



Diary versus questionnaire information on time spent on housework – The case of Norway

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Abstract

Information on housework-time is important for understanding the daily life organisation of different population groups, especially parents. However, time-use surveys, which are usually seen as the best method for capturing information on unpaid work, are very costly and are conducted rather rarely in Norway. Hence, we want to assess whether housework can be adequately measured by other methods. Internationally, a great deal of work has been undertaken in cross validating diaries and questionnaires. It is often found that questionnaires generate somewhat larger estimates for housework-time than diaries, but the reporting gap varies between groups of people. It is assumed that social desirability plays an important role so that people feeling pressures to do much housework over-report their contributions more than others. In Norway, the housewife role has nearly vanished, and people now rarely meet social prescriptions to do much housework. This might imply less over-reporting in questionnaires. The present paper compares estimates for housework-time from the diary-section and the questionnaire-section in the latest Norwegian Time Use Survey with particular focus on parents. Looking at all adults we find only modest differences in the time-estimates between the two methods, but the gap varies considerably between age groups.

JEL-Codes: C81, D13, J16, O17, R20

Keywords: Time allocation, data collection and data estimation technology, housework, measuring time-use

The paper is based on a project titled *The new working life: New working time patterns among fathers and mothers and couples of parents*, funded by the Norwegian Research Council's program on Working Life Research, and by Statistics Norway. An earlier version of the paper was presented at the 25th IATUR Conference on Time Use Research - COMPARING TIME in Brussels, 17-19 September 2003. We would like to thank our colleagues Randi Kjeldstad, Silje Vatne Pettersen and Marit Rønsen for helpful comments on earlier versions of the paper. We have also benefited from useful suggestions from participants at the IATUR conference in Brussels and from eIJTUR's two reviewers.

1 Introduction

In Norway, as in many other countries, the significant raise in women's labour market participation during recent decades has entailed an increased interest in issues concerning peoples', and particularly parents', organisation of housework and childcare, and hence, also in high quality data on unpaid labour. The Norwegian Time Use Surveys reveal major changes in people's time-use since the beginning of the 1970s, and one of the most significant alterations is found in time spent on housework such as meal preparation, cleaning, laundry etc. (Kitterød 2002a, Vaage 2002, pp. 38-40). Consistent with findings in many other countries (Bianchi et al. 2000, Gershuny 2000, Robinson and Godbey 1997) we see that women's housework-time has decreased considerably, whereas there has been a slight increase among men. This is true for parents as well as for other demographic groups. Consequently, the gender difference has dramatically diminished, although in most couples women still do the bulk of the household chores. Such observations are based on two types of information, questionnaire data and diary data, the congruence of which is in question. As diary data are rather expensive to collect, the need for alternative measurements of housework-time is widely recognized, and the importance of methodological research in this field is emphasized. The purpose of this paper is to compare measurements of time spent on housework from the questionnaire-section and the diary-section in the latest Norwegian Time Use Survey in order to assess whether questionnaire information in this field can be used to analyse people's daily life practices.

It is well established that time spent on unpaid work is most accurately measured through time-use studies where respondents give an account of their activities in a structured diary covering one or more days. Since people report their activities in their naturally occurring order and shortly after they have been undertaken, over- or under-reporting of certain tasks is minimized. All time periods are to be accounted for, and the 24 hours frame of the diary has to be respected. Hence, estimates from time use studies are often utilised as a benchmark against which measures generated by alternative methods are assessed (see for instance Press and Townsley 1998, Robinson and Godbey 1997, Marini and Shelton 1993, Niemi 1993). Most of these methodological studies have shown that direct questions about housework-time produce somewhat higher estimates than time diaries. However, in a recent analysis of a Danish Time Use Survey, Bonke (2004) reports the opposite finding, namely that the questionnaire approach gives less reported household work than the diary approach. Although direct questions on housework-time are usually seen as less reliable and valid than diary estimates in identifying precisely how much time people spend on domestic labour, such questionnaire information is often used in analyses of various aspects of people's daily lives, for instance of the division of household chores among spouses and of parents' time-use more generally (see for instance Kitterød 2002b, Bond and Sales 2001, Bianchi et al. 2000, Greenstein 2000, Hellevik 2000, Brines 1994).

As information on housework-time is most urgently needed in analyses of parents' balancing between family work and employment, and in exploring the division of unpaid labour between mothers and fathers, special attention is paid to parents with children living in the household. Since diary-based time use surveys have until now been conducted only every tenth year in Norway, information on housework-time collected through other methods is at times utilised in analyses in this field. However, questionnaire information on housework-time has usually been captured by questions with pre-categorized alternatives such as 0-4 hours per week, 5-9 hours,

10-14 hours etc. Hence, until now good comparisons between measures from diaries and questionnaires were not possible. In the Norwegian Time Use Survey 2000-01 time spent on housework was registered in hours per week in an interview prior to the participants' diary keeping. Thus we can now explore possible discrepancies between measures of housework-time from the diary and the questionnaire. In the present paper we look at averages for various population groups and undertake multivariate analyses for parents.

2 Possible explanations of observed discrepancies between diary and questionnaire measures

Whereas extensive methodological work has revealed a reporting bias across methods regarding time spent on housework, the mechanisms causing this reporting gap are disputed. In a review article Marini and Shelton (1993) mention random error, recall or memory problems in questionnaires, and double counting of simultaneous tasks as some possible explanations. As housework is usually carried out at irregular intervals and in spells of varying duration, there is, it is argued, reason to believe that people have difficulties in estimating accurately the number of hours spent on housework per week in a direct question. As for double counting, it is claimed that people, and particularly women, sometimes carry out housework as a secondary activity while a primary activity is undertaken simultaneously. In such cases the primary activity is registered as a main activity in the time diary whereas simultaneous household chores are recorded as secondary activities and as such excluded in most reports on time-use. If respondents include simultaneous housework tasks when asked direct questions about their time input, we get higher estimates.

Reporting gaps on housework-time between methods may also be due to varying conceptions of which activities are to be counted as housework (Baxter and Bittman 1995). In time use studies, activities are usually categorized according to a pre-defined coding list. Hence, the researchers decide which tasks are to be classified as housework. Survey questions asking how much time people usually spend on housework per day or week leave it more to the respondents to decide what activities to include.

