data from American time-diary studies - in which respondents keep detailed track of all their daily activities for a single day - show no decrease in how many hours of sleep they average per day over the last 40+ years. Indeed, data from the very large ATUS diary study conducted by the US Census Bureau indicate that Americans in 2003 to 2007 were actually averaging more weekly hours of sleep than they did 10-40 years previously. Diaries from the GSS of Statistics Canada similarly show Canadians have also recently increased their weekly hours of sleep. Thus, there is no hint from either country of any decline in sleep - consistent with earlier studies showing no long-term decrease in free time or effects of a 24/7 economy as a reflection of a societal time crunch from work, family or other demands.

Table 1 show that these current US and Canadian sleep times for both men and women are at about the same levels as in most other European counties, which are slightly higher than the proverbial 8 hours of sleep. As in the Americas, women in Western and Northern (but not in other) European countries report 1-2 more weekly hours of sleep than men, although in the Americas these gender differences are mainly due to employment, education and other demographic predictors of sleep. Moreover, in some Eastern countries, and particularly in Japan, it is men who average slightly more sleep time.

While cross-time trend data on sleep are only available for 8 of the 23 countries in Table 1, data from France, Poland and Bulgaria show increases of 2-4 hours a week, and Belgium no significant decline, which are consistent with the US-Canadian findings in Figure 1. Long-term declines in sleep hours were found in Germany and Japan, perhaps indicating these to be forerunner countries in experiencing time crunch. However, the latest free-time figures for Germany show an increase since 1965, casting doubt on that dynamic.

In the US, the discrepancy between survey time estimates and time-diary data documented in Figure 1 is not unique to sleep. Survey respondents also seriously underestimate the amount of free time they have each week, and also over-report their hours of housework, paid work and volunteering (Robinson and Godbey, 1999). Indeed, it seems part of a larger picture of Americans giving time estimates that are in a “socially desirable” direction, in terms of portraying their daily lives as busier, more productive or less sedentary.

Nonetheless, the importance of sleep should not be taken lightly. When US diary respondents in earlier university diary studies were asked to rate all their daily activities on a 0-10 enjoyment scale, sleep emerged as one of life’s most enjoyable activities, higher than TV and most other free-time activities (Robinson and Godbey, 1999). For Americans who are getting less sleep than they want or need, that could signal a significant decrease in the quality of their lives.

Nor should these sleep results be used to minimize the severe problems many people face from insomnia, truncated sleep or insufficient “down time”. It simply means that survey respondents mis-estimate how much time they spend sleeping, giving estimates that are at odds with what they report when asked to provide much more detailed accounts of where their daily time goes. At the same time, the NSF figures are based on respondents’ single-question *perceptions* of what their sleeping lives *feel* like; and if that is how people perceive their sleep lives, these probably reflect real felt time pressures. As noted above, the latest NSF surveys show a decline, possibly reflecting people’s *perceptions* that they are sleeping less). (Of course, sleeping more might also be a sign that increasingly hectic waking hours are tiring people out, or looking for some escape from their daily routine).

Finally, declining sleep is not the only media “story” about time that is at odds with sleep time in the ATUS diaries. Michelson (2010) has used ATUS data to show that, despite the reported physical dysfunctions accompanying the annual transitions to daylight saving time (DST) and back, time changes have minimal lingering effects on the sleep Americans get - especially because the time changes occur on the night between Saturday and Sunday, when people typically have fewer binding obligations bearing on how much sleep they are able to get, which, even when an hour in the night is lost, is much more than typical weeknight sleep durations.

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# *time-pieces*

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## **New developments in time technology – projects, data, computing and services**

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### **LATIN AMERICAN TIME USE NEWS**

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Time-use data collection continues to be very active in the Latin American region<sup>1</sup>. The 8<sup>th</sup> International Meeting on Time-Use Statistics (*8va Reunión Internacional “Estadísticas sobre Uso del Tiempo y Políticas Públicas”*), held in Mexico City in July 2010 under the auspices of UNIFEM, ECLAC, the Mexican Women’s Institute (*Instituto Nacional de las Mujeres*) and INEGI (*Instituto Nacional de Estadística y Geografía, México*) shows the new Latin American developments in the field.<sup>2</sup>

As in the past, TUS have been collected following a variety of methods. *Tasks lists* are still favoured in the region, because of their relatively simple design. *Long tasks lists* have been used in Uruguay (2007) (60 tasks), and in El Salvador (2010) (47 tasks). The Peruvian TUS, which is in its pilot stages at the moment, has followed the *exhaustive activity list* format (127 questions), although local researchers have noted problems with the length of the interview, which might generate high drop-off rates and/or inaccurate responses. Following the same model, Ecuador (2005) solved these tensions by revisiting the household as many times as required to find respondents, while in Mexico (2009), filters (based on household structure) allowed to avoid the repetition of activities that, by definition, are not performed in certain households (i.e., if there are no children in the household, no questions about childcare provi-

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<sup>1</sup> For a review that covers LA TUS up until 2007, see Esquivel, Valeria (2008), Time-use surveys in Latin America, in: *Feminist Economics*, Vol. 14, No. 3, July.

<sup>2</sup> See the program of the meeting, and most presentations, at <http://www.cepal.org/cgi-bin/getProd.asp?xml=/mujer/noticias/paginas/7/40297/P40297.xml&xsl=/mujer/tpl/p18f.xsl&base=/mujer/tpl/top-bottom.xslt>, (accessed 04 October, 2010).

sion were posed). Lastly, *short tasks lists* have been used in Honduras (2009) and in Colombia (2007-2008-2009). Repeatedly, researchers note the difficulties associated with these survey instruments, given that they rule-out simultaneous activities by design.

