

Intergenerational Correlation of Domestic Work: Does Gender Matter?

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Despite the increasing prevalence of dual-earner couples, women still perform the bulk of domestic and parental tasks within the household. In this paper, we investigate the role of the parental model in the persistence of this gender inequality. We study the correlation between the domestic time of parents and their co-resident young adult children using the French time-use survey conducted in 1999-2000 in which all family members aged above 14 were interviewed. Estimation results show a positive relationship between child and parental housework times. Girls' participation in domestic tasks is much higher than that of boys, but a gendered effect of the intergenerational relationship is not systematically confirmed and depends on the type of domestic tasks.*

I. Introduction

Although the gender gap in time spent on unpaid work has declined over the last decades, women still perform the bulk of domestic labor (M. VOICU, B. VOICU, and STRAPCOVA [2009], SHELTON and JOHN [1996]). The increasing number of dual-earner couples has led to a narrowing of this gender gap in housework, but has not eliminated it, even when both partners are working full-time. Trends from seventies in the male-female distribution of domestic activities in the United States (J. BIANCHI S. R. and MILKIE [2006]) and France (CHENU and HERPIN [2002], RICOCH and ROUMIER [2011]) show almost the same pattern. In both countries, the relative share of housework done by women has decreased since 1970.

A noticeable point is that this decrease is mainly due to a reduction of the time spent by women on unpaid work rather than an increase in male participation. In fact, the increase in female labor force participation has not been followed by a greater male involvement in domestic activities (GERSHUNY [2000]). Time spent in housework by men (parental care being excluded) has remained more or less constant since the mid 1980s. Of course, the gender gap in domestic work is not of the same magnitude in all industrialized countries. As shown in ANXO *et al.* [2010], it is higher in Italy (roughly 22 hours a week) than in Sweden (around five hours), France being in an intermediate position.¹ Nonetheless, the gender gap remains apparent even in countries which have made substantial progress towards gender equality, such as Nordic countries.

What explains the persistence of the gender gap in domestic work? Why has the division of domestic labor been only modestly affected by the increase in female labor force participation?

1. The weekly gender gap in housework (childcare excluded) is around 13 hours in France.

The aim of this article is to assess the role of the family in explaining gender differences in domestic tasks. Up to now, intergenerational transmission has been studied primarily to explain the persistence of income and educational inequalities (LEFRANC [2011]) or labor force behavior (FERNANDEZ, FOGLI, and OLIVETTI [2004]). The correlation between the familial and labor force behaviors of children and of their parents may go beyond the social and economic situation of families, however. For instance, the intergenerational transmission of divorce (AMATO and DEBOER [2001], WOLFINGER [2000]) and fertility (BOOTH and HIAU [2009]) are key findings in the demographic literature.

Our contribution focuses on how a young adult's involvement in housework may be linked to domestic time devoted by parents. Several mechanisms may be evoked to explain an intergenerational correlation in domestic activities within the family. A first explanation is that the relationship might stem from imitation behaviors such as "doing by watching", parental behavior being a sort of model reproduced by children. It is also often claimed that during childhood, parents transmit common values and norms to their children that affect their preferences and encourage them to reproduce similar behaviors (BECKER [1993]). Another explanation could be related to a joint decision-making process within the family, the quantity or quality of household domestic goods being decided at the household level.

Whether the parent-child correlation is driven by some mechanism of transmission (related to norms or imitation) or by the household decision-making process, assessing the magnitude of the correlation in family behaviors is of great interest because it may explain the persistence of behaviors across generations. Housework is an interesting field for analyzing such intergenerational relationships because it lies at the heart of gender norms and might inform about the creation of these norms at young ages.

The first originality of our contribution is that the intergenerational correlation of unpaid work has rarely been studied so far, even though it has been advanced as an explanation for the transmission of working preferences. As emphasized in FERNANDEZ, FOGLI, and OLIVETTI [2004], p. 1250, "men brought up by working mothers may have greater household productivity arising perhaps from a different attitude toward participating in housework". Determining whether domestic preferences are transmitted from one generation to the next within the family is hence a crucial issue. It means that individuals might begin their married life with different skills inherited from the parenting model, and these skills might differ by sex. Moreover, this paper aims to test a possible gender asymmetry in the parent-child correlation in domestic tasks.

A second originality of our research concerns our population of interest. We focus on the participation in domestic work of young adults who live with their parents, before couple formation and couple specialization, whereas most economic research on housework concentrates on prime-age individuals after couple formation, and often specifically on dual-earner couples (ALVAREZ and MILES [2003], HERSCH and STRATTON [1997]).² Our empirical analysis sheds new light on male and female comparative advantages before entering the marriage market.

The remainder of our paper is organized as follows. In the next SECTION, we provide a brief overview of the existing literature. In SECTION III, we describe the French data and our various

2. Exceptions are S. BIANCHI and ROBINSON [1997] who focus on the time use of children and more recently BONKE [2010]. The literature is more extensive in developing countries (for instance VU [2012], LIN and ADSERA [2012]), where child labor is more frequent as an economic necessity and might compete with their education needs.

indicators of domestic time. We present our empirical strategy and discuss our econometric results in SECTION IV. Finally, SECTION V concludes.

II. Literature Review

There is still a considerable debate about the factors contributing to the persistence and reproduction of gender inequality in the domestic workload. As emphasized in BECKER [1973], unequal sharing of housework may be seen as the result of marriage specialization choices. This specialization is the result of an efficient division of work between husbands and wives and is thus one of the main benefits of marriage. Spouses investing proportionally more in domestic production are those who have a comparative advantage in this area. The advantage in home production might be the consequence of a relative disadvantage on the labor market (due to the gender wage gap) or might come from a productivity advantage in household activities. These advantages in household work productivity may also be derived from early training (LUNDBERG and ROSE [1999]).³ Curiously, little is known about this early training which seems to be at the heart of gender inequality in housework division.

Up to now, the marriage specialization theory has failed to explain the following paradox. Even in couples where the wife earns more than her husband, the woman still spends more time on domestic tasks. This stylized fact cannot be explained by pure economic factors. Gender norms and stereotypes have been advanced by the economic literature on identity formation to explain this over-investment of women in the domestic sphere (AKERLOF and KRANTON [2000]). There are gender norms about what a man or a woman should or should not do, with a social cost of deviating from the behaviors expected under these norms. These norms might partly explain the above paradox. Actually, economists know little about the creation and possible transmission of these norms within the family and how they maintain gender inequalities in domestic work from one generation to the next.

The focus on teenagers is particularly interesting because their behavior is not the result of a within-spouses negotiation process that aims to maximize efficiency by marital specialization. Even if their behavior were the result of family bargaining, there is no economic reason to think that this behavior might be gendered, except if gendered social norms exist. Teenagers who live with their parents are generally not yet working and even if they are, the possible advantage for men on the labor market should be low at these ages. However, a gender social norm might involve different behaviors if a boy (or a girl) grows up with some behavioral restrictions (either transmitted from parents, peers or the society) about what a boy or girl should do or should not do. We will analyze to what extent these norms and gender stereotypes may be transmitted directly by the parental model by measuring the correlation between the domestic behaviors of parents and their children.

The empirical literature on teenagers' participation in housework shows that even though their participation remains limited, girls participate significantly more than boys (BONKE [2010], S. BIANCHI and ROBINSON [1997], KOOREMAN [2007]). Using the Spanish time-use

3. Biological factors have also been suggested (specifically for child care activities), but other authors assume that there are no biological differences in the capacity to learn different domestic tasks (BAKER and JACOBSEN [2007], Sofer and Thibout, 2011).

survey, ALVAREZ and MILES-TOUYA [2012] find that if parents adhere to traditional gender norms about housework division, the gap between the unpaid work performed by boys and girls is larger. Participation of boys in female-oriented tasks, defined as those activities generally performed mainly by women (such as cooking, setting the table, washing dishes, doing laundry and cleaning the home), is particularly dependent on the father's investment in such tasks. Using the American National Longitudinal Survey of Youth, FARRÉ and VELLA [2013] find a strong positive correlation between mothers' attitudes and daughters' labor market participation, also visible for daughters-in-law, but they find no effect for sons.

In what follows, we will focus on the correlation of domestic production patterns between parents and children. On the one hand, children might reduce their participation when parents devote a lot of time to domestic tasks due to substitution in family tasks. On the other hand, participation of both children and parents might be positively linked because parents and children share common preferences and requirements about the cleanliness of the home or the quality of meals. We also study how the parental model of time allocation and the associated stereotypes affect children's participation and examine whether intergenerational correlation differs when considering the different roles of fathers and mothers on boys and girls.