Although a reporting bias across methods is found for most groups, the size of this gap varies. Analyses in the USA as well in Australia suggest that women over-report somewhat more than men. For instance, using the Jackson validity study to compare respondents' weekly estimates of their time spent on housework from stylised questions, with estimates from time diaries, Robinson (1985, p. 47) finds a more substantial over-reporting for women than men. Baxter and Bittman (1995, pp. 41-42) report a similar finding when they compare the estimates for time spent on housework based on an Australian survey using stylised questions, with those from the Australian Time Use Survey 1992. According to Marini and Shelton (1993) the more serious over-reporting among women than men stems from the fact that women continue to do the majority of the housework, and that much housework entails more over-reporting (Marini and Shelton 1993). Press and Townsley (1998) argue that one might also expect less reporting bias for women than for men because spending much time on housework entails better information on the time required for various chores. However, they too find a more significant reporting gap between the questionnaire and the diary for women than for men.

Whereas diaries and questionnaires produce somewhat different estimates for time spent on housework, the two methods often reveal roughly similar patterns of variation between subgroups (Baxter and Bittman 1995, Marini and Shelton 1993, Robinson 1985). Therefore, it is argued, in

spite of the fact that direct questions tend to entail somewhat biased estimates, they can provide a fairly good ordinal scaling and thus be useful for multivariate analyses of life-style differences in people's contributions at home.

However, Press and Townsley (1998) contend that the reporting gap on housework-time across methods cannot be fully explained by memory, double counting, or differing conceptions of what is to be counted as housework, but rather seems to be deeply gendered and associated with social desirability and social norms. The inflation in the direct question context is, they maintain, the outcome of different and uneven social perceptions of the appropriate roles for men and women regarding their contributions at home. Their analysis shows that while both men and women tend to over-report their housework in direct questions, there are significant gender and class differences in the level and structure of the reporting gap across surveys. Gender attitudes play a crucial role in this context and affect husbands' and wives' reporting in opposite directions. Husbands with egalitarian attitudes tend to over-report their contributions more than traditional husbands, whereas the reverse pattern is found for wives. Egalitarian wives are less vulnerable to normative expectations concerning women's duties at home and hence are less prone, than other wives, to over-report in questionnaires. The authors argue that gender attitudes are correlated with age and education, so that more educated and young husbands are likely to feel pressure to do much housework and therefore exaggerate their time input. For women, egalitarian attitudes combined with employment entail more precise reporting of housework among the young than the old.

In Norway, the traditional housewife role has nearly vanished, at least among young women and those in their 40s and 50s (Danielsen 2002, pp. 175-180). Women now rarely look upon themselves as housewives (Bø and Molden 2000), and mothers of small children usually have paid employment. Periods of leave or non-employment are chosen primarily in order to take care of children and not to do housework. In general, childcare now constitutes a far more central part of parents' identity than housework. Hence, social pressures to do much housework are less pronounced than before, and this is true for both women and men. Although Norwegian work-family policies aim at encouraging fathers to participate more actively at home, the focus is more on involvement in children than in housework (Brandth and Kvande 2003, pp. 149-169). Egalitarian fathers are probably more likely to overstate their childcare than their housework. Hence, over-reporting of housework in direct questions because of social desirability is presumably rather modest among the young and the middle aged in Norway. Elderly women, however, who married and had children in the 1950s and 1960s, often have a rather strong "housewife identity" (Thorsen 2003) and should, according to Press and Townsley's reasoning, be expected to exaggerate their housework-time in questionnaires.

Inaccurate reporting in questionnaires because of recall problems or varying conceptions of which activities should be considered as housework is of course likely to come about in Norway as in other countries. However, as the amount of housework has been significantly reduced and as housework chores are increasingly being planned and organized in order to be conducted as efficiently and quickly as possible (see for instance Kristjansson 1999, Bjørnberg 1992, p. 94) it might be expected that people can more easily keep track of their time-use and report this rather accurately in direct questions.

Whereas most researchers regard the higher time-estimates produced in questionnaires compared to time diaries as a consequence of the inferior character of the questionnaire approach in measuring housework-time, it has also been argued that diary estimates on housework-time may

be somewhat incorrect. Rydenstam (2001) maintains that diary-based estimates for unpaid work time are in fact extreme net measurements. Short breaks in order to rest, drink coffee, read the newspaper etc. are coded as leisure time or personal needs and not included in the estimates for housework-time. As far as paid work is concerned, such short breaks are incorporated in the estimates. Rydenstam shows that if short breaks in periods of unpaid work are regarded as inevitable parts of this work, estimates for housework-time increase significantly, especially for women. If people conceive such breaks as an integrated and unavoidable part of their housework, their understanding of their time inputs will necessarily differ from what is revealed through time diaries. Hence, somewhat higher estimates in questionnaires than in diaries should be expected.

3 Recording housework-time in the Norwegian time use survey

The fourth Norwegian Time Use Survey was carried out in 2000-01. The sample was randomly drawn from people 9-79 years of age. Each participant kept a diary for two consecutive days, and data were collected during a whole year. The diaries had fixed ten-minute time intervals, and for each time-slot participants were asked to write down their most important activity in their own words. Simultaneous activities were captured as well, and so was time spent alone and with various groups of people. Activities were subsequently coded according to a list with 176 activity codes, developed in accordance with the Eurostat recommendations. The following activities were categorised as housework: Preparation of food, laying the table, cleaning the table, doing the dishes, house cleaning, doing laundry, ironing and mending clothes, private production of food and heating, wood chopping and water fetching. Consistent with results from time use surveys in many other Western countries, the Norwegian survey showed that most time was spent on food preparation, laundry and housecleaning, whereas very little time was allocated to mending clothes, production of food, heating, chopping wood, and fetching water (Vaage 2002, pp. 112-114).

Prior to the diary keeping an interview was carried out with each respondent. Towards the end of the interview, people were asked the following summary question about time spent on housework: *About how many hours do you usually spend on housework per week? Housework includes activities as food preparation, house cleaning, laundry and mending of clothes, but not looking after and caring for children or ill people.* The exact numbers of reported hours were recorded. This way of asking differs somewhat from the practice in surveys in many other countries where time-use is captured for various household chores separately (see for instance Baxter and Bittman 1995), or where participation in various tasks is recorded first, followed by a summary question on time spent on all the relevant tasks together (see for instance Bonke 2004). Whereas questionnaires sometimes also capture time spent on childcare and/or maintenance work, only ordinary housework was recorded in the questionnaire-section in the latest Norwegian Time Use Survey.