On a different road, a new breed of TUS is following the *twenty-four hour-recall activity diary*, administered by an interview. This is the case of Chile (2007-2008), where the diary had 30-minutes time-slots with up to one simultaneous activity. The city of Rosario (Argentina, 2010) has followed the Buenos Aires TUS design (Argentina, 2005). In this case, the diary had also 30-minutes time-slots, but allowed up to three simultaneous/consecutive activities.

Also, Bolivia, Brazil and Venezuela (the Venezuelan TUS will go to field in the second semester of 2010) are evaluating the results of their pilot surveys, based on self-administered diaries, to fine-tune their design. A seminar that took place in Rio de Janeiro at the beginning of September 2010, organized by the Secretariat for Women's Policies of the Presidency of Brazil (SPM/PR), IBGE (*Instituto Brasileiro de Geografia y Estadística*), IPEA (*Instituto de Pesquisa Econômica Aplicada*), the ILO and UNIFEM, served the purpose of contrasting different developing-countries' experiences in view of contributing to improve the design of the future Brazilian TUS.

Lastly, efforts have been put to design a Latin American Classification of Time-Use Activities (CAUTAL), as an adaptation of ICATUS that can guide future exhaustive activity lists' design. Interestingly, care activities in CAUTAL are not necessarily those provided only for dependents. Transportation, however, is not disaggregated in all major divisions.

All these experiences show a strong emphasis on giving visibility to unpaid care work, in line with the Beijing Platform for Action. Following the Quito Consensus, launched by ECLAC in 2007, debates in the region are currently focusing on the ways in which existing TU data can be effectively used to inform gender-aware policies. Contact for further information: [valeria.esquivel@datamarkets.com.ar](mailto:valeria.esquivel@datamarkets.com.ar).

## US AND CANADIAN PROJECTS AND PUBLICATIONS OF INTEREST

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This brief report draws attention to two projects and a publication of possible interest to readers in and outside of North American region.

- (1) In July 2010, the U.S. Bureau of Labour Statistics released *2003-2009 American Time Use Survey data*. The data files are available from the ATUS on the Web site: <http://www.bls.gov/tus/home.htm>. Questions could be addressed to ATUS staff members by e-mail at [atusinfo@bls.gov](mailto:atusinfo@bls.gov).

- (2) In June 2010, Atkinson Foundation released the final report of the *Canadian Index of Well-being – Measuring what matters*. An important section of the report examines contribution of time use to well-being. The objectives of the time use report were, according to the authors, to define and conceptualize time use, to examine its associations with well-being and to propose a series of indicators to monitor time use in Canada. Following is the table of contents of the time use part of the report:
1. Introduction; 2. Methods; 3. Conceptual framework of time use and well-being; 3.1 Conceptualizing time use; 3.2 Conceptualizing well-being; 3.3 Gendered age and life stage approach; 3.4 Social determinants of time use; 3.5 Time use of individuals and well-being; 3.6 Graphical depiction of conceptual framework for the time use domain; 3.7 Social determinants of time use; 4. Literature review on time use and well-being; 4.1 Working-age adults; 4.2 Children and adolescents; 4.3 Retired seniors; 4.4 Social-level factors – Indicator recommendations; 5. Time use indicators – Evaluation; 5.1 Review of Canadian data sources; 5.2 Measurement issues; 5.3 Final indicator selection; 6. Headliners – How are Canadians measuring up with respect to time use? 7. Conclusion and discussion.
- (3) An interesting publication addressing relationship between time use and well-being “*Measuring the subjective well-being of nations – National accounts of time use and well-being*” was edited by Alan B. Krueger and 2009 published by the University of Chicago Press. The publication includes papers originally presented at a conference at the National Bureau of Economic Research in Cambridge, Massachusetts, December 7-8, 2008. At the time of the publication A.B. Krueger was on leave from Princeton University and the National Bureau of Economic Research, serving as assistant secretary for economic policy and chief economist for the U.S. Department of Treasury.

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## OCEANIA TIME USE NEWS

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Time use research in Oceania is active, though data on the smaller nations is sparse. No national Time Use Study (TUS) has yet been done in the Pacific. A major report 'Making Invisible Work More Visible' (2008) from the Development Programme Pacific Centre brings together current knowledge and endorses earlier calls for TUS to be carried out in the Pacific Islands.

A major established data source for time use research in the region is the Australian Bureau of Statistics (ABS) TUS, conducted in 1992, 1997, and 2006. The next is planned for 2013. The ABS has been restructured, and time use statistics is to be run out of Melbourne. Elisabeth Davis, who coordinated and managed ABS time use statistics for much of the 1990s and 2000s has temporarily come out of retirement to hand over to the new team. Current plans are to combine the 2013 survey with the next Survey of Employment Arrangements, Retirement and Superannuation into one vehicle. It will have a module on work and family, which will significantly broaden the range of possible research questions.

Another Australian data source is the Longitudinal Study of Australian Children (LSAC) is administered by the Department of Family, Housing, Community Services and Indigenous Affairs (FaHCSIA) and the Australian Institute of Family Studies (AIFS). Importantly, it collects data on children's time use, and as the waves grow is building up a unique and increasingly rich source of information. The main phase of data collection for Wave 4 began in March 2010.