III. Description of the Data

III.1. *The French Time Use Survey*

We study the intergenerational correlation of domestic time within the family using the Time Use survey conducted in France by INSEE from February 1998 to February 1999 on a sample of 8,186 respondents.⁴ Data was collected over a one-year period in order to account for possible seasonal variations in the way individuals organize their time. Three distinct questionnaires were used to collect information: i) a household questionnaire describing the composition of the household along with some characteristics of the dwelling and household resources; ii) an individual questionnaire with information on the respondent's work and leisure activities; iii) an individual daily booklet in which respondents were asked to note down the details of their activities over one randomly selected day. Each line corresponds to a time unit of exactly 10 minutes.⁵

The French 1998-1999 survey is especially well-suited to study the pattern of intergenerational correlation in domestic work since all family members aged over 14 and living in the household had to complete both the individual questionnaire and the daily booklet. By linking the answers of the young adult co-resident children and those of their parents, we can observe the amount of time devoted to various domestic activities by family members of two different generations over the same period of time since all household members aged 15 and over had to complete the booklet on the same day.⁶ A drawback of this focus on co-resident children is that

4. The 1998-1999 Time Use survey is available online to researchers through the Quetelet network (<http://www.reseau-quetelet.cnrs.fr/spip/>).

5. Each respondent is required to note the start and end times of each activity, so there should be no measurement errors due to recall bias.

6. We could not use the most recent French Time Use survey conducted in 2009-2010 because no more than two randomly selected members of the household aged above 10 were interviewed.

it entails some sample selection which may potentially affect the measure of intergenerational correlation.

Indeed, the characteristics or preferences of older children still living with their parents are likely to differ from those of children of the same age living independently and this could affect their involvement in domestic activities. Several studies have shown that the leaving-home decision was related to the child's characteristics such as income (LE BLANC and WOLFF [2006]), educational choices, the receipt of public transfers as well as the comfort of the parental home (ERMISCH and DI SALVO [1997], MARTINEZ-GRANADO and RUIZ-CASTILLO [2002], HU [2001]). All these characteristics may affect their housework involvement. For instance, co-resident children might be tempted to postpone their home-leaving decision if most domestic tasks are completed by their parents.

Unfortunately, there is no information in the Time survey on the number and characteristics of children living independently, and the direction of the selection bias is difficult to determine *ex ante*. On the one hand, if older co-resident children decide to stay longer at home because they contribute little to domestic tasks, this means that we would underestimate the parent-child correlation in such activities. On the other hand, parents may expect their older children to spend more time on domestic tasks as part as an implicit family contract. When considering the various reasons why young adults still live with their parents, the Eurobarometer shows that material constraints, mainly financial ones and the lack of affordable housing, are the most cited.⁷ At the same time, a comfortable life with parents without the responsibilities of independent living, which certainly include domestic work, is also evoked but by only 15% of French young adults aged 15-30.

Overall, this suggests that the selection bias due to the restriction on co-resident children should be limited when studying the intergenerational correlation of domestic activities. Keeping this shortcoming in mind, we constructed a sample of co-resident children matched with their parents. Since detailed information on time use of both the parents and their children is needed, we selected our sample in the following way. Firstly, we excluded all the children below age 15 because respondents under 15 were not asked to fill in a daily booklet. Secondly, we excluded adult children aged above 23, which corresponds approximately to the average age at leaving the parental home in France (23 years for daughters and slightly above 24 years for sons according to EUROSTAT [2009]).⁸ Our final sample contains 1,507 children aged 15-23 belonging to 1,082 families.

We now present the various indicators of domestic work considered in our empirical analysis. As is usually the case in economic studies on domestic tasks, our first indicator is the total time spent by each family member on the different domestic tasks (expressed in minutes per day). This information is obtained directly from the daily booklet. We classify the following activities as domestic: cooking, washing dishes, laying or clearing the table, activities linked to shopping for food and cleaning the home, laundry and ironing, paperwork, do-it-yourself and gardening, and caring for pets. We choose to exclude childcare because teenage participation in childcare is very dependent on the family composition (and the presence of siblings in the household who

7. See http://ec.europa.eu/public_opinion/archives/ebs/ebs_151_summ_en.pdf.

8. We have assessed the robustness of our results with respect to this upper age limit. We reach very similar conclusions with different values for the upper age.

are young enough to require childcare). Furthermore, child care as a family-oriented activity is also more likely to increase the utility of caregivers than other domestic activities.

A difficulty with the participation of teenagers in domestic tasks is that it may be less frequent and less regular than that of adults (SHELTON and JOHN [1996]). Observing only one day may not necessarily be representative of the true contribution to domestic workload.⁹ Another frequent criticism of the time indicators is that time differs from productivity. Some people may take very different amounts of time to perform a given task (for an output of the same quality). In the individual questionnaire of the Time Use survey used, each person was also asked whether he or she had undertaken one of the following activities over the last four weeks: shopping, cooking, cooking for guests, washing-up, cleaning, ironing, do-it-yourself, and gardening. Our second indicator therefore corresponds to the number of times the activity was performed over the last four weeks. It allows taking into account the young adult participation on a larger observational period than on day.

III.2. *The Pattern of Domestic Tasks Within the Family*

We begin with a description of our sample (see TABLE I). It includes slightly more sons than daughters (52.2% versus 47.8%). On average, the children are 18.3 years old and the mean number of children living in the parental home is 2.44 (whatever their age). The father's average age is around 47.7 years, 2.5 years more than the mother, and 27% of them have completed high school at least. The mother is more educated than the father in 25% of cases. The proportion of employed fathers is very high (88.9%), while 36.9% of mothers have a full time job and 31.9% a part-time job. Finally, 29% of respondents were interviewed on either a Saturday or a Sunday.

TABLE II gives some statistics summarizing the time devoted to domestic tasks by the children and their parents. The total time recorded in the booklet is positive for 61.4% of the children. This means that more than one-third of them do no housework on the day of interview, which seems a high proportion. For participants, the total contribution amounts to one and a half hours (92.6 minutes exactly). There are substantial differences when considering the different activities performed during the last month. On average, children are more likely to devote time to cleaning (54.1%), shopping (50.0%), washing-up (48%) and cooking (42.3%). The largest contributions for participants are observed for washing-up (15.2 times per month), cooking (10.8 times) and cleaning (9.2 times).

We observe significant differences in the behavior of boys and girls. The participation rate in domestic tasks is 21.9 percentage points higher for girls compared to boys (72.8% versus 50.9%). A similar pattern is found for time devoted to domestic tasks among the subsample of participants. On average, boys devote 78.4 minutes to these activities, 25 minutes less than girls (92.6 minutes). So, our results suggest a gendered pattern of household work for young adult children living with their parents. Using the monthly frequency indicators, we also find that the participation rate is much higher for girls than for boys. The difference is large especially for cleaning (+33.8%), ironing (+30.9%), washing-up (+27.2%) and cooking

9. Nonetheless, the drawback of the daily interview is not specific to children as it also applies to all individuals whose participation is irregular or not daily.

TABLE I. – Descriptive Statistics of the Sample

Variables	Boys		Girls		Boys and girls	
	mean	s.d.	mean	s.d.	mean	s.d.
Child: girl	0.000	0.000	1.000	0.000	0.478	0.500
Child: age	18.304	2.380	18.226	2.356	18.267	2.369
Child: size of the sibship	2.438	1.295	2.510	1.248	2.472	1.273
Child: birth order	1.450	0.727	1.480	0.764	1.464	0.745
Father's age	46.944	5.889	47.379	6.504	47.152	6.193
Father's age - mother's age	2.548	4.312	2.569	4.694	2.558	4.497
Blended family	0.079	0.270	0.108	0.311	0.093	0.290
Father's education: no education, primary school	0.291	0.455	0.315	0.465	0.303	0.460
Father's education: secondary school	0.440	0.497	0.404	0.491	0.423	0.494
Father's education: high school, undergraduate	0.162	0.368	0.168	0.374	0.165	0.371
Father's education: graduate, postgraduate	0.107	0.309	0.114	0.318	0.110	0.313
Father's education > mother's education	0.347	0.476	0.341	0.474	0.344	0.475
Father's education = mother's education	0.398	0.490	0.419	0.494	0.408	0.492
Father's education < mother's education	0.254	0.436	0.240	0.427	0.248	0.432
Father's employment	0.889	0.314	0.850	0.357	0.871	0.336
Mother's full time employment	0.369	0.483	0.319	0.466	0.345	0.476
Mother's part time employment	0.319	0.467	0.318	0.466	0.319	0.466
Household income (log)	9.687	0.485	9.651	0.513	9.670	0.499
Number of rooms per household member	1.185	0.387	1.168	0.385	1.177	0.386
Dishwasher	0.740	0.439	0.712	0.453	0.727	0.446
Microwave oven	0.635	0.482	0.632	0.482	0.634	0.482
Garden	0.762	0.426	0.738	0.440	0.750	0.433
Rural area	0.299	0.458	0.264	0.441	0.282	0.450
Interviewed on Saturday/Sunday	0.290	0.454	0.294	0.456	0.292	0.455
Number of observations	786		721		1,507	

Source: INSEE Time Use survey 1999, authors' calculations.