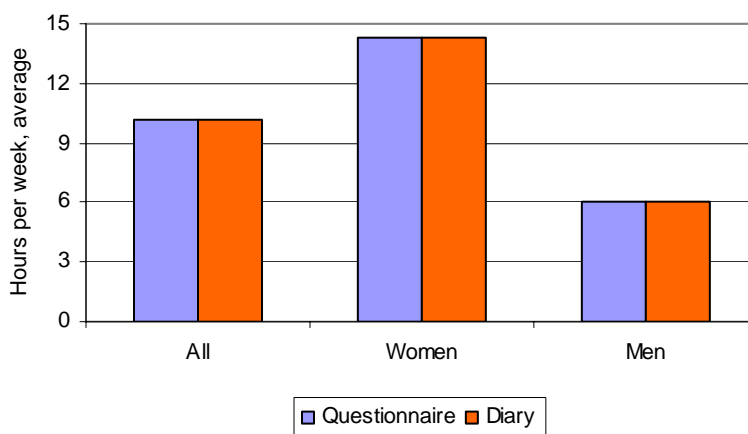
In the present paper, we compare estimates of the average number of hours spent on housework obtained from diary and questionnaire data. Reporting gaps are examined for the total population as well as for men and women and various age groups, and special attention is paid to mothers and fathers with children living in the household. Since the direct question in the questionnaire-section refers to approximately the same activities that are coded as housework in the diary-section, all the housework activities from the diary are included in the analyses. Consistent with most methodological work in the field, only the primary activities from the diary are considered.

However, some information on secondary activities is presented in order to demonstrate that very little housework was recorded as simultaneous activities. The diary estimates are based on two diary days per participant, whereas the questionnaire estimates are, of course, based on one observation per respondent. In comparing time-use estimates from the diary and the questionnaire in the latest Danish Times Use Survey, Bonke (2004) included only diary observations representing "rather normal" days according to a question asked at the end of each diary day. In Norway participants were asked at the end of each day whether they had spent their time approximately as they usually did on this weekday, or if the day had been particular in some way. Since as much as 38 per cent of the days were characterised as particular days,² it seems that particular days are rather normal. Hence, we decided to include them in the analyses.

4 Estimates by gender and age

Figure 1 shows the estimated average weekly housework hours from the questionnaire and the diary for all adults 16-79 years of age, and for women and men separately. Only main activities are included in the diary estimates. The two methods produce almost identical results. For all adults the reporting gap constitutes only 0.03 hours per week. For women there is no discrepancy at all between methods, whereas the discrepancy is 0.04 hours per week for men. Table 1 demonstrates that if secondary activities are included in the diary estimates, the diary actually produces slightly larger measures for weekly housework-time than the questionnaire, and this is true for both women and men. However, the difference is small and hardly statistical significant. In agreement with most of the previous methodological research in the field we chose to incorporate only main activities in the following. Table 1 reveals that the time allocated to housework as a secondary activity is rather modest. It amounts to 0.34 hours per week for all adults, - about half an hour per week for women, and 0.18 hours per week for men.

Figure 1
Time spent on housework, from questionnaire
and diary information, among women and men 16-79 years.



Source: The Norwegian Time Use Survey 2000-01.

² The proportion is almost identical for women and men, but is somewhat higher for weekend days than for weekdays, 44 per cent and 36 per cent respectively.

Contrary to other researchers' findings (Marini and Shelton 1993, Press and Townsley 1998), we do not see a larger reporting gap for women than for men, at least not when we look all adults. Both the diary and the questionnaire show that women spend far more time on housework than men, and the instruments produce quite similar gender differences. According to the questionnaire, men's housework-time constitutes 43 per cent of women's time. The diary-based proportion is 42 per cent.

Table 1
Time spent on housework, from questionnaire and diary information, among women and men 16-79 years. Average number of hours per week (standard errors in parenthesis).

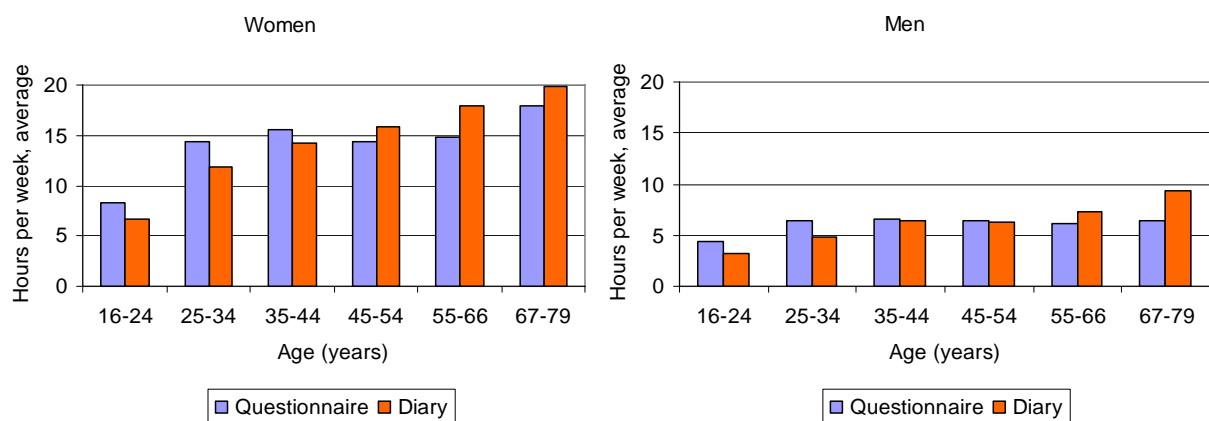
	Questionnaire	Diary, main activity	Diary, main + secondary activity	Diff I (Q - D, main activity)	Diff II (Q - D, main + secondary Activity)	Number of observations
	Hours	Hours	Hours	Hours %	Hours %	Questionnaire/diary ¹
Women	14.25 (0.24)	14.25 (0.21)	14.75 (0.21)	0.00 0	-0.50 -4	1461/2920
Men	6.09 (0.14)	6.05 (0.14)	6.23 (0.14)	0.04 1	-0.14 -2	1516/3031
All	10.17 (0.16)	10.14 (0.13)	10.48 (0.14)	0.03 0	-0.31 -3	2977/5951

¹ As each respondent kept a diary for two days, the number of diary days is twice the number of respondents. The time-estimates from the diary are based on the diary days, whereas the time-estimates from the questionnaire are based on the number of respondents.