Statistics New Zealand conducted its first national Time Use Survey in 1999. This is to be followed up by the NZ Time Use Survey 2009-2010, which is in train.

The Australian Time Users Group (ATUG), coordinated by Marie-Louise van der Klooster from Deakin University, keeps members informed of time use news, current research and upcoming events and publications. Researchers come from a range of academic disciplines, and investigate a very wide variety of time use dimensions, activities and implications. Members' current topics encompass travel, childcare, aging, social engagement, physical activity, new technologies, statistical methods, leisure, employment, nonstandard work schedules, voluntary work, media, retail time, well-being, time stress and the gender division of labour. In 2009, ATUG members produced more than fifteen publications as academic journals and government reports. Their output received substantial media coverage, generating over a dozen stories in the print media, and stimulating lively debate on radio and television.

Time use researchers from Oceania were well represented at the IATUR in Paris. For those who couldn't make it, the Australian Consortium for Social and Political Research Incorporated (ACSPRI) is hosting a conference from Dec 1-4 in Sydney and the ATUG has been asked to have a session on time use research and to run workshops in time use.

Christina Inbakaran and Marie van der Klooster are working with colleagues from Eindhoven, Utrecht and Leuphana Universities and from CDSP Science Po, Paris on a joint Australian European travel Survey Portal, focusing on Travel time and are also working on the development of an Australian/European Employment Time Portal and a 2010 Time Use in Australia and Europe Bulletin. Contact for further information: [lcraig@unsw.edu.au](mailto:lcraig@unsw.edu.au).

## TIME USE SURVEYS IN ASIA

Indira Hirway

Centre for Development Alternatives

Time use surveys are not very new to Asia. National level time use surveys were conducted even before 1980 by countries like Japan, S Korea and USSR, and small-scale surveys, covering a few villages or a town, were conducted in the 1980s by developing countries like India, Nepal, Philippines etc. The National Statistics Bureau of Japan conducted the first large-scale national survey on *Time Use and Leisure Activities* in 1976 to understand how people spend their leisure time. The Bureau has been conducting this survey after every five years since 1976. The NHK, Japan Broadcasting Company, also has been conducting time use surveys, though on a smaller scale, since the 1970s, mainly to collect information on the time spent by people on different programmes and on spare time of people. Similarly, KBS, the Korean Broadcasting System also conducted a time use survey in 1981, and then after every five years till 2000, to understand how Korean population spent their time, and particularly their leisure time. The main objective of this survey was to plan for television / media programmes. The 1999 time use survey, however, was conducted by the national statistical body also to understand and estimate unpaid work of men and women.

On the other hand, countries like India, Nepal, Philippines conducted small-scale surveys in the 1980s mainly to measure work, both SNA and non-SNA, performed by men and women. Such surveys were sporadic, small scale and exploratory in character. This situation changed considerably in the 1990s, as two events gave a push to time use surveys in Asia. These events are (1) the Human Development Report (HDR) 1995 and (2) the Beijing World Conference on Women. The central message of the HDR 1995 was that 'human development must be engendered' and that 'development that is not engendered is endangered'. This message, along with the new measures of gender development and gender empowerment (i.e. GDI and GEM) had significant impact on policy makers and scholars in Asia. Also, the Platform for Action (PFA) adopted at the fourth World Conference on Women in Beijing (1995) called for developing 'suitable statistical means to recognize and to make visible the full extent of the work of women and all their contributions to the national economy including their contribution in the unremunerated and domestic sectors', and stressed the need 'to develop a more comprehensive knowledge of work and employment through efforts to measure and better understand the type, extent

and distribution of unremunerated work, particularly in caring for dependents' (PFA 1995). This conference was followed by a major International Seminar organized by UNDP, UNSD, UNIFEM and Government of ROK (Republic of Korea) on Integrating Unpaid Work into National Policies at Seoul in May 1997. Several scholars, activists and policy makers from the region, participated in the seminar. A major outcome of the seminar was setting up a Regional Resource Group on Integrating Unpaid Work into National Policies at UN-ESCAP, Bangkok in 1998. This Resource Group undertook several activities to promote time use surveys in the ESCAP Region.

The Regional Resource Group organized an international seminar on time use studies in Ahmedabad to 'discuss the results of the (first) Indian and Korean time use surveys, to exchange international experiences in time use studies and to learn lessons from the same to promote time use studies in the Region. The Regional Resource Group also organized training workshops at ESCAP on the subject of integrating unpaid work into national policies for national level planners, statisticians and gender experts. A major contribution of the Regional Resource Group is the preparation of *the Guidebook on Integrating Paid and Unpaid Work into National Policies* (2003). Following this Guidebook and the training workshops at ESCAP (Bangkok), several countries undertook time use surveys in the late 1990s and early years of the present century.

So far more than 20 developing / emerging countries in Asia (apart from developed countries like S.Korea, Japan) have conducted time use surveys, and many more are in the process of conducting this survey. About half of these countries, such as China, India, Oman, Israel, Palestine, Lao, PDR, Mangolia, Nepal, Pakistan, Thailand, Turkey etc have conducted national or large scale surveys. Time use surveys are gradually spreading in Asia, as more and more countries are now conducting this survey. One finds rapidly growing awareness about the need to collect time use data to estimate paid and unpaid work of men and women in the economy and to measure and address gender inequalities prevailing in the society. Time use surveys, which began as small scale surveys in several developing countries in the 1970s and 1980s, are now increasingly graduating into large and national surveys.