TABLE II. – Parents' and Child's Investment in Domestic Tasks

Variables	Daily domestic time	Number of activities performed over the last four weeks							
		Shopping	Cooking	Cooking for guests	Washing-up	Cleaning	Ironing	Do-it-yourself	Gardening
<i>Participation in domestic tasks (over the day)</i>									
Fathers and mothers	0.854	0.810	0.685	0.340	0.642	0.637	0.496	0.478	0.410
Fathers	0.727	0.646	0.386	0.129	0.415	0.305	0.064	0.748	0.444
Mothers	0.982	0.974	0.985	0.551	0.868	0.969	0.928	0.209	0.376
Δ = Father-Mother	-0.255***	-0.328***	-0.599***	-0.423***	-0.452***	-0.664***	-0.865***	0.539***	0.068***
Boys and girls	0.614	0.500	0.423	0.073	0.480	0.541	0.224	0.224	0.113
Boys	0.509	0.430	0.312	0.041	0.350	0.379	0.076	0.359	0.151
Girls	0.728	0.577	0.544	0.108	0.623	0.717	0.386	0.076	0.071
Δ = Boys-Girls	-0.219***	-0.147***	-0.232***	-0.067***	-0.273***	-0.338***	-0.309***	0.282	0.081***
<i>Time (in minutes) (in number of times over the last four weeks)</i>									
Fathers and mothers	200.969	7.670	16.549	0.968	15.037	11.501	4.454	4.465	3.503
Fathers	117.857	4.625	4.775	0.305	6.265	2.403	0.251	7.633	3.870
Mothers	284.081	10.714	28.323	1.630	23.809	20.598	8.656	1.297	3.137
Δ = Fathers-Mothers	-166.224***	-6.089**	-23.547***	-1.325**	-17.543***	-18.194***	-8.405***	6.336***	0.733**
Boys and girls	56.822	3.342	4.545	0.214	7.297	4.988	1.316	1.532	0.547
Boys	39.911	2.611	2.659	0.087	4.534	2.842	0.323	2.620	0.653
Girls	75.257	4.139	6.602	0.352	10.309	7.327	2.398	0.347	0.433
Δ = Boys-Girls	-35.346***	-1.528***	-3.943***	-0.266***	-5.775***	-4.485***	-2.075***	2.273***	0.220
<i>Time for participants (in minutes) (in number of times over the last four weeks)</i>									
Fathers and mothers	235.231	9.468	24.154	2.846	23.434	18.032	8.979	9.333	8.559
Fathers	162.201	7.166	12.386	2.371	15.083	7.874	3.948	10.206	8.734
Mothers	289.264	10.999	28.761	2.957	27.431	21.223	9.324	6.206	8.352
Δ = Fathers-Mothers	-127.063***	-3.833**	-16.376***	-0.586**	-12.348***	-13.349***	-5.376***	4.000***	0.383
Boys and girls	92.573	6.679	10.754	2.927	15.189	9.223	5.867	6.852	4.853
Boys	78.425	6.071	8.531	2.125	12.960	7.497	4.233	7.301	4.311
Girls	103.352	7.173	12.143	3.256	16.555	10.219	6.219	4.545	6.118
Δ = Boys-Girls	-24.927***	-1.102*	-3.612***	-1.131	-3.595***	-2.722***	-1.986**	2.756**	-1.807

Source: INSEE Time Use survey 1999, authors' calculations.
 Note: the sample comprises 1,507 children (1,082 families). Significance levels for the mean-comparison tests are respectively 1% (***), 5% (**) and 10% (*).

(+23.2%). Conversely, boys are more frequently involved than girls in do-it-yourself (+28.2%) and gardening (+8.1%).¹⁰

We find that parents are much more involved in domestic activities than their children. Their participation rate calculated from the daily booklet is 85.4%, which is nearly 40% higher than that of the younger generation ($85.4/61.4 = 1.391$). The gap is even higher when considering the time per participant. On average, fathers and mothers devote about 4 hours to domestic work compared to around 1.5 hours for children. For each selected activity, the participation rate is always higher for parents than for children: +31 percentage points for shopping, +29.7 points for gardening, and around 25-27 points for ironing, cooking and do-it-yourself.

As evidenced for the young generation, we find significant differences in the investment of fathers and mothers. While almost all mothers (98.2%) have done some domestic tasks on the interview day, the proportion is 25.5 points lower for fathers. Among participants, the difference is quite remarkable since fathers spend more than two hours less on domestic activities than mothers (289.3 minutes for mothers versus 162.2 minutes for fathers). Do-it-yourself and gardening are characterized by higher male participation rates (+53.9% for do-it-yourself, +6.8% for gardening). Conversely, ironing (+86.5%), cleaning (+66.4%) and cooking (+59.9%) are activities essentially performed by mothers. Among participants, there are also substantial differences by gender. Compared to mothers, the monthly frequency of fathers is 16.4 times lower per month for cooking, 13.3 times lower for cleaning and 12.3 times lower for washing-up.

A very interesting result from TABLE II is that the child's behavior tends to mirror the parental situation, albeit on a smaller scale. Tasks mainly performed by women at the parental level such as cooking, cleaning, washing-up and ironing are also those mainly performed by daughters among children. Conversely, the do-it yourself tasks mainly performed by fathers are also mainly performed by sons. Activities generally more evenly shared by male and female adults are also more often shared by male and female children. Next, we investigate the correlations between the parents' and child's involvement in domestic activities, which are presented in FIGURE 1.

When considering the total times recorded from the daily booklet, we obtain a positive correlation between the parents' and child's investments in domestic tasks. The coefficient of correlation is 0.160 and is significant at the 1% level. However, we note a few differences for the selected activities. The intergenerational correlation is large for shopping (0.144), washing-up (0.104), cleaning (0.142), do-it-yourself (0.118) and gardening (0.156), but it is not significant at the 5% level for the other activities.¹¹ If parents spend a lot of time on a task, it does seem to release their children from doing the same task. This positive intergenerational correlation in domestic activities tends to rule out the idea that the efforts of the two generations could be substitutes within the household. It could mean that in some families there are more demanding standards for home cleanliness or expected quality of domestic production, for example. This positive correlation might come from a mimetic effect between children and parents or the share of common preferences and requirements about domestic production.

10. When considering the monthly frequencies among participants, the largest negative gender gaps are observed for cooking (-3.6 times per month for boys), washing-up (-3.6) and cleaning (-2.7). The gap is positive for do-it-yourself (+2.8 times per month for boys).

11. The correlation is even negative for cooking, with a coefficient of -0.005 (not significant).

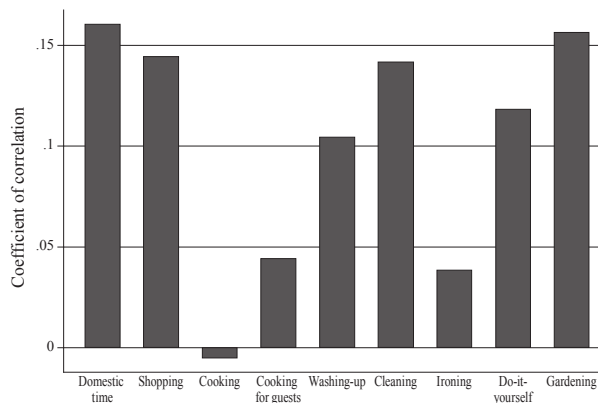


FIGURE 1. – Parent-Child Correlation in Domestic Activities

Source: INSEE Time Use survey 1999, authors' calculations.

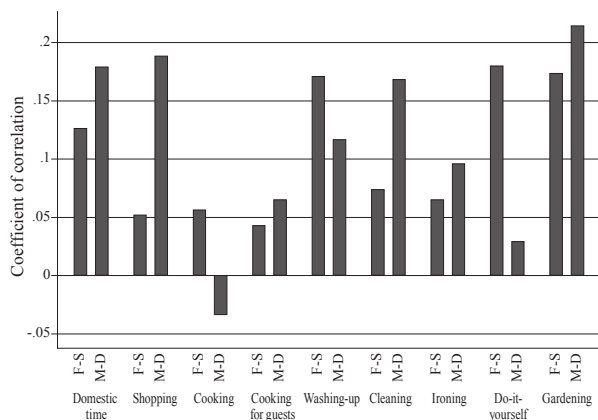


FIGURE 2. – Father-Son and Mother-Daughter Correlation in Domestic Activities

Source: INSEE Time Use survey 1999, authors' calculations.

Note: F-S stands for "father-son", M-D for "mother-daughter".

In FIGURE 2, we investigate the role of gender in this process of intergenerational correlation by comparing the coefficients of correlation between sons and fathers, and between daughters and mothers.¹² Overall, the correlation in total domestic time is much higher for women than for men (0.179 versus 0.126). The mother-daughter correlation is substantially higher for shopping, cleaning and, to a lesser extent, for ironing and gardening, while the reverse pattern is found for do-it-yourself and, more surprisingly, for washing-up and cooking. Albeit descriptive, these findings suggest that fathers could have an influential role on their children's participation in domestic activities. In what follows, we turn to an econometric analysis to assess the magnitude of the intergenerational correlation in domestic activities net of the influence of family characteristics.