Source: The Norwegian Time Use Survey 2000-01.

However, looking at different age groups reveals more significant discrepancies between questionnaire and diary estimates, and the differences also have opposite directions for some groups (figure 2 and table 2).

Figure 2
Time spent on housework, from questionnaire and diary information, by gender and age



Source: The Norwegian Time Use Survey 2000-01.

Both for women and men we see that for the youngest age groups, 16-34 years, questionnaires produce somewhat higher estimates for housework-time than diaries, whereas the contrary applies to the older age groups. For the middle-aged the difference across methods is rather

modest, while it is more significant for the young and the elderly. These results are not easily explainable. The finding that elderly women report less housework-time in the questionnaire than in the diary goes against the pattern we should expect if social desirability were at play. These women belong to cohorts with a strong housewife identity, and should, according to the social desirability hypothesis, exaggerate their contributions at home in the questionnaire. One possible explanation for the higher time-estimates in diaries than in questionnaires among the elderly might be that old people consider some of their housework chores as leisure activities and consequently do not account for these in the questionnaire. For the youngest age groups the higher estimates in questionnaires than in diaries may be associated with the fact that most young people find housework rather boring and thus misconceive their own time inputs as more extensive than they really are. As today's young Norwegians rarely feel social pressure to do much housework, this discrepancy across methods is hardly due to deliberate over-reporting in the questionnaire.

Table 2
Time spent on housework, from questionnaire and diary information, by gender and age
Average number of hours per week (standard errors in parenthesis)

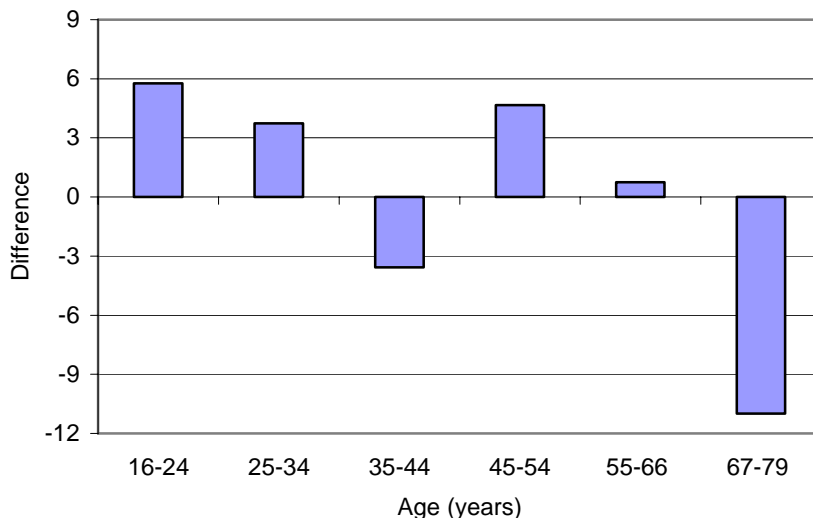
	Questionnaire	Diary	Difference (Q-D)		Number of observations
	Hours	Hours	Hours	%	Questionnaire/diary ¹
Women					
16-24 years	8.31 (0.54)	6.63 (0.39)	1.68	20	181/362
25-34 years	14.38 (0.59)	11.80 (0.37)	2.58	18	305/610
35-44 years	15.54 (0.51)	14.25 (0.41)	1.29	8	309/617
45-54 years	14.32 (0.54)	15.85 (0.47)	-1.53	-11	247/494
55-66 years	14.84 (0.46)	17.89 (0.54)	-3.05	-21	281/561
67-79 years	17.89 (0.77)	19.91 (0.70)	-2.02	-11	138/276
Men					
16-24 years	4.44 (0.29)	3.16 (0.22)	1.28	29	209/419
25-34 years	6.42 (0.30)	4.82 (0.24)	1.59	25	300/600
35-44 years	6.50 (0.32)	6.47 (0.31)	0.03	0	293/585
45-54 years	6.36 (0.31)	6.30 (0.32)	0.06	1	262/524
55-66 years	6.20 (0.33)	7.34 (0.36)	-1.14	-18	307/613
67-79 years	6.39 (0.55)	9.30 (0.55)	-2.91	-46	145/290

¹ As each respondent kept a diary for two days, the number of diary days is twice the number of respondents. The time-estimates from the diary are based on the diary days, whereas the time-estimates from the questionnaire are based on the number of respondents.

Source: The Norwegian Time Use Survey 2000-01.

Both questionnaires and diaries demonstrate that elderly people spend more time on household chores than younger people, but questionnaires seem to generate somewhat more modest differences among age groups than diaries. Also concerning gender differences the two methods produce rather similar results in demonstrating that irrespective of age, women spend far more time on housework than men (figure 3). Again, the magnitude of the gender difference varies somewhat across methods. For most age groups the questionnaire produces slightly smaller gender differences than the diary, but for certain categories, particularly for the oldest ones, the diary generates the smallest gender difference.

Figure 3
Differences between questionnaire and diary estimates
(questionnaire - diary) when it comes to men's time spent
on housework as a per cent of women's time, by age



Source: The Norwegian Time Use Survey 2000-01.

5 Estimates for mothers and fathers

In the Norwegian context knowledge about housework-time is particularly salient for parents with children in the household. The work-family balance of mothers and fathers has been a central issue in policy and research in Norway for decades, and information on housework contributions is a crucial factor in analyses in the field. Therefore it is important to cross-validate various approaches for capturing parents' time inputs at home in order to see if different methods produce similar or diverging conclusions. Table 3 shows estimates for housework-time from the questionnaire and the diary for women and men in different family phases.³ We see that for married fathers with young children as well as for those with older children, the discrepancy between the two approaches is fairly modest. For those with children 0-6 years of age the questionnaire produces somewhat larger estimates than the diary, the difference being about 1 hour per week on average. For fathers with older children the difference between the methods is even smaller, about half an hour per week. In fact, the divergence across methods is more modest for married fathers than for men in most other family phases.