These surveys however differ significantly from each other in terms of their objectives, survey design, methods of data collection, data analysis etc. As far as the objectives of these surveys are concerned, the objectives of these surveys vary from country to country. The most common objectives are (1) to collect data on all forms of work performed by men and women and (2) to get improved estimates of workforce, particularly those employed in informal employment and subsistence work. The other objectives are to measure quality of life of people, to understand leisure and social activities of people, to highlight contribution of women to agriculture etc. This is because there is a realization that conventional surveys are not able to provide accurate estimates of workforce in these countries.

When developing countries in Asia started conducting national time use surveys, they did not have standard concepts and methods to follow, as the available concepts and methods were developed keeping in mind the needs of developed countries. These countries therefore had to

select from the available methods or develop their own methods for conducting the survey. Consequently, one finds wide variations in the approaches and methods used. Given the constraints arising from the specific problems faced by these countries while conducting time use surveys, they have made difficult choices, within the constraints and the trade-offs arising from the constraints, with respect to survey design, sampling, data collection and field operations, classification of time use activities and analysis of time use data.

To start with, half of these countries have so far conducted only small scale isolated time use surveys, usually conducted by private researchers, scholars, and frequently conducted by official agencies. Barring a few exceptions, no country has conducted more than one survey so far, with the result that these surveys are far from being a part of the national statistical systems in these countries. There are serious methodological problems with respect to survey design, sampling, data collection methods, classification of activities etc: the sample is usually small and not representative at the national level, the reference period and the time sample are frequently small and unstable to represent the time use of people; the methods of data collection selected are not always likely to give accurate estimates; there are serious limitations with respect to the treatment of simultaneous activities and use of context variables and there are issues related to the classifications of time use activities used by many countries.

Another important observation about the time use studies in Asia (also in developing countries) is that these data are not used by these countries in official documents or in policy making. Several reasons have been forwarded for this state of affairs: Firstly, time use surveys are frequently pushed by international organizations rather than by driven by local needs. As a result, national governments do not really appreciate the need for the data. Secondly, there is a lack of national capacity to analyze the data in some cases, or the country is not in a position to bear the cost of analysis. The lack of cross country comparability also happens to be one of the reasons for the non-use / under use of the data, particularly by global organizations. Since the surveys are conceptualized, designed and carried out by national statistical offices without any globally accepted standard concepts and methods, (these are not really developed so far) the data generated do not remain much comparable. The data therefore frequently not respected as “good data” by experts.

In spite of the limitations of the concepts, definitions, data collection, data analysis, classification etc, concrete data have emerged in a large number of countries on unequal sharing of paid and unpaid work by men and women in the economy. A new understanding is emerging on nature and extent of gender inequalities prevailing in these economies. This dynamism indicates that these countries will be able to face the remaining challenges in the coming years.

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## ROUND-UP OF TIME USE STUDIES IN THE NORTH-EAST ASIAN REGION

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Japanese and Korean researchers in the North East Asian region have conducted their time use research programmes independently to date. China has recently entered the field. There is no harmonized time use survey, as is being conducted as in Europe.

The Korean Broadcast Station (KBS) carried out the first National Time Use Survey in 1983, with the help of Japanese Nippon Housou Kyoukai (NHK), which conducts surveys in Japan. However, the Korean grouping of activities is different from that of NHK. Both sets of surveys are conducted at the same time, in five year increments. Both NHK and KBS started their national time-use surveys to find the audience rating of radio and TV programs.

NHK started its National Time Use Survey in 1941, right before the Pacific War, modelled on BBC time use studies in Great Britain. After the war, the NHK restarted its survey in 1960, and have conducted their survey every five years.<sup>3</sup> After Japan's rapid economic growth in the 1960's, during the expanding service economy, people were more interested in leisure activities than before. In order to clarify the changing social life, the Japanese Statistic Bureau began to survey people's daily time allocation and leisure activities in 1976. The survey has been conducted every five years; the 2006 survey being the seventh. The earlier surveys used pre-coded activity lists, the sixth and seventh surveys allow respondents to give more detail and activities are coded after collection (to facilitate more comparative research with Europe). In Korea, the Statistics Bureau also started its time use survey in 1999, incorporating gender studies and other interests.

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<sup>3</sup> There is one irregularity. Surveys were conducted in 1965, 1970, 1973, 1980, 1985, 1990, 1995, 2000 and 2005.

Recently, the Chinese Statistic Bureau started their own national time use survey in 2008, and published its first report in 2009.

In 2012, the first IATUR conference in Asia will be held in Tokyo, Japan. This will be hosted by the Japanese Association of Time Use Research (JATUR), founded in 25 March of 2008. In the Tokyo conference, many more Asian researchers are expected to participate than before. The organizers plan to open a special session of time use studies in the North East Asian region. This is expected to inspire increasing interest in harmonized time use survey in future and co-operation among North East Asian time use researchers. Contact for further information: [m-fujiwara@u-shimane.ac.jp](mailto:m-fujiwara@u-shimane.ac.jp).

## **HOUSEHOLD'S TIME USE ON HEALTH CARE IN PAKISTAN**

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Pakistan's labor force survey asks households for the time used for 'work on caring for children or health care'. The analysis of time used by private households on health care allows for estimates in monetary terms. The nonmarket production of health care of own family members may hold as extension of National Health Accounts (NHA). NHA in Pakistan so far only cover monetary transactions of public and private entities on health. NHA can be enhanced by additional estimates of nonmonetary transactions and unpaid work, which is so far unaccounted. This extension is necessary, since NHA according to the internationally accepted System of National Accounts (SNA) generally do not take into account nonmonetary transactions. SNA allows for the production of satellite accounts in those cases where there is a need to expand the analytical capacity especially where the linkage of physical data sources (like time use) and analysis to the monetary accounting system (valuation) becomes possible (UN, 1993, 21.4).