12. Standard errors reported in TABLE 3 are clustered at the family level.

IV. Econometric Analysis and Results

IV.1. Intergenerational Correlation in Domestic Activities

We first focus on the intergenerational correlation in housework time between the child and parent generations to check whether we observe a substitution or rather a mimetic effect between parental and child involvement in domestic tasks. For the presentation, we denote by t_k the time devoted by a child k to housework; t_f and t_m have a similar interpretation for the father f and for the mother m so that $t_p = t_f + t_m$ is the total parental contribution to domestic tasks. We assess the correlation in housework time by estimating the following model:

$$t_k = \beta_p t_p + \varepsilon_k \quad (1)$$

In (1), the coefficient β_p sheds light on the correlation between child and parental housework time. We assume that the error term ε_k is normally distributed such that $\varepsilon_k \sim N(0, \sigma_\varepsilon^2)$. Our dependent variable t_k is censored since many children perform no housework at all (38.4% based on information reported in the daily booklet).¹³ Assuming the existence of a latent variable t_k^* measuring the propensity for a child to spend time on domestic tasks, we observe $t_k = 0$ when $t_k^* \leq 0$ and $t_k = t_k^*$ otherwise, so that $t_k = \max(0; t_k^*)$. We estimate a Tobit model to account for this censoring. In subsection 4.3, we will investigate the sensitivity of our results to alternative econometric specifications.

As shown in model A of TABLE III, we obtain a positive correlation in the family times devoted to domestic activities, which is significant at the 1% level. At the sample means, each additional hour devoted by parents to housework increases by around 5.6 minutes (0.093*60) the time devoted by the child to these activities. At the monthly activity level, the coefficients of intergenerational correlation are all positive, although two of them are not statistically significant (cooking and ironing). The highest correlations are found for cooking for guests (if parents perform this task one additional time unit during the month, then the child's participation increases by 0.282 units), gardening (+0.251), washing-up (+0.201) and do-it-yourself (+0.187). Some of these tasks are sometimes assimilated to semi-leisure (gardening and do-it-yourself) or call for more skills (cooking for guests and washing up) and might require more training. Some learning by doing from parents is then possible. In any case, these results confirm the positive correlation between children and parental domestic participation that might come from a mimetic effect or learning process.

Because the intergenerational correlation in family times may be driven by background socio-economic factors, we decide to introduce two sets of explanatory variables specific to the child and to the parents denoted by X_k and X_p , with γ_p and γ_k the associate vectors of coefficients. We extend our previous model in the following way:

$$t_k = X_k \gamma_k + X_p \gamma_p + \beta_p t_p + \varepsilon_k \quad (2)$$

We introduce the following covariates in our different regressions: age, number of siblings, number of sisters and child's birth order, father's age, age gap between the parents, blended

13. As shown in TABLE II, the proportion of zero values for participation in each activity per month ranges between 45.9% for cleaning to 88.7% for gardening (and even 92.7% for cooking for guests).

TABLE III. – Effect of Parental Domestic Activity on Child’s Domestic Activity

Variables	Number of activities performed over the last four weeks								
	Daily domestic time	Shopping	Cooking	Cooking for guests	Washing-up	Cleaning	Ironing	Do-it-yourself Gardening	
Model A									
Parent: daily domestic time/activity over the last four weeks	0.093*** (5.80)	0.121*** (4.22)	0.031 (0.53)	0.282*** (2.71)	0.201*** (4.90)	0.141*** (4.63)	0.018 (0.32)	0.187*** (4.83)	0.251*** (5.14)
Other family characteristics	NO	NO	NO	NO	NO	NO	NO	NO	NO
Log likelihood	-6,171.9	-3,344.9	-3,203.4	-633.6	-3,688.9	-3,761.3	-1,783.9	-1,805.5	-964.6
Model B									
Child: girl	64.952*** (7.56)	3.094*** (3.79)	9.745*** (8.15)	4.738*** (3.09)	11.800*** (8.96)	10.206*** (10.12)	13.248*** (8.76)	-14.236*** (-9.06)	-3.998*** (-2.99)
Child: age	4.242*** (2.71)	1.339*** (2.30)	1.416*** (6.04)	0.444*** (2.34)	1.416*** (5.35)	0.387*** (2.08)	0.774*** (3.93)	0.328 (1.52)	0.048 (0.21)
Parent: daily domestic time/activity over the last four weeks	0.094*** (5.77)	0.111*** (3.90)	0.030 (0.55)	0.281*** (3.12)	0.196*** (4.98)	0.119*** (3.97)	0.071 (1.19)	0.161*** (4.14)	0.206*** (4.43)
Other family characteristics	YES	YES	YES	YES	YES	YES	YES	YES	YES
Log likelihood	-6,098.4	-3,294.9	-3,091.1	-602.9	-3,579.1	-3,645.2	-1,653.7	-1,692.8	-929.0
Model C									
Child: girl	52.306*** (3.56)	1.828* (1.74)	11.596*** (3.18)	3.975** (2.58)	13.970*** (5.24)	8.087*** (5.15)	13.029*** (7.37)	-12.640*** (-6.96)	-4.620*** (-2.70)
Child: age	4.237*** (2.71)	0.338** (2.27)	1.340*** (6.04)	0.456** (2.40)	1.410*** (5.32)	0.388** (2.09)	0.772*** (3.94)	0.341 (1.58)	0.053 (0.23)
Parent: daily domestic time/activity over the last four weeks	0.078*** (3.76)	0.068 (1.57)	0.060 (0.74)	0.152 (1.41)	0.234*** (4.13)	0.071* (1.70)	0.057 (0.61)	0.211*** (4.27)	0.184*** (3.71)
Parent: daily domestic time/activity over the last four weeks * Child : girl	0.031 (1.03)	0.080 (1.50)	-0.056 (-0.53)	0.283* (1.87)	-0.071 (-0.99)	0.090 (1.61)	0.023 (0.20)	-0.145 (-1.59)	0.055 (0.64)
Other family characteristics	YES	YES	YES	YES	YES	YES	YES	YES	YES
Log likelihood	-6,097.8	-3,293.5	-3,090.1	-601.8	-3,578.6	-3,644.0	-1,653.6	-1,691.1	-928.7

Source: INSEE Time Use survey 1999, authors’ calculations.
 Note: Estimates from Tobit models. Standard errors are clustered at the family level, significance levels being respectively 1% (***), 5% (**) and 10% (*). The sample comprises 1,507 children (1,082 families). The other family characteristics include number of siblings, number of sisters, birth order, father’s age, difference between father and mother’s age, blended family, father’s education (four categories), two dummies comparing father and mother’s education (mother and father have same education, mother is more educated), father’s employment, mother’s full-time employment, mother’s part-time employment, household income (log), number of rooms per household member, presence of dishwasher and of microwave oven, having a garden, living in a rural area and interviewed on either Saturday or Sunday.

family, father's education, education gap between parents (mother and father have same education, mother is more educated), father's and mother's employment (distinguishing full-time from part-time for women), household income (log), housing variables (number of rooms per household, having a garden, living in a rural area, presence of dishwasher and of microwave oven) and the day of interview (either weekday, Saturday or Sunday). Estimates of specification (2) correspond to model B in TABLE III.

Our main finding is that controlling for all these characteristics has almost no influence on the magnitude of the intergenerational correlation. This result reveals the existence of an intergenerational correlation that goes beyond socioeconomic differences. On average, children with parents spending more time on domestic activities are likely to spend more time on domestic tasks, and this relationship remains significant after accounting for their observable characteristics. It remains somewhat difficult to explain the children's contribution to domestic tasks since very few parental characteristics have a significant influence on the selected outcomes.¹⁴ An exception is the influence of parental education since children with highly educated parents spend 25 minutes less on domestic tasks on average. Apart from that, the parental model plays a major role in the domestic participation of children. If we assume that shopping, cooking or cleaning are necessary activities of daily life to be able to eat or live in a clean house, what will matter is not so much the parental socioeconomic situation, but whether the parents have themselves spent time on these domestic tasks or not.

Two important covariates in our regressions are child's gender and age. First, being a girl increases by more than one hour the total amount of time devoted to domestic tasks. The longer time spent by daughters compared to sons may be the sign of strong sex-oriented norms of domestic work within the family, even at young ages. Secondly, time devoted to housework is positively correlated to age. On average, the total time spent increases by about 4 minutes for each additional year of age. Conversely, there is no interaction within the sibship since neither the number of siblings, the number of sisters nor the birth order do affect the child's domestic activity. Finally, more time is devoted to domestic activities during the week-end, probably because young adults have more free time.¹⁵

After accounting for family background, cooking for guests, gardening, do-it-yourself, cleaning and shopping remain the monthly activities characterized by the highest intergenerational correlations. Depending on their gender, young adults tend to specialize in domestic activities. Girls spend more time than boys on ironing (+13.2 times per month), washing-up (+11.8 times per month), cleaning (+10.2 times per month) and cooking (+9.7 times per month). Conversely, they are less involved in do-it-yourself (-14.2 times per month) and, to a lesser extent, gardening (-4 times per month). Interestingly, these two last activities are not correlated with the child's age, whereas washing-up, cooking and ironing are the three activities most sensitive to the child's age. Parents might expect to receive more help in those more routine activities as the children grow older.