³ Family phase classifies individuals mainly by age, marital status, and whether or not they have children. The classification distinguishes between married and single persons. Cohabitants are regarded as married, and single persons include both unmarried and previously married individuals. The respondents were asked if they were married or lived in a stable relationship as cohabitants, with the possibility of answering "married", "cohabitant" or "no". Those choosing the second alternative are counted as cohabitants. The term "single" refers to an individual's marital or cohabitational status, not to whether one lives alone or with others. The categories with children include individuals with children (biological children, step-children or adopted children) under the age of 20 living in the household. As there are rather few single parents in the sample, especially single fathers, the analyses in this section focus primarily on married and cohabiting parents.

Table 3
Time spent on housework, from questionnaire and diary information, by gender and family phase. Average number of hours per week (standard errors in parenthesis).

	Questionnaire	Diary	Difference (Q - D)		Number of observations Questionnaire/diary ¹
	Hours	Hours	Hours	%	
WOMEN					
Single, 16-24 years in parents' household	4.87 (0.63)	4.90 (0.55)	-0.03	-1	76/152
Other single, 16-24 years	8.04 (0.65)	5.28 (0.55)	2.76	34	49/98
Single, 25-44 years	6.50 (0.43)	7.13 (0.60)	-0.63	-10	76/151
Married, 16-44 years, no children	10.81 (0.64)	9.64 (0.56)	1.17	11	107/214
Single parents	15.38 (0.83)	14.26 (0.78)	2.10	13	71/142
Married, children 0-6 years	18.26 (0.69)	14.68 (0.44)	3.58	20	253/506
Married, youngest child 7-19 years	16.29 (0.51)	15.40 (0.50)	0.89	5	237/474
Married, 44-66 years, no children	14.72 (0.40)	17.41 (0.47)	-2.69	-18	331/662
Married, 67-79 years, no children	21.00 (0.96)	22.51 (0.88)	-1.51	-7	85/170
Single, 44-66 years, no children	12.07 (0.98)	13.39 (0.67)	-1.32	-11	115/229
Single, 67-79 years, no children	13.68 (0.95)	16.60 (0.98)	-2.92	-21	61/122
MEN					
Single, 16-24 years in parents' household	3.04 (0.26)	2.32 (0.23)	0.72	24	135/271
Other single, 16-24 years	7.17 (0.74)	3.91 (0.49)	3.26	45	36/72
Single, 25-44 years	5.98 (0.34)	4.34 (0.32)	1.64	27	147/293
Married, 16-44 years, no children	5.87 (0.42)	4.61 (0.35)	1.26	21	111/222
Married, children 0-6 years	7.19 (0.41)	6.15 (0.31)	1.04	14	244/487
Married, youngest child 7-19 years	6.05 (0.30)	6.38 (0.35)	-0.33	-5	237/475
Married, 44-66 years, no children	5.18 (0.25)	6.16 (0.31)	-0.98	-19	348/695
Married, 67-79 years, no children	5.61 (0.60)	8.16 (0.58)	-2.55	-45	121/242
Single, 44-66 years, no children	10.31 (0.76)	9.46 (0.70)	0.85	8	87/174
Single, 67-79 years, no children	9.15 (0.97)	13.63 (1.23)	-4.48	-49	32/64

¹ As each respondent kept a diary for two days, the number of diary days is twice the number of respondents. The time-estimates from the diary are based on the diary days, whereas the time-estimates from the questionnaire are based on the number of respondents

Source: The Norwegian Time Use Survey 2000-01.

For mothers the discrepancy between questionnaire and diary estimates is somewhat more pronounced, and unlike the case for fathers, with particularly modest reporting gaps across methods, mothers do not stand out in the family phase. For mothers with young children the diary gives an average of 3.58 hours, or 20 per cent, less housework per week than the questionnaire. For those with older children, the difference between methods is only 0.89 hours per week. As today's mothers barely meet normative prescriptions for doing much housework, it is unlikely that conscious over-reporting in the questionnaire causes these discrepancies. A more plausible explanation is probably that housework chores are often intermingled with other activities in this family phase, especially with childcare, so that at times it is difficult to tell where one activity ends and another starts. An alternative or supplementary explanation is that having small children entails rather fragmented housework patterns for mothers so that exact calculation in direct questions is difficult. Rydenstam (2001) has shown that women's housework is actually rather fragmented and include more interruptions than men's housework. Hence, it is also possible that

mothers calculate gross accounts of their housework-time in the questionnaire by including short breaks of resting.

Table 4
Men's time spent on housework as a per cent of women's time,
from questionnaire and diary information, by family phase

	Questionnaire %	Diary %
Married, 16-44 years, no children	54.30	47.82
Married, children 0-6 years	39.38	41.90
Married, youngest child 7-19 years	37.14	41.43
Married, 44-66 years, no children	35.19	35.38
Married, 67-79 years, no children	26.71	36.25

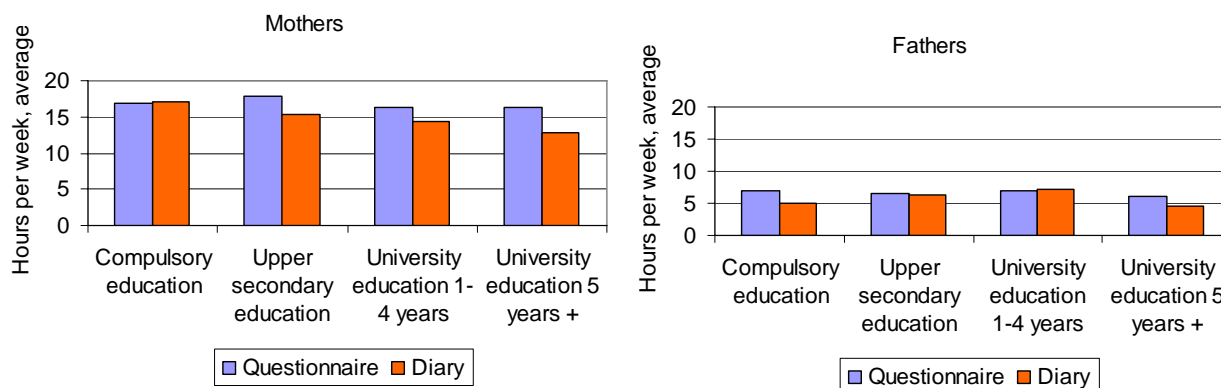
Source: The Norwegian Time Use Survey 2000-01.