Furthermore, it was found that in some cases the health care is carried out against pay to other households, so that the service becomes a market production and has according to System of Health Accounts (SHA) to be included in the regular NHA (OECD, 2010, 102).

### *Data and results*

The valuation of unpaid health care services is an important issue with respect to health policy and health insurance. Unpaid services in the households do influence the length of stay at the hospitals when patients are cared by their families, which is very common in maternal mother and child care and elderly and disabled individuals. WHO defines the expenditure for nonmarket production as the value established at the cost of resources (labour, supplies, etc.) used to produce the good or service in question (WHO, 2003, 295).

Services produced by the household have to be compared and valued with the market price for the same service, e.g. given by a maid or nurse, which are paid for their services. The valuation cannot be based on the opportunity costs, because e.g. days off are difficult to value, since 1. the share of the informal economy is high and respondents are not even able or willing to give their real income<sup>4</sup> and 2. since many caring activities will be carried out by unemployed/retired persons like grandparents etc. And 3. the household could have hired someone else at market rates to take care of the relative. Therefore the market price (1,500-3,000 PKR per month for a maid or 6,000-12,000 PKR for a nurse (Janjua, 2009, 18)) should be applied for valuation. Another 4. argument why to use market prices instead of the individual opportunity costs is the gender component. This means that the largest share of formally unemployed women's activities is unpaid and therefore not taken into account; its opportunity costs would be valued with zero. Household production satellite accounts should focus on the production of goods and services that could be readily accomplished using market substitutes for household members' time and they should be valued using replacement cost. For household time inputs to production this would be a replacement wage, which is the market wage of a specialist adjusted for differences in skill and effort between home and market production (Landefeld et al., 2009, 2).

Health care services provided without payment are a major input in some countries, which is unrecognized by NHA so far. In Pakistan more people receive unpaid personal assistance services than paid services from households; with the given data we are able to quantify them. The average weekly amount of unpaid care with 8 hours was as expected found to be much higher than the paid care work.

#### *Labour Force Survey*

The LFS gives insights on the hours 'During the last week worked in caring for children or health care' (LFS, 1999-2009). Respondents are individuals with ten years and above who are doing housekeeping and are not willing to work or are willing to work but do not find a job at the moment. The total hours worked are disaggregated by hours spent for the 'Own family' and hours spent for 'Other People for cash'. Pakistan time use survey 2007 shows the importance of health care compared to the care of children (FBS, 2009, 51). The share of health care is about one third (33.5%) of the total care on both, children and sick. These results differ between sexes and areas (the share is more than one half for rural and total men and only 11% for total women).

Raised to the total population there are about 2.6 billion hours worked on health care per year. Only a small share, less than 1%, of the given health care is carried out against pay. Women carry out between 97-98% of the health care. These figures have to be transformed via valuation from time dimension to monetary dimension to be applied in NHA.

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<sup>4</sup> The given income is either calculated as residual out of running businesses and therefore strongly depending on economic cycles or the officially given income is much lower due to the high importance of the informal sector.

According to SHA only the type of paid health care for other people has to be taken into account. Unpaid care for own family members as extended SNA activity is excluded from NHA, but can be covered in a separate estimation for health care. Therefore, we apply the hours worked of LFS and value them with market prices for health care services. Even if we apply the lower bound of a maid salary with 1000 PKR per month (Dawn, 2010) and only the official working time of 40 hours per week, the given amount of hours worked results in health expenditures for health care of more than 15 billion PKR in most years. This figure has to be seen in relation to the total health expenditure in 2005-6, which is 185 billion PKR and the private household's out of pocket payments, which are 119 billion PKR (FBS, 2009b, 38). In 2005-6 an additional amount of about 9% of the total health expenditure is health care given by households. The paid health care services which have to be included in NHA are given in the next table:

**Table 1**  
**Yearly values worked on health care in PKR**

|         | total value health care | value own family | value for sale |
|---------|-------------------------|------------------|----------------|
| 1999-00 | 14,657,886,370          | 14,654,368,870   | 3,517,500      |
| 2001-02 | 16,199,292,244          | 16,196,514,152   | 2,778,092      |
| 2003-04 | 19,021,155,531          | 19,020,210,098   | 945,433        |
| 2005-06 | 16,099,669,106          | 16,099,583,263   | 85,844         |
| 2006-07 | 15,764,481,297          | 15,764,114,367   | 366,930        |
| 2007-08 | 15,680,166,089          | 15,679,773,511   | 392,578        |
| 2008-09 | 16,463,798,613          | 16,463,655,400   | 143,213        |

Source: own calculations based on FBS, LFS, 1999-2009.

The value of paid services on health care which has to be included in NHA differs strongly over time from 85,000 PKR in 2005-6 up to more than 3.5 million in 1999-2000. Most households respond not to give any paid services to other households. However, in Time Use Survey, which is not connected to questions on employment and income, many respondents answer to have carried out care 'for non household sick and disabled adult'. These individuals have even spent about double the time on care for non household members than those who cared for household members (FBS, 2009, 151).