14. Detailed estimates are available from the authors upon request.

15. When the child is interviewed either on Saturday or Sunday, then the total amount of time spent on housework increases by 21 minutes.

We now investigate whether there is any difference in the parent-child transmission of housework for boys and girls. For that purpose, we define a dummy variable s such that $s = 1$ when the child is a girl and $s = 0$ otherwise. We estimate the following model:

$$t_k = X_k\gamma_k + X_p\gamma_p + \beta_p t_p + \delta_p(t_p * s) + \varepsilon_k \quad (3)$$

where the dummy s is also included in the vector of control variables. If the parental time spent on domestic tasks has a more pronounced influence either on sons or on daughters, then the coefficient δ_p associated with the crossed term ($t_p * s$) should be significant. It will be positive, for instance, if the intergenerational correlation in housework is higher for girls than for boys.

The corresponding estimates are presented in model C of TABLE III. When considering total domestic time, we find a comparable effect of the intergenerational coefficient compared to that one previously found, but no difference between boys and girls. The positive estimate found for the interaction term is quite low and not significant. Similar results are found for each activity, the only exception being cooking for guests with a positive interaction term (equal to 0.283 and significant at 10%) meaning that the intergenerational correlation is stronger for girls. So, we conclude that girls devote more time to domestic tasks than boys. The child's effort and parental investment in domestic tasks are then mutually influenced, but this intergenerational correlation is of similar magnitude for boys and girls.

IV.2. *The Distribution of Parental Housework Time*

We now attempt to capture the specific influence of paternal involvement and maternal involvement, respectively, in domestic tasks. Indeed, a same amount of total parental time spent on domestic activities might be shared differently between the mother and father. A simple way to account for the contribution of both spouses is to add to equation (2) the parental inputs t_f and t_m instead of the aggregate parental time t_p .¹⁶

$$t_k = X_k\gamma_k + X_p\gamma_p + \beta_f t_f + \beta_m t_m + \varepsilon_k \quad (4)$$

The question of interest is to know whether the role played by the father (measured by β_f) is different from that of the mother (measured by β_m). We implement a Wald test to assess the relevance of the null assumption $H_0 : \beta_f = \beta_m$.

The corresponding estimates are reported in model A of Table IV. For the child's total domestic time, we find positive and significant coefficients for both paternal and maternal domestic time. Interestingly, the paternal influence is 73.5% higher than the maternal influence, but we are not able to reject the assumption that these two coefficients are similar (the significance level being around 30%). In fact, we reach the same conclusion for the eight selected activities. The corresponding Wald statistic is never significant at conventional level. Thus, we conclude that for a given child the intergenerational correlation is not affected by who is involved in housework within the family.

16. An alternative specification to account for the relative role of spouses is to add an indicator measuring the share of the mother's contribution to the total spousal contribution. Let $t_r = t_m / (t_f + t_m)$. The corresponding model would be $t_k = X_k\gamma_k + X_p\gamma_p + \beta_p t_p + \beta_r t_r + \varepsilon_k$. If there is no effect of the spousal distribution of domestic activities, then we should have $\beta_r = 0$. We reach very similar results with this specification.

TABLE IV. – Effect of Paternal and Maternal Domestic Activity on Child's Domestic Activity

Variables	Number of activities performed over the last four weeks								
	Daily domestic time	Shopping	Cooking	Cooking for guests	Washing-up	Cleaning	Ironing	Do-it-yourself	Gardening
Model A									
Child: girl	65.011*** (7.57)	3.136*** (3.84)	9.750*** (8.16)	4.795*** (3.13)	11.801*** (8.96)	10.246*** (10.16)	13.302*** (8.77)	-14.262*** (-9.09)	-3.993*** (-2.97)
Child: age	4.265*** (2.73)	0.343** (2.30)	1.338*** (6.04)	0.448** (2.36)	1.416*** (5.35)	0.384** (2.07)	0.780*** (3.35)	0.325 (1.50)	0.048 (0.21)
Father: daily domestic time/activity over the last four weeks	0.118*** (4.01)	0.075 (1.52)	0.048 (0.86)	0.477** (2.21)	0.188*** (3.42)	0.214*** (3.30)	0.385 (1.37)	0.146*** (3.05)	0.209*** (3.44)
Mother: daily domestic time/activity over the last four weeks	0.068** (2.34)	0.132*** (3.60)	-0.029 (-0.35)	0.234** (2.30)	0.203*** (3.64)	0.086** (2.37)	0.060 (0.99)	0.212** (2.44)	0.203** (2.40)
Test: Father's time = mother's time	[1.07;0.302]	[0.79;0.374]	[0.90;0.343]	[1.00;0.318]	[0.04;0.848]	[2.64;0.104]	[1.28;0.259]	[0.39;0.533]	[0.01;0.926]
Log likelihood	-6,097.4	-3,294.4	-3,090.8	-602.5	-3,579.1	-3,643.4	-1,653.1	-1,692.5	-928.9
Model B									
Child: girl	54.461*** (3.55)	1.815* (1.71)	9.641** (2.11)	3.991*** (2.58)	10.806*** (3.68)	7.512*** (4.75)	12.865*** (7.34)	-12.154*** (-6.79)	-4.243*** (-2.59)
Child: age	4.259*** (2.73)	0.338** (2.26)	1.337*** (6.03)	0.458** (2.41)	1.394*** (5.26)	0.387** (2.09)	0.766*** (3.91)	0.342 (1.59)	0.092 (0.41)
Father: daily domestic time/activity over the last four weeks	0.092*** (2.61)	0.037 (0.51)	0.087 (1.04)	0.319 (1.27)	0.315*** (4.20)	0.235*** (2.96)	0.714** (2.34)	0.219*** (3.74)	0.310*** (4.13)
Mother: daily domestic time/activity over the last four weeks	0.061* (1.67)	0.086 (1.63)	-0.043 (-0.38)	0.100 (0.85)	0.141* (1.77)	0.010 (0.20)	0.012 (0.13)	0.160 (1.39)	0.017 (0.21)
Father: domestic time/activity * Child: girl	0.055 (1.19)	0.068 (0.77)	-0.072 (-0.66)	0.482 (1.22)	-0.254*** (-2.59)	-0.054 (-0.46)	-1.022* (-1.85)	-0.270** (-2.53)	-0.263** (-1.99)
Mother: domestic time/activity * Child: girl	0.014 (0.31)	0.089 (1.23)	0.016 (0.11)	0.267 (1.61)	0.110 (1.08)	0.139** (2.18)	0.072 (0.58)	0.161 (0.94)	0.396*** (2.63)
Test: Father's time = mother's time	[0.29;0.591]	[0.30;0.582]	[1.31;0.252]	[0.63;0.427]	[2.53;0.112]	[5.06;0.025]	[4.76;0.029]	[0.18;0.673]	[5.90;0.015]
Test: Father's time * girl = mother's time * girl	[0.39;0.532]	[0.03;0.856]	[0.37;0.545]	[0.24;0.625]	[6.69;0.010]	[2.01;0.156]	[3.67;0.055]	[4.06;0.044]	[8.26;0.004]
Log likelihood	-6,096.5	-3,292.9	-3,090.4	-601.2	-3,575.1	-3,640.9	-1,651.2	-1,688.9	-922.3

Source: INSEE Time Use survey 1999, authors' calculations.
 Note: Estimates from Tobit models. Standard errors are clustered at the family level, significance levels being respectively 1% (***), 5% (**) and 10% (*). [value;prob] indicate the value of the Wald-test and the probability of equality of coefficients. The sample comprises 1,507 children (1,082 families). The other family characteristics include number of siblings, number of sisters, birth order, father's age, difference between father and mother's age, blended family, father's education (four categories), two dummies comparing father and mother's education (mother and father have same education, mother is more educated), father's employment, mother's full-time employment, mother's part-time employment, household income (log), number of rooms per household member, presence of dishwasher and of microwave oven, having a garden, living in a rural area and interviewed on either Saturday or Sunday.

While our results suggest that the child’s investment in housework does not depend on the specific contribution of each parent, we did not account so far for the fact that a large proportion of fathers never perform certain domestic tasks.¹⁷ It could be that seeing the father involved in housework (even for a limited time) will influence the child’s decision to undertake some domestic activities. Let t_f be a dummy variable such that $t_f = 1$ when $t_f > 0$ and $t_f = 0$ otherwise. We estimate the following regression $t_k = X_k\gamma_k + X_p\gamma_p + \beta_p t_p + \beta_f t_f + \varepsilon_k$. The corresponding estimates, available upon request, show that a child devotes more time to domestic tasks when the father does some housework (net of the total parental contribution).