Gender differences in time spent on housework according to the questionnaire and the diary in some family phases are illustrated in table 4. Calculations are made for married individuals only. As explained in footnote 3, cohabitants are included among the married in the analyses in this paper. For most groups the questionnaire generates somewhat more pronounced gender differences than the diary, albeit for parents with children in the household, the differences are rather modest. Looking at parents with small children we see that fathers' housework-time makes up about 39 per cent of mothers' time according to the questionnaire and 42 per cent according to the diary. For parents with older children the difference between the methods is somewhat more pronounced.

As previously mentioned, Press and Townsley (1998) argue that the over-reporting of housework-time in direct questions is associated with social desirability. More educated and young husbands are likely to feel pressure to do much housework and therefore tend to exaggerate their time input, whereas the opposite is the case for wives. Figure 4 shows questionnaire and diary estimates for average weekly housework-time for married mothers and fathers in various educational groups in Norway (more detailed information is presented in table 5).

The time-estimates from the diary are based on the diary days, whereas the time-estimates from the questionnaire are based on the number of respondents. Concerning mothers, we see that except for those with compulsory education only, the questionnaire gives larger estimates than the diary for all educational groups. According to Press and Townsley we should expect smaller differences for the most well educated than for those with less education, but this pattern does not seem to apply for Norwegian mothers, at least not in the simple bivariate analysis undertaken here. However, due to the small number of respondents at the highest educational level, the difference between questionnaire and diary estimates is not statistically significant for this group of mothers.

Figure 4:
Time spent on housework, from questionnaire and diary information, among married mothers and fathers with children 0-19 years in different educational groups



Source: The Norwegian Time Use Survey 2000-01

Table 5
Time spent on housework, from questionnaire and diary information, among married mothers and fathers with children 0-19 years in different educational groups. Average number of hours per week (standard errors in parenthesis).

	Questionnaire	Diary	Difference (Q - D)		Number of observations
	Hours	Hours	Hours	%	Questionnaire/diary ¹
Mothers					
Compulsory education	16.83 (1.35)	17.06 (1.35)	-0.23	-1	33/66
Upper secondary education	17.87 (0.59)	15.28 (0.44)	2.59	14	284/568
University/high school 1-4 years	16.32 (0.68)	14.44 (0.58)	1.88	12	146/292
University/high school 5 years +	16.28 (3.13)	12.82 (1.35)	3.46	21	24/48
All	17.30 (0.44)	15.04 (0.33)	2.26	13	490/980
Fathers					
Compulsory education	6.93 (1.15)	5.06 (0.79)	1.87	27	35/70
Upper secondary education	6.51 (0.37)	6.24 (0.30)	0.27	4	273/545
University/high school 1-4 years	7.03 (0.42)	7.14 (0.53)	-0.11	-2	118/236
University/high school 5 years +	6.14 (0.64)	4.67 (0.49)	1.47	24	53/107
All	6.63 (0.26)	6.26 (0.23)	0.37	6	481/962

¹ As each respondent kept a diary for two days, the number of diary days is twice the number of respondents

Source: The Norwegian Time Use Survey 2000-01.

For fathers we should expect most salient over-reporting in questionnaires among the most educated, and least for those with compulsory education only. While the Norwegian data suggest a certain discrepancy between questionnaire and diary estimates both for fathers with many years of education and for those with few years of education, the differences are very modest for those with upper secondary education and for those with 1-4 years of university education. This lends

support to the presumptions that social norms and perceptions do not affect Norwegian parents' housework reporting in direct questions so that discrepancies between methods must be attributed to other factors. However, with the small number of respondents at the lowest and the highest educational level, the differences between the questionnaire and diary estimates are not statistically significant.

6 Multivariate analyses of mothers' and fathers' housework-time. Questionnaire and diary information

As referred to in a previous section, it has been argued that even though diaries and questionnaires produce somewhat different estimates for housework-time, the methods reveal roughly similar patterns of variation among subgroups. Hence, direct questions can provide a fairly good ordinal scaling and are useful for multivariate analyses to sort out covariates of people's contributions at home. In order to assess whether this is the case for parents in Norway, multiple regression analyses are undertaken for time spent on housework based on questionnaire and diary data. As the daily life organisation of parents with children is high on the political agenda in Norway, good data on parents' unpaid work is strongly demanded. The debate concerning modern families' time crunch, as well as the debate regarding mothers' and fathers' reconciliation of paid employment and family work, calls for research based on valid and reliable data on parents' time spent on paid and unpaid work. Hence, we choose to focus on parents in the following. The analyses are conducted for married and cohabiting mothers and for married and cohabiting fathers with children 0-19 years in the household. For both groups the same sets of independent variables are included in the models based on the diary-section and the model based on the questionnaire-section of the time use survey. Our concern here is not primarily to identify the best models for predicting the number of hours spent on housework by parents, but rather to explore whether questionnaires and diaries produce similar patterns of associations between the independent variables and housework-time.

In the analyses of mothers' housework-time, the independent variables are defined as follows:

- Mother's age is treated as a categorical variable differentiating between four age groups. Three dummies are constructed, with the youngest ones as the reference.
- Mother's educational level is treated as a continuous variable measuring number of years of education beyond the mandatory level (secondary modern school), which is defined as zero. In the data, the variable capturing the respondents' educational level has 9 values corresponding to the various levels in the Norwegian educational system. In the analyses, we have converted this to number of years of education beyond the mandatory level, which has the value "two" in the original variable, and "zero" in the variable utilised in our analyses. The highest level, 8 in the original data, refers to researchers, and is defined as 11 years of education beyond the mandatory level in our analyses; three years at high school and 8 years at the university.
- Mother's weekly working hours refer to the number of hours of paid work in an ordinary week, measured in the questionnaire. Non-employed and those on leave are set to zero. Weekly working hours is defined as a continuous variable with zero as the bottom value.
- The age of the youngest child is treated as a categorical variable with four groups. Three dummies are constructed and those with the youngest children are chosen as the reference.

- The number of children in the household is defined as a continuous variable and refers to children below 19 years of age.

The dependent variables are defined as the weekly number of hours spent on housework, based on questionnaire and diary information. As the unit of analysis in the diary is a single day and not the individual person, we get some more zero values in the diary than in the questionnaire. However, as most mothers do spend some time doing housework almost every day, the proportion of zeroes is low in the diary, too, only 2 per cent for those with children 0-19 years of age. In the questionnaire, less than 0.5 per cent of the mothers report zero hours of housework in an ordinary week. As each participant in the survey kept a diary for two consecutive days, the analyses of the diary data are based on twice as many observations as is the analysis of the questionnaire. The results from the ordinary least square regressions (OLS) for mothers' housework-time are presented in table 6. Estimates that are statistical significant at the 0.05 level or lower, are italicised.