### *Conclusion*

With the help of time use information we are able to quantify the time used by private households on health care. The results can firstly be applied for an estimation of the nonmarket production of health care of own family members in monetary terms. For the NHA base year 2005-6 health care given by households has an additional share of about 9% of the total health expenditure. Secondly, in some cases the health care is carried out against pay to other house-

holds, so that the service becomes a market production and has to be included in National Health Accounts. This service has an average overall value of 1.2 million in the last available years, which should be taken into account regularly in NHA. Contact for further information: christian.lorenz@gmx.ch.

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## THE USES OF TIME DEPARTMENT, BARCELONA CITY COUNCIL

Elena Sintes Pascual

Uses of Time Department, Barcelona City Council

Barcelona City Council was a pioneer in the year 2003 in creating a specific department for the management of the daily life time, with the aim of providing solutions to the time management needs of city residents. With the creation of the Uses of Time Department, a political space was instituted for the specific purpose of designing and implementing local time policies. The policies that are promoted there are based on two basic principles: the consideration of the management of time as a right of citizens and the promotion of changes in social organisation, turn-

ing the administration into an active agent of this transformation. The action plans implemented seek to be a factor of social and territorial cohesion and of parity between men and women.

The Uses of Time Department works on four strategic lines:

- Observation, as a tool for learning about and analysing the real situation.
- Intervention, through the design and implementation of action plans, programmes and good practices.
- Consensus and collaboration with social agents.
- Awareness-raising, in order to change social concepts associated to the time value.

Time policies require the analysis of the evolution of society and its consequences on the rhythms of daily life, activities, travel and, above all, the social equalities generated by the current distribution of time. In this sense, the Uses of Time Department is promoting a process of research, analysis and diagnosis to allow access to detailed information on the urban reality, the imbalances and tensions in the uses of citizens' time, as well as the new practices of time administration. The research process is developed through the studies plan, the time laboratory and the organisation of congresses and conferences.

The studies plan is produced based on quantitative and qualitative analysis methodologies. The quantitative part is based mainly on the *Survey of living conditions and habits of the population* and the *Working Day Mobility Survey*, which exist from 1985. The qualitative part is based on the results of different discussion groups formed by Barcelona residents and of exploratory interviews carried out with different experts who are working on the theme of the social use of time.

Another research work line is that of giving support to intervention actions and projects through research oriented either towards helping in the design and planning of actions or the assessment and diagnosis of them. The neighbourhood, the main everyday reference for citizens, is the space of proximity where initiatives and experiments have been launched to make compatible working timetables with those of schools, administrative duties at the citizens' office, the bank, shopping, the market, time in the park and those tasks present in our everyday life.

The Barcelona City Council, sensitive to emerging phenomena and strongly committed to finding effective answers to new problems, has set off down the path of new policies of time, with the aim of designing a model of city that takes into account people's time requirements in order to improve the quality of daily life. More information: [www.bcn.cat/nust](http://www.bcn.cat/nust). Contact: [laboratorideltemps@bcn.cat](mailto:laboratorideltemps@bcn.cat).

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## Book notes

by Kimberly Fisher

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**Antonopoulos, R. and I. Hirway (eds.)**  
**Unpaid work and the economy – gender, time use and poverty in developing countries (2010)**

*Publisher:* Palgrave Macmillan  
*Languages Available:* English

This book explores the contribution of unremunerated work to the economies of developing countries. Development measures need to account for the full range of economic activity (paid and unpaid) as work routines (whether paid or not) are inter-related with well-being. Further, the poorest peoples in the least advantaged countries, particularly women, rely on unpaid activities to obtain basic life necessities (food, water, shelter and clothing). This book includes theoretical, methodological and policy-orientated discussion that reveals the importance of unpaid work in dynamics of gender and income inequality. Chapters cover research in Argentina, Bolivia, India, the Philippines, and South Africa, as well as general overviews of work in Africa, Asia, and Latin America.

**Armas, A., Contreras, J. and A. Váscquez**  
**La economía del cuidado, el trabajo no**

**remunerado y remunerado en Ecuador (2009)**

*Publisher:* Comisión de Transición, Instituto Nacional de Estadística y Censos  
*Languages Available:* Spanish

This report investigates one dimension of gender inequality in Ecuador – the provision of care for children and older people, provided mostly by the unpaid and largely unrecognised work of women. The report also considers how proper accounting of unpaid care work is essential for measuring development in Ecuador.

**Birch, E.R., Le, A.T. and P.W. Miller**  
**Household divisions of labour – Teamwork, gender and time (2009)**

*Publisher:* Palgrave Macmillan  
*Website:* <http://us.macmillan.com/householddivisionsoflabour>  
*Languages Available:* English

Birch, Le and Miller compare the distribution of paid and unpaid work tasks in households in developed countries. The authors compare couple households (with and without children) and single parent households, and also look at changing divisions of labour at different life course phases. The authors assess the degree to

which societies have – and also have not – moved towards gender equality.

**Durán, M.Á. and J.R. García,**  
**La investigación sobre el uso del tiempo**  
**(2009)**

*Publisher:* Centro de Investigaciones  
Sociológicas

*Website:* [http://www.cis.es/cis/opencm/ES/3\\_publicaciones/catalogo/ver.jsp?id=487](http://www.cis.es/cis/opencm/ES/3_publicaciones/catalogo/ver.jsp?id=487)

*Languages Available:* Spanish

Durán and García look at changing patterns of time use in Spain. In particular, the authors explore the complexity of social life and free time outside the realms of paid and unpaid work. The authors discuss how the human rights debates in Spain led to legislative changes that have given new rights to quality of life. The authors consider how these new legal rights have changed daily activities. The authors also consider the patchy history of time diary data collection in Spain, and examine the analytic implications of methodological differences in the survey designs.