When the father performs such activities, the domestic time spent by the child increases by around 17 minutes. Among the eight selected activities, the participation dummy is positive and significant for five of them at the 10% level. The highest effects are found for washing-up (+3.4 times per month), cleaning (+3.2 times per month) and do-it-yourself (+2.6 times per month). This highlights the symbolic role of paternal participation in domestic tasks in encouraging children to behave likewise (both in quantity and type of tasks). It appears less influential for the most equally shared tasks such as cooking, while it increases the likelihood of child involvement in the domestic tasks performed mainly by women, such as washing-up and cleaning, and also those mainly performed by men, such as gardening and do-it-yourself.

In a next step, we assess whether there is any difference in the respective influence of paternal and maternal inputs between boys and girls. In particular, it could be that the father’s time is more influential for sons than for daughters while the maternal role is more important for daughters than for sons. To study this question, we add in equation (4) two interaction terms between the child’s gender and, respectively, the paternal and maternal time:

$$t_k = X_k\gamma_k + X_p\gamma_p + \beta_f t_f + \beta_m t_m + \delta_f (t_f * s) + \delta_m (t_m * s) + \varepsilon_k \tag{5}$$

In (5), the coefficient δ_f indicates whether the influence of the father’s time is the same for boys and for girls and δ_m has a similar interpretation for maternal time. Put differently, these coefficients are such that $\delta_f = \beta_f^{s=1} - \beta_f^{s=0}$ and $\delta_m = \beta_m^{s=1} - \beta_m^{s=0}$. We rely on a Wald test to test the assumption that $\delta_f - \delta_m = 0$. Note that our approach corresponds to a difference-in-difference strategy since $\delta_f - \delta_m = (\beta_f^{s=1} - \beta_f^{s=0}) - (\beta_m^{s=1} - \beta_m^{s=0})$.

We find very similar results with both sets of estimates, which are reported in model B of TABLE IV.¹⁸ On the one hand, the child’s total domestic time is not influenced by these new interaction terms. On the other hand, we observe interesting differences in the role of fathers and mothers, respectively, on sons and daughters for some activities. The coefficient δ_f is negative and significant for washing-up, ironing (at the 10% level), do-it-yourself and gardening. For these activities, the father-son correlation is higher than the father-daughter correlation ($\beta_f^{s=1} < \beta_f^{s=0}$). The higher correlation for male-oriented activities (mainly performed by men) was an expected result that may stem from both the gendered social norms and the father’s model.

17. For total domestic time, 27.3% of fathers have null values. For the various activities, the proportion ranges between 25.2% for do-it-yourself and 93.6% for ironing.

18. In panel B of TABLE V, we drop observations with missing values for t_r , which occurs when both $t_f = 0$ and $t_m = 0$.

By contrast, our result of a higher correlation for boys on almost all female-oriented tasks, which is significant for two of them, is more surprising and interesting. It suggests that the domestic behavior of sons is not only driven by social norms, but also by the father's participation (or by the joint decision process within household). A son's investment in such domestic tasks is more influenced by the father's involvement in such tasks than by that of the mother. Similarly, the coefficient of the mother δ_m is positive for cleaning and gardening. For these two activities, the mother's influence is stronger for daughters than for sons since $\beta_m^{s=1} > \beta_m^{s=0}$. We compare the influence of fathers on sons and daughters to that of mothers by testing the assumption $\delta_m = \delta_f$. Results from a Wald test show that the maternal effect differs from the paternal effect on daughter's involvement (or boy's involvement) for four activities: washing-up, ironing, do-it-yourself and gardening. Overall, our results suggest that a gendered intergenerational correlation of housework exists, but for some specific tasks only.

IV.3. Robustness Checks

In this subsection, we investigate more closely the robustness of our findings. In particular, we try alternative econometric specifications to estimate the intergenerational correlation in domestic activities and attempt to account for unobserved heterogeneity at the sibship level.

IV.3.1. Tobit Model Estimation

Given the censoring of our various dependent variables, we turn to Tobit models to study the determinants of domestic tasks. A drawback of this parametric approach is that the consistency of the Tobit estimates depends crucially on the assumption of normality of the residual. We apply some diagnostic tests based on generalized residuals to test the null assumption of normality (see CAMERON and PRAVIN [2005]). Results from a Lagrange multiplier test lead to a strong rejection of the normality hypothesis.¹⁹

It is thus important to assess whether the failure of normality affects our results. Specifically, we consider a two-part model, with one equation for the censoring mechanism (whether the participation in domestic time is null or not) and a second model for the outcome condition on strictly positive values. The probability for a child of undertaking some domestic task is first estimated using a Probit model. The probability that the child takes part in domestic tasks during the day of interview is positively correlated with the total parental time ($t = 4.23$). Assuming that the two parts of the model are independent, the second part is estimated using an OLS regression on the subset of children involved in domestic tasks. We also get a positive correlation between the daily times of the parent and the child, with a coefficient of 0.056 ($t = 4.08$).

When considering each specific activity, we find that the parental activity has no effect on either the probability of participating or the number of times per month for cooking and ironing.

19. Rewriting (2) as $t_k = X\beta + \varepsilon_k$ (X includes characteristics of both child and parents), we denote by $\hat{\beta}$ and $\hat{\sigma}_\varepsilon^2$ the estimated parameters. For uncensored observations, we calculate the four powers $E(\varepsilon_k t_k > 0)$, $E(\varepsilon_k^2 t_k > 0)$, $E(\varepsilon_k^3 t_k > 0)$ and $E(\varepsilon_k^4 t_k > 0)$ using $\hat{\varepsilon}_k = (t_k - X\hat{\beta})/\hat{\sigma}_\varepsilon$. Let $\hat{z} = -X\hat{\beta}/\hat{\sigma}_\varepsilon$ and $\hat{\lambda} = \phi(-\hat{z})/(1 - \Phi(\hat{z}))$. For left-censored observations at zero, we calculate, $E(\varepsilon_k t_k = 0) = -\hat{\lambda}$, $E(\varepsilon_k^2 t_k = 0) = 1 - \hat{z}\hat{\lambda}$, $E(\varepsilon_k^3 t_k = 0) = -(2 + \hat{z}^2)\hat{\lambda}$ and $E(\varepsilon_k^4 t_k = 0) = 3 - (3\hat{z} + \hat{z}^3)\hat{\lambda}$. The statistic for the Lagrange multiplier test is, for instance, equal to 78.5 for the child's daily domestic time. For the eight monthly activities, the statistic ranges between 25.4 (cooking) and 187.4 (shopping).

A similar pattern was found with the Tobit specification. The intergenerational correlation obtained from the Probit model is always positive and significant for the six remaining activities, while the correlation estimated on positive frequencies is positive and significant only for shopping, cleaning, do-it-yourself and gardening.

Since the validity of maximum likelihood methods for censored data requires a correct specification of the error distribution, several semiparametric alternatives have been proposed (see CHAY and CHAY and POWELL [2001]). In what follows, we rely on the censored least absolute deviation (CLAD hereafter) estimator proposed by POWELL [1984]. The data are trimmed to compensate for the censoring issue and coefficients are obtained from a regression step applied to the trimmed sample.²⁰ When estimating (2) for the child's total daily time, the CLAD estimator gives a coefficient of 0.080 for the correlation with total parental time, with a bootstrapped standard error of 0.023. This is very close to the value found with the Tobit specification, the parental time coefficient being equal to 0.094. So, we are confident in the relevance of our results from the Tobit models, although the assumption of normality of errors for the various domestic tasks is not supported.²¹

IV.3.2. *Joint Estimation of Parent-Child Behaviors*

So far, we have estimated several regressions which explain the time-use of the child as a function of the exogenous time-use of parents. However, the observed correlation between the parent and child's time values may simply be due to the household decision-making process.²² Put differently, this means that a joint estimation of the parent's and child's decision to participate in domestic tasks could be more appropriate. We decide to turn to conditional mixed process estimators to jointly estimate the parental and child outcomes (ROODMAN [2011]).

Consider first the case of the parent-child correlation. Instead of estimating (2), we now estimate a joint model with t_p and t_k as dependent variables. Let $t_p = X\gamma_p + \varepsilon_p$ and $t_k = X\gamma_k + \varepsilon_k$, with X a set of family characteristics. Assuming that t_p is continuous (almost all parents undertake domestic activities) and t_k is censored, then the joint model comprises one continuous equation and one Tobit equation. The residuals ε_p and ε_k are supposed to follow a bivariate normal distribution. Denoting by ρ the coefficient of correlation between ε_p and ε_k , then this coefficient provides another measure of the correlation in domestic tasks between the parent and child behaviors net of family observed heterogeneity.²³

Our results are shown in panel A of TABLE V. Concerning the daily domestic time, we find a value of 0.168 for the correlation between ε_p and ε_k , which is significant at the 1 percent level. This coefficient obtained from a modeling of the joint parent-child participation is slightly higher than the intergenerational correlation of 0.094 reported in TABLE III. More broadly, we reach very similar conclusions with both approaches, i.e. an estimation of a joint parent-child

20. The key idea behind the CLAD estimator is that medians are preserved by monotone transformations of the data.

21. We have also estimated a linear model to explain the child's domestic time. Again, we find a positive correlation between the child and parental daily time, with a coefficient equal to 0.060 ($t = 5.40$).