Table 6
Time spent on housework among married mothers with children 0-19 years of age, from questionnaire and diary information. Multiple regression results in hours per week¹

	Questionnaire			Diary			Q-D
	Estimate	S. e.	t	Estimate	S. e.	t	(estimates)
Constant term	14.19	1.52	9.32	12.46	1.24	10.02	1.73
Mother's age (ref.: -29 years)							
30-34 years	2.00	1.31	1.52	1.28	1.07	1.20	0.72
35-39 years	1.11	1.46	0.80	1.81	1.20	1.51	-0.70
40 years +	2.08	1.57	1.32	4.91	1.28	3.84	-2.91
Mother's level of education (continuous)	-0.04	0.17	0.26	-0.17	0.13	1.26	0.13
Mother's weekly working hours (continuous, 0-60 hours)	- 0.15	0.03	5.33	- 0.10	0.02	4.18	-0.05
Age of youngest child (ref.: 0-2 years)							
3-6 years	-0.09	1.25	0.07	-0.73	1.02	0.71	0.64
7-10 years	-0.21	1.44	0.15	-0.65	1.18	0.55	0.44
11-19 years	-1.06	1.54	0.69	-1.11	1.26	0.88	0.05
Number of children in the household (continuous, 1-6 children)	3.09	0.51	6.07	1.96	0.42	4.72	1.15

¹ For the questionnaire the specified model gives an R² of 0.18. For the diary the R² is 0.07.

Source: The Norwegian Time Use Survey 2000-01.

By and large, the analyses of the questionnaire-section and the diary-section reveal rather similar patterns concerning the relationship between the mother's housework-time and the independent variables in the analyses. However, the strength of the association between the variables differs to some extent, as does the size of the constant terms. The somewhat higher constant term in the first model reflects that questionnaires generate slightly higher estimates for the mother's housework-time than diaries. Both models indicate that older mothers spend more time on housework than younger mothers, but the association is statistically significant only for the diary, and is also stronger for the diary than the questionnaire. According to the diary, mothers aged 40 years + spend almost 5 hours more per week on housework than do those below 30 years of age. The corresponding OLS-estimate from the questionnaire information is 2.08 hours per week,

which is not significant at the 0.05 level. The model based on questionnaire-data as well as the one based on diary-data reveal a strong negative relationship between the mother's housework-time and her weekly hours of paid work, and a significant positive relationship between the mother's housework and the number of children in the household. However, the effect of the number of children is stronger in the first than in the second model. Mothers' level of education has no significant effect in any of the two models, and the same is true for the age of the youngest child.

On the whole, it seems that for married/cohabiting mothers, questionnaires and diaries produce rather similar patterns of variations between subgroups in multivariate analyses. This finding is consistent with results from some other studies (Baxter and Bittman 1995, Marini and Shelton 1993, Robinson 1985). It seems safe to conclude then, that at least for mothers in Norway, questionnaire information can be utilized as an alternative to diary information on time spent on housework to sort out associations in multivariate analyses. However, questionnaire estimates may exaggerate mothers' housework-time somewhat, but the bias is not very serious.

In analysing fathers' housework-time, some of the independent variables are defined a little differently than in the analyses of mothers' housework. Since there are fewer young fathers than mothers, the two youngest age groups are collapsed. As there is less variation in fathers' than in mothers' employed working hours, we define working hours as a categorical variable for fathers. Three dummies were constructed, with the non-employed / part-timers as reference. Supposing that the father's contribution at home is associated with his partner's working hours in the labour market, we have included a continuous variable for partners' weekly working hours in the models. Level of education, number of children in the household and age of the youngest child is defined in the same way as in the analyses of mothers.

Unlike mothers, a rather large proportion of fathers did not spend any time on housework during their diary days. This applies to 19 per cent of the diary days for the fathers included in the present analyses. With a high proportion of zeroes in the distribution, the distribution can be viewed as being censored with respect to the latent variable we want to measure. Parameter estimates from an OLS regression model may in these cases be severely biased. There are several ways to adjust for such left censoring, of which one is to use a Tobit regression model rather than OLS (Breen 1996). Tobit regression estimates relate to the latent, uncensored distribution of the dependent variable, in this case the fathers' propensity to spend time on housework. However, we also present the results from an OLS-regression from the diary. As only 6 per cent of the fathers reported zero hours of housework per week in the questionnaire, OLS is used analysing these. The results of the OLS-regression from the questionnaire-section are shown in table 7, and the results of the Tobit-regression as well as of the OLS-regression from the diary-section are demonstrated in table 8. Estimates significant at the 0.05-level or lower are italicised.

The analyses reveal agreement as well as disagreement across the questionnaire and the diary data about the relationship between the independent variables and the father's housework-time. Both datasets indicate that fathers who work long hours in the labour market spend less time on housework than non-employed and part-time working fathers. However, according to the questionnaire data, only very long working hours for the father (at least 45 hours per week) affects his housework contribution negatively. According to the diary data, also moderately long working hours, 40-44 hours per week, has a negative effect on the father's time input in housework.

Table 7
Time spent on housework among married fathers with children
0-19 years of age, from questionnaire information.
Estimates in hours per week from an OLS-regression.

	Questionnaire		
	Estimate	S. e.	t
Constant term	6.05	1.20	5.03
Father's age (ref.: -34 years)			
35-39 years	0.48	0.78	0.61
40 years +	- 0.33	0.89	0.37
Father's level of education (continuous)	- 0.00	0.10	0.02
Father's weekly working hours (ref.: non-employed/working 1-35 hours)			
36-39 hours	0.44	0.91	0.48
40-44 hours	- 1.41	0.99	1.43
45 hours +	- 2.64	0.92	2.87
Partner's weekly working hours (continuous, 0-60 hours)	0.06	0.02	3.22
Age of youngest child (ref.: 0-2 years)			
3-6 years	- 0.86	0.75	1.16
7-10 years	- 1.32	0.92	1.43
11-19 years	- 1.19	1.01	1.18
Number of children in the household (continuous, 1-6 children)	0.47	0.35	1.36

¹ The specified model gives an R² of 0.09.

Source: The Norwegian Time Use Survey 2000-01.