**Durán, M.Á.**  
**O valor do tempo – Quantas horas te**  
**faltam ao dia? (2010)**

*Publisher:* Secretaria de Políticas Para as  
Mulheres – Presidência de República,  
*Languages Available:* Portuguese

This translation of Durán's 2007 book, *El Valor del Tiempo: Cuántas Horas te Faltan al Día?*, brings this analysis of daily activities, time pressure, and work-life balance in

Spain to a wider audience. Durán covers the development of time-use research techniques and the growth of the international time use community.

**Gerson, K.**  
**The unfinished revolution – How a new**  
**generation is reshaping family, work and**  
**gender in America (2010)**

*Publisher:* Oxford University Press  
*Languages Available:* English

Gender Sociologist Gerson challenges the obsession with “family values” in the United States, and demonstrates that structural constraints on daily activities imposed by the legal, economic and social systems, rather than a loss of moral standards, contribute to feelings of time pressure and inadequacy in American families. While women have taken on more paid work, men have not entered the unpaid work sphere with similar enthusiasm. Women and men's expectations of family life have changed, but the daily behaviour patterns of most Americans do not facilitate achieving these expectations. Gerson shows that women and men have adopted competing strategies to pursuing their family ideals. The author argues for workplace and community changes that increase scheduling flexibility would facilitate a more egalitarian family life.

**Goggin, G. and L. Hjorth (eds.)**  
**Mobile technologies – From telecommu-**  
**nications to media (2009)**

*Publisher:* Routledge

*Languages Available:* English

While not generally about time-use, this book does cover a number of issues relating to how mobile technologies affect daily behaviours. The book includes one time-relevant chapter, "Intimate Connections: The Impact of the Mobile Phone on Work/Life Boundaries", by Judy Wajcman, Michael Bittman and Judith E Brown.

**Gomez, A. and M. Ellwood**

**Time at the top – Productive work habits from CEOs and top executives (2009)**

*Publisher:* Pace Productivity Inc.

*Website:* <http://www.getmoredone.com/servicesproductsbuy.html>

*Languages Available:* English

Gomez and Ellwood analyse the work behaviours and lifestyles of business leaders based on time-use information collected via a timecorder, a mobile pre-coded diary that records time when people press buttons to mark changes of activity. The book offers tips for ordering routines to increase productivity while also protecting individuals' overall quality of life.

**Goodin, R.E., Rice, J.M., Parpo, A. and L. Eriksson**

**Discretionary time – A new measure of freedom (2010)**

*Publisher:* Policy Press

*Languages Available:* English

Goodin, Rice, Parpo and Eriksson reassess the traditional basic categories of activity used in time-use research. The authors argue that people only need to engage in paid work, unpaid work, and personal care up to a point, and once people stray beyond the normal range of time people in sex, age and other demographic groups devote to these basic categories of activity, the excess time should be considered as part of discretionary time. The authors use data from Australia, Finland, France, Germany, Sweden, and the United States to demonstrate how use of free time is related to the wider concepts of freedom and quality of life.

**Krueger, A.B. (ed.)**

**Measuring the subjective well-being of nations – National accounts of time use and well-being (2009)**

*Publisher:* University of Chicago Press

*Languages Available:* English

Krueger, Kahneman, Schkade, Schwarz and Stone demonstrate how collecting emotions and stress measures alongside time-use data allows construction of indexes of well-being which allow comparison of social policies across nations and the assessment of the well-being of populations. These authors invited commentary on their methods and conclusions from the other eight contributors, before offering a final rejoinder. The book sets out the case for including subjective well-being as a key indicator of the state of nations alongside other conventional economic measures, like GNP.

**Leccardi, C.**

**Sociologie del tempo – Soggetti e tempo  
nella società dell'accelerazione (2009)**

*Publisher:* Laterza

*Languages Available:* Italian

Leccardi examines the factors contributing to increased feelings of time pressure. The book first looks at changing understandings of time, and discusses why people now feel time elapses more quickly. Leccardi then considers how younger people's perceptions of time and the horizons over which events are relevant to daily choices have recently evolved. Leccardi argues that people feel anxiety from mixing their perceptions of the present and the future.

**Matuska, K. and C.H. Christiansen (eds.)  
Life balance – multidisciplinary theories  
and research (2009)**

*Publisher:* Slack Incorporated

*Website:* <http://www.slackbooks.com/lifebalance>

*Languages Available:* English

While not specifically about time-use, this book explores a number of time relevant issues relating to measuring work-life balance. One chapter, "Time Use Imbalance: Developmental and Emotional Costs" by Jiri Zuzanek, uses the recording of emotions alongside activities, to explore the concept of unbalanced life patterns. Zuzanek shows the correlations between emotions, health and general well-being.

**Peters, P.F.**

**Time, innovation and mobilities – Travel  
in technological cultures (2010)**

*Publisher:* Routledge

*Website:* <http://www.routledge.com/books/details/9780415581233/>

*Languages Available:* English

This book offers both a theoretical and methodological exploration of the modelling of travel behaviours. Peters shows how travel is integrated within daily schedules. Factors beyond the primary aim of any specific segment of travel influence the choice of mode and route. Travel needs to be examined in context of other behaviours. Peters also explores the influence of mobile technologies on travel decisions, and the opportunities for using these technologies for data collection.