22. Writing and estimating a structural model describing how parents and children decide about housework is beyond the scope of this paper.

23. For some activities over the last four weeks, we estimate a parent-child model with two Tobit equations. We decided to use a Tobit model when the proportion of zeros for a dependent variable was greater than 5%.

model or an estimation of the child's time as a function of parental time. The coefficients of correlation between the parent and child residuals for the various activities over the last four weeks are always positive and significant, except for cooking and ironing.

Next, we try to disentangle the interaction between the child and, respectively, the father and the mother. As an alternative of (4), we estimate a joint model with t_f , t_m and t_k as dependent variables using the same type of mixed process estimator. The corresponding specification includes the three following equations $t_f = X\gamma_f + \varepsilon_f$, $t_m = X\gamma_m + \varepsilon_m$ and $t_k = X\gamma_k + \varepsilon_k$. The residuals ε_f , ε_m and ε_k are supposed to follow a trivariate normal distribution and we focus more closely on the three coefficients of correlation ρ_{fm} , ρ_{fk} and ρ_{mk} which shed light on the interaction between unobservables for the father-mother, father-child and mother-child relationships, respectively. The corresponding model is a trivariate Tobit when both t_f , t_m and t_k are treated as censored variables, while it comprises two Tobit equations and one continuous outcome when t_m is treated as a continuous outcome (t_f and t_k are censored).²⁴

Results are presented in panel B of TABLE V. For daily domestic time, the three coefficients of correlation are positive, but we note that $\rho_{fc} > \rho_{mc}$. A similar result was found in Panel A of TABLE IV. There are a few differences for the selected activity frequencies over the last four weeks. Firstly, for activities like cooking, cleaning or ironing, the correlation between both parents is negative (but it is only significant for cooking), which suggests some substitution and specialization in the spousal contributions. Conversely, the spousal correlations are very high and positive for shared activities like cooking for guests, do-it-yourself or gardening. Secondly, the father-child correlations are always significant except for ironing, while the mother-child correlation is not significant for cooking, cleaning and ironing. Thirdly, we obtain similar father-child and mother-child coefficients for many activities like cooking for guests, washing up, do it yourself and gardening.²⁵

IV.3.3. *Unobserved Heterogeneity and Domestic Tasks Within the Sibship*

An interesting feature of our data is that they provide information on the housework behavior of siblings. This allows us to deal with unobserved heterogeneity at the family level.²⁶ Suppose, for instance, that there are some unobserved traits of the parents that are transmitted to the children, like preferences for leisure or altruism. Such unobservables might bias our previous estimates of the intergenerational correlation of housework. To investigate differences in behavior among siblings, we first estimate a model of the form:

$$t_{pk} = X_k\gamma_k + X_p\gamma_p + \beta_f t_f + \beta_m t_m + \mu_p + \varepsilon_{pk} \tag{6}$$

We explain the domestic time of a child k with parents p as a function of family characteristics X_k (specific to each child), X_p , t_f and t_m , and of two error terms μ_p and ε_{pk} . The term μ_p picks up the unobserved heterogeneity at the parental level, while ε_{pk} is a random perturbation.

24. As shown in TABLE V, the proportion of women not doing any domestic tasks over the last four weeks is very low for several activities.

25. Conversely, the father-child coefficients tend to be higher for cooking and cleaning.

26. Up to now, we only take into account this information by clustering the standard errors of our various regressions at the family level.

TABLE V. – Joint Estimation of Parental and Child Domestic Activities

Variables	Number of activities performed over the last four weeks									
	Daily domestic time	Shopping	Cooking	Cooking for guests	Washing-up	Cleaning	Ironing	Do-it-yourself	Gardening	
Model A – parent and child equations										
% of censored values for parents	0.6	0.2	0.3	41.9	10.3	2.1	6.3	20.4	43.1	
Specification for parental equation	Continuous	Continuous	Continuous	Tobit	Tobit	Continuous	Tobit	Tobit	Tobit	
% of censored values for child	38.6	50.0	57.7	92.7	52.0	45.9	77.6	77.6	88.7	
Specification for child's equation	Tobit	Tobit	Tobit	Tobit	Tobit	Tobit	Tobit	Tobit	Tobit	
Correlation between residuals of parental and child equations	0.168*** (6.08)	0.125*** (4.06)	0.018 (0.56)	0.168*** (4.25)	0.169*** (5.08)	0.113*** (4.05)	0.050 (1.19)	0.164*** (4.62)	0.262*** (6.36)	
Log likelihood	-16,250.5	-9,183.3	-8,478.0	-3,680.8	-9,474.2	-9,529.2	-6,738.4	-6,721.4	-4,829.7	
Model B – father, mother and child equations										
% of censored values for father	27.3	35.4	61.4	87.1	58.5	69.5	93.6	25.2	55.6	
Specification for father's equation	Tobit	Tobit	Tobit	Tobit	Tobit	Tobit	Tobit	Tobit	Tobit	
% of censored values for mother	1.8	2.6	1.5	44.9	13.2	3.1	7.2	79.1	62.4	
Specification for mother's equation	Continuous	Continuous	Continuous	Tobit	Tobit	Continuous	Tobit	Tobit	Tobit	
% of censored values for child	38.6	50.0	57.7	92.7	52.0	45.9	77.6	77.6	88.7	
Specification for child's equation	Tobit	Tobit	Tobit	Tobit	Tobit	Continuous	Tobit	Tobit	Tobit	
Correlation between residuals of father and mother equations	0.170*** (4.83)	0.075* (1.89)	-0.247*** (-7.68)	0.225*** (5.29)	0.103*** (2.58)	-0.042 (-1.01)	-0.110 (-1.54)	0.153*** (3.05)	0.281*** (6.49)	
Correlation between residuals of father and child equations	0.168*** (5.35)	0.086** (2.50)	0.062* (1.68)	0.169** (2.48)	0.162*** (4.45)	0.138*** (3.51)	0.082 (1.13)	0.148*** (3.99)	0.237*** (5.05)	
Correlation between residuals of mother and child equations	0.104*** (3.22)	0.121*** (3.85)	-0.020 (-0.67)	0.151*** (3.62)	0.138*** (3.97)	0.039 (1.26)	0.043 (1.02)	0.146*** (3.08)	0.239*** (4.77)	
Log likelihood	-23094.4	-12757.7	-10769.9	-4399.4	-12188.0	-11163.7	-7241.5	-8006.4	-6603.3	

Source: INSEE Time Use survey 1999, authors' calculations.
 Note: Estimates from conditional mixed process regressions. Standard errors are clustered at the family level, significance levels being respectively 1% (***), 5% (**) and 10% (*). The total sample comprises 1,507 children (1,082 families). Each equation include the following family characteristics: number of siblings, number of sisters, birth order, father's age, difference between father and mother's age, blended family, father's education (four categories), two dummies comparing father and mother's education (mother and father have same education, mother is more educated), father's employment, mother's full-time employment, mother's part-time employment, household income (log), number of rooms per household member, presence of dishwasher and of microwave oven, having a garden, living in a rural area and interviewed on either Saturday or Sunday.

TABLE VI. – Random and Fixed Effect Estimates of Paternal and Maternal Domestic Time on Child’s Domestic Time

Variables	(1)	(2)	(3)	(4)
Child: girl	65.082*** (8.37)	60.922*** (4.13)	2.137*** (2.91)	153.920*** (3.73)
Child: age	4.344*** (2.78)	4.329*** (2.77)	0.167 (1.58)	4.179 (0.55)
Father: domestic time	0.116*** (4.74)	0.094*** (2.95)		
Mother: domestic time	0.062** (2.46)	0.065* (1.95)		
Father: domestic time * Child: girl		0.048 (1.10)	0.003 (1.24)	-0.032 (-0.27)
Mother: domestic time * Child: girl		-0.006 (-0.13)	-0.003* (-1.72)	-0.224** (-1.97)
Other family characteristics	YES	YES	YES	YES
Test: Father’s time = mother’s time	[1.98;0.159]	[0.33;0.567]		
Test: Father’s time * girl = mother’s time * girl		[0.69;0.405]	[3.96;0.137]	[3.93;0.140]
Log likelihood	-6,082.5	-6,081.9	-96.1	

Source: INSEE Time Use survey 1999, authors’ calculations.