The two datasets are consistent in showing that neither the father's level of education, age of the youngest child, nor the number of children in the household significantly affect his housework-time. However, unlike the questionnaire, the diary reveals a certain association between the father's age and his housework-time in that 35-39 year old fathers spend somewhat more time on housework than younger fathers. This is true in the Tobit-regression as well as in the OLS-regression of the diary data. Moreover, the questionnaire, but not the diary, shows a significant positive relationship between the father's housework-time and his partner's working hours. Hence, questionnaires and diaries produce fairly close aggregate averages for the father's housework contributions, but the two approaches give somewhat divergent pictures in multivariate analysis. As for the diary data, it turns out that the Tobit analysis and the OLS-model produce fairly similar results concerning the factors affecting the father's housework-time.

Table 8
Time spent on housework among married fathers with children 0-19 years of age, from diary information. Estimates in hours per week from Tobit analysis and OLS regression and differences from estimates reported in table 7

	Diary, Tobit				Diary, OLS			
	Estimate	S. e.	χ^2	Q-D	Estimate	S. e.	t	Q-D
Constant term	5.46	1.27	18.54	0.59	6.67	1.08	6.18	-0.62
Father's age (ref.: -34 years)								
35-39 years	1.76	0.83	4.56	-1.28	1.63	0.70	2.31	-1.15
40 years +	0.01	0.94	0.00	-0.34	-0.26	0.80	0.32	-0.07
Father's level of education (continuous)	0.05	0.10	0.26	-0.05	0.05	0.09	0.53	-0.05
Father's weekly working hours (ref.: non-employed/working 1-35 hours)								
36-39 hours	-1.06	0.96	1.21	1.50	-1.29	0.83	1.56	1.73
40-44 hours	-3.78	1.05	12.95	2.37	-3.39	0.90	3.78	1.98
45 hours +	-3.34	0.98	11.67	0.70	-2.83	0.83	3.40	0.19
Partner's weekly working hours (continuous, 0-60 hours)	-0.00	0.02	0.01	0.06	-0.01	0.02	0.58	0.07
Age of youngest child (ref.: 0-2 years)								
3-6 years	0.06	0.79	0.01	-0.92	-0.21	0.67	-0.31	-0.65
7-10 years	-0.11	0.98	0.01	-1.21	-0.10	0.83	0.12	-1.22
11-19 years	1.29	1.06	1.48	-2.48	1.26	0.91	1.39	-2.45
Number of children in the household (continuous, 1-6 children)	0.59	0.37	2.65	-0.12	0.58	0.31	1.87	-0.11

¹ For the Tobit analyses, the specified model gives a log likelihood of -2973.92, and the OLS-regression gives an R² of 0.04.

Source: The Norwegian Time Use Survey 2000-01.

7 Conclusions

This paper compares estimates for time spent on housework from the diary-section and the questionnaire-section in the latest Norwegian Time Use Survey. Contrary to results in many other studies, we do not see a consistent pattern of higher time-estimates in questionnaires than in diaries. For the adult population as a whole, we find only minor differences between the methods. However, looking at different age groups reveals larger divergences between diary and questionnaire estimates. For young people questionnaires tend to produce slightly higher estimates for housework-time than diaries, whereas the contrary holds for the older age groups. For all age groups except the oldest one, the methods produce fairly similar gender differences in housework-time.

For parents with children in the household, the questionnaire generates somewhat higher time measures than the diary, but the discrepancy is rather modest, especially for fathers. For mothers the divergence is more prominent for those with small children than for those with older children. Although the two methods generate somewhat different time-estimates for mothers' housework-time, they produce rather similar patterns of variation between subgroups in multivariate analysis. They also generate quite similar differences between mothers' and fathers' contributions. Hence,

it seems that at least for mothers, direct questions can be used as a substitute for time diary data in analysing time inputs in housework and differences between groups of parents. Yet, it is important to keep in mind that such measures may give a somewhat exaggerated impression of mothers' time inputs compared to those obtained through the diary. Whereas the two approaches produce rather similar averages for fathers' housework-time, multivariate analyses of the factors predicting fathers' time inputs at home generate somewhat dissimilar results. To be sure, for most of the independent variables included in the analyses the two methods show quite similar association with fathers' housework-time, but two of the variables turn out to have significant effects in one of the datasets only.

The fact that questionnaires tend to produce higher estimates for housework-time than diaries has been attributed to various mechanisms. Random error, recall problems, double counting of activities and diverging conceptions of what activities are to be regarded as housework are often mentioned as possible explanations. The reporting gap across methods has also been explained by social desirability implying more serious over-reporting by certain groups than others. It is argued in this paper that over-reporting of housework in direct questions because of social desirability and perceived pressures to do much housework is probably rather modest in Norway. The other mechanisms mentioned above are likely to play an important role in Norway as in other countries. It is also argued in the paper that time diaries may underestimate peoples' housework-time somewhat because short breaks to rest is being subtracted in the calculations. When reporting their housework-time in direct questions, people presumably include such breaks. Hence, somewhat higher estimates in questionnaires than in diaries should be expected and it is not a matter of course that diary estimates should straight away be defined as the benchmark against which survey information is validated.

Taken as a whole, the work here suggests that questionnaire and diary data may supplement each other, or provide different kinds of information. It was noted that both approaches seemed to arrive at the same total housework-time overall and by gender. Hence, either can be used to get at aggregate time and to look at the gender division of labour. This will help some in establishing household accounts. Taking the two approaches together provides greater insights into how housework is distributed across members of society.

Even though questionnaires seem to produce fairly good estimates for time spent on housework for certain demographic groups in Norway, such direct questions can of course never provide the rich analytical possibilities obtained through time diaries. In order to explore the rhythms and structures of people's housework, diary information is undoubtedly indispensable. Variation between weekdays, seasons, and time of the day, and also the duration of housework episodes, can hardly be captured by structured questionnaires. Moreover, time spent on childcare is probably harder to measure through direct questions than ordinary housework. However, when it comes to recording average time spent on ordinary housework, the analyses in this paper indicate that at least for some demographic groups questionnaires generate fairly reasonable results. More methodological work is of course required in order to assess whether questionnaires create similar associations as diaries between housework-time and different independent variables for other demographic groups than mothers and fathers. Besides, further research needs to be undertaken in order to explore whether different questionnaire surveys produce similar estimates for parents' housework-time. Hence, data from the survey-section in the Time Use Survey should be compared with data from other surveys containing similar questions on weekly housework-time.

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