**Ploeg, M.V., Breneman, V., Farrigan, T.,  
Hamrick, K., Hopkins, D., Kaufman, P.,  
Lin, B.H., Nord, M., Smith, T., Williams,  
R., Kinnison, K., Olander, C., Singh, A.  
and E. Tuckermanty**

**Access to affordable and nutritious food  
– Measuring and understanding food  
deserts and their consequences: Report  
to congress (2009)**

*Publisher:* United States Department of  
Agriculture

*Website:* <http://www.ers.usda.gov/Publications/AP/AP036/AP036.pdf>

*Languages Available:* English

This books examines food policy, eating patterns and health in the United States. While some sections have time relevance,

the main chapter of interest to time-use researchers is “Time Costs of Access to Food”. This chapter uses the USDA-funded eating and drinking supplement to the American Time Use Study, which covers not only instances of secondary eating and drinking, but also the places people shop and the type of food that they purchase and consume. The authors have particular interest in the eating habits of people who do not live in close proximity to healthy food retailers.

**Pääkkönen, H.**

**The time and time use of families – Studies about total workload, voluntary work, children and time pressure (2010)**

*Publisher:* Statistics Finland

*Website:* <http://acta.uta.fi/teos.php?id=11324>

*Languages Available:* English and Finnish

This report uses the sequence of four national time use studies, conducted at approximately 10-year intervals, to assess changes in the total committed time of Fins (including paid and unpaid work, voluntary activities and care activities). Pääkkönen examines how changing daily schedules and distributions of tasks in households in Finland shape family time and perceptions of time pressure.

**Salverda, W., Nolan, B. and T. Smeeding (eds.)**

**The Oxford handbook of economic inequality (2009)**

*Publisher:* Oxford University Press

*Website:* <http://ukcatalogue.oup.com/product/9780199231379.do>

*Languages Available:* English

This handbook contains chapters exploring a wide range of approaches to measuring economic inequality. The one chapter directly relevant to time-use research is “Inequality, Consumption and Time Use” by Nancy Folbre. This chapter compares the daily activities of women and men, and considers the association between paid and unpaid work, consumption behaviours and financial power.

**Shove, E., Trentmann, F. and R. Wilk (eds.)**

**Time, consumption and everyday life – Practice, materiality and culture (2009)**

*Publisher:* Berg Publishers

*Website:* <http://us.macmillan.com/timeconsumptionandeverydaylife>

*Languages Available:* English

This book explores the relationship between changes in daily behaviours and changes in patterns of consumption. The chapters cover topics including time stress and burn-out arising both from fluctuating perceptions of time and changes in activity schedules. The authors particularly focus on patterns of purchase of goods and services, and the way these purchases in turn shape behaviours. The authors also consider how changes in consumption might both lead to more sustainable patterns of living and increased well-being. Individual chapters

cover research in developed countries in North America, Europe and Asia.

**Svendsen, G.T. and G.L.H. Svendsen (eds.)**

**Handbook of social capital – The troika of sociology, political science and economics (2009)**

*Publisher:* Edward Elgar Publishing Ltd  
*Languages Available:* English

This packed volume includes a number of chapters on social capital with a vague relevance to time use research. One chapter, “The Sociability of Nations: International Comparisons in Bonding, Bridging and Linking Social Capital” by Roger Patulny, uses time-use data to examine how measures of daily behaviour contribute to monitoring changes in social capital resources.

**Sweet, S., Casey, J., Kossek, E. and M.P. Catsoupes (eds.)**

**Work and family encyclopedia (2009)**

*Publisher:* Sloan Work and Family Research Network  
*Languages Available:* English

This compendium includes short articles covering a range of research approaches to studying family life and how changing patterns of work have changed conditions for families. Many sections have a general relevance to time-use research. Jennifer Schmidt’s chapter “Experience Sampling Method: Measuring Work and Family Time Commitments” discusses the use of beeper collection of time and attitudes for measur-

ing work-life balance and the changing experience of families. Examples from the United States feature prominently in this vast volume.

**UNECE**

**In-depth review on time use surveys in different countries (2010)**

*Publisher:* UNECE

*Website:* <http://www.unece.org/stats/documents/ece/ces/2010/25.e.pdf>

*Languages Available:* English

The report compares time-diary methodologies in studies carried out in Finland, Germany and the United States. The report also assesses the policy uses to which these time-use data have been put.

**Verde, F.M.L**

**Sociologia del tempo libero (2009)**

*Publisher:* Laterza

*Website:* <http://www.liberonweb.com/asp/libro.asp?ISBN=8842091359>

*Languages Available:* Italian

This book explores philosophical writings from Aristotle on the meaning and purpose of work and free time. Lo Verde then examines how changing definitions of work affect people’s expectations for their leisure time. In particular, Lo Verde is concerned with the social control effect of business management of employee’s work schedules, which in turn restrict the range of patterns available for leisure.

**Ward, E.**

**Chow Hounds: Why Our Dogs Are Getting Fatter – A Vet's Plan to Save Their Lives (2010)**

*Publisher:* Health Communications Inc.

Books

*Website:* <http://www.hcibooks.com/p-4002-chow-hounds.aspx>

*Languages Available:* English

Ward examines how the tendencies of American's to lead more sedentary lives and eat to excess has lead to a rise in obesity and inactivity among pets. Obesity shortens dog's lives and increases the risk of health problems in pets. Ward argues that permitting animals to develop weight problems is a form of abuse. Ward sets out strategies for modifying pet behaviours to restore companion animals to healthier lives (which in turn also may improve living conditions of pet owners).