Note: (1) and (2) are estimates from random effect Tobit models, (3) are estimates from a fixed-effect conditional Logit model and (4) are estimates from a fixed effect Tobit model. Significance levels are respectively 1% (***), 5% (**) and 10% (*). [value;prob] indicate the value of the Wald test and the probability of equality of coefficients. The sample comprises 1,507 children (1,082 families). The fixed effect Logit model is estimated on 322 observations (348 families). The other family characteristics include number of siblings, number of sisters, birth order, father’s age, difference between father and mother’s age, blended family, father’s education (four categories), two dummies comparing father and mother’s education (mother and father have same education, mother is more educated), father’s employment, mother’s full-time employment, mother’s part-time employment, household income (log), number of rooms per household member, presence of dishwasher and of microwave oven, having a garden, living in a rural area and interviewed on either Saturday or Sunday.

We suppose that μ_p and ε_{pk} are normally distributed such that $\mu_p \sim N(0; \sigma_\mu^2)$ and $\varepsilon_{pk} \sim N(0; \sigma_\varepsilon^2)$ and are independent of each other. Under the assumption that the family-specific error term is uncorrelated with the family characteristics, the corresponding model is a random effects Tobit model estimated by maximum likelihood and quadrature techniques.

As shown in column (1) of TABLE VI, we find little difference for total domestic time between the random effect specification and the simple Tobit regression.²⁷ We observe a positive influence of both the paternal and maternal domestic time on the child’s time devoted to these tasks, but these two coefficients are not significantly different (the critical probability is 0.159). In column 2, we introduce two interaction variables corresponding to the product of the child’s gender and the domestic time of the father and mother. The random effect estimates do not support the idea that there are gender differences in the intergenerational transmission of housework behavior since both interaction terms remain insignificant.

A potential shortcoming of the random effect estimates is that they depend on the assumption that the family-specific component μ_p is independent of the family characteristics. There may be some reasons to believe that this assumption does not hold. For instance, more educated parents may have a higher (unobserved) preference for leisure. Thus, we decide to relax the assumption that the family component is orthogonal to the covariates and turn to a fixed effect specification. As a preliminary step, we focus on the extensive margin of housework and consider the probability $Pr(t_{pk} > 0)$ for a child k of performing some domestic tasks on the day of interview. In our sample, 61.4% of children have positive time values.²⁸

27. We reach similar conclusions when estimating the random effect Tobit models for the eight selected activities.

28. Among families with two children living at home, in 19.9% of cases neither sibling performed any domestic tasks on the day of interview. The proportion of families with two positive time values is 40.6%.

Specifically, we rely on the conditional Logit model originally proposed by CHAMBERLAIN [1980]. A difficulty with this fixed effect specification is that all the characteristics remaining invariant at the household level are picked up by the family fixed effect. In our context, both the paternal and maternal time values do not vary among siblings by definition. This implies that our parameters of interest β_f and β_m (and also γ_p) are not identified. However, we can still consider a fixed effect framework to study the gender-specific impact of time spent by parents on housework by gender on the total time spent by their children. Indeed, the coefficients associated with the interaction terms $(t_f * s)$ and $(t_m * s)$ will be identified using information for families including siblings of different genders.

The fixed-effect Logit estimates are presented in column 3 of TABLE VI. All families with no variation in the domestic time values of siblings are dropped from the sample, which reduces the number of observations to 322. This change in the sample composition is important as it is expected to affect our previous results. For instance, the average number of siblings is now much higher as families with only one child are excluded. We find that the probability of doing some housework on the day of interview is higher for girls than for boys. Also, while the paternal interaction term is insignificant, we obtain a negative coefficient for the maternal interaction term. This effect suggests that the intergenerational correlation in housework stemming from the maternal role is lower for girls than for boys, but it is only significant at the 10% level.

A difficulty with the full estimation of fixed effect non-linear models is that parameters are subject to the incidental parameters problem.²⁹ While the bias in coefficients may be large with very small or small group sizes, it has been shown that there was almost no bias for the fixed effect estimates in the case of a Tobit model (GREENE [2004]). Finally, we estimate a censored regression model with family fixed effect. We rely on the semiparametric trimmed least squares estimator proposed by HONORÉ [1992], which is consistent and asymptotically normal even when the time dimension of the panel is low. As shown in column (4), the conditional Logit and fixed effect Tobit estimates show that only the interaction term between maternal domestic time and the child's gender is significant.

V. Concluding Comments

The aim of this paper was to study the intergenerational correlation of housework patterns with potential differences by gender. Our empirical analysis is based on the French time-use survey conducted in 1999-2000 in which all family members aged above 14 years old were interviewed. We thus link the housework decisions of teenagers and young adults to those of their parents. Our main results are as follows.

First, we find significant gender differences in the domestic work of young adults. Co-resident girls aged 15-23 spend around one hour more on housework than boys. This gender gap in unpaid work before couple formation is puzzling for economists since it cannot be linked to marital specialization, but is consistent with the theory of identity formation. Secondly, we obtain a positive intergenerational correlation in domestic work, meaning that domestic time

29. Estimators of fixed effects are inconsistent in a panel of finite length (which is the case in our context given the average size of the sibship). The incidental parameters problem occurs when this inconsistency is transmitted to the estimator of the other parameters of the model.

spent by a child complements but does not substitute to time spent by parents. One additional hour of parental housework leads to an increase of around 5 minutes in the child's domestic participation. Thirdly, we observe a gender asymmetry in the intergenerational correlation of domestic tasks between boys and girls in certain domestic tasks.

The positive intergenerational correlation, which is robust to different specifications, may stem from various mechanisms. It may be due to parents who use more or less consciously gendered stereotypes when allocating household labor to children (RALEY and S. BIANCHI [2006]). It could also come from a joint decision-making process within the family, with household members sharing common values about housework. Lastly, it might be explained by the behavior of children who reproduce the parental model through mimetism or common preferences. Unfortunately, these explanations cannot be disentangled with the data at hand and we leave this issue for future research.

As they stand, our results may be helpful for targeting public policies towards greater gender equality. In particular, the magnitude of the intergenerational correlation of housework and gender roles should be taken into account when implementing public policies since they create persistent effects (for or against gender equality) over time. Since unequal participation of teenagers by gender is correlated to that of their parents, the current unequal gender division of parents will contribute to the unequal housework division of the next generation, who will themselves become parents one day and may potentially transmit these norms to a third generation. Clearly, appropriate policies integrating these long-term consequences are needed to avoid an intergenerational multiplier of gender inequality in housework.

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References

- AKERLOF, G., and R. KRANTON (2000): "Economics and Identity," *Quarterly Journal of Economics*, **115**, 715-753. [161]
- ALVAREZ, B., and D. MILES (2003): "Gender Effect on Housework Allocation: Evidence from Spanish Two-Earner Couples," *Journal of Population Economics*, **16**, 227-242. [160]
- ALVAREZ, B., and D. MILES-TOUYA (2012): "Exploring the Relationship Between Parent's and Children Housework Time in Spain," *Review of Economic of the Household*, **10**, 299-318. [162]
- AMATO, P., and D. DEBOER (2001): "The Transmission of Marital Instability Across Generations: Relationship Skills or Commitment to Marriage?," *Journal of Marriage and Family*, **63**, 1038-1051. [160]
- ANXO, D., L. MENCARINI, A. PAILHÉ, A. SOLAZ, M.-L. TANTURRI, and L. FLOOD (2010): "Gender Differences in Time-Use Over the Life-Course. A Comparative Analysis of France, Italy, Sweden and the United States," *Feminist Economics*, **17**, 159-195. [159]
- BAKER, M., and J. JACOBSEN (2007): "Marriage, Specialization, and the Gender Division of Labor," *Journal of Labor Economics*, **25**, 763-793. [161]
- BECKER, G. (1973): "A Theory of Marriage : Part I," *Journal of Political Economy*, **81**, 813-846. [161]
- BECKER, G. (1993): "Nobel Lecture: The Economic Way of Looking at Behavior," *Journal of Political Economy*, **101**, 385-409. [160]
- BIANCHI S. and Robinson, J., and M. MILKIE (2006): *Changing Rhythms of American Family Life*. ASA Rose Monographs, New York, Russell Sage. [159]
- BIANCHI, S., and J. ROBINSON (1997): "What Did You Do Today? Children's Use of Time, Family Composition, and the Acquisition of Social Capital," *Journal of Marriage and Family*, **59**, 332-344. [160, 161]
- BONKE, J. (2010): "Children's Housework. Are Girls More Active Than Boys?," *Electronic International Journal of Time Use Research*, **7**, 1-16. [160, 161]
- BOOTH, A., and K. HIAU (2009): "Intergenerational Transmission of Fertility Patterns," *Oxford Bulletin of Economics and Statistics*, **71**, 183-208. [160]
- CAMERON, C., and T. PRAVIN (2005): *Microeconometrics. Methods and Applications*. Cambridge University Press, New York. [175]
- CHAMBERLAIN, G. (1980): "Analysis of Covariance With Qualitative Data," *Review of Economic Studies*, **47**, 225-238. [180]
- CHAY, K., and J. POWELL (2001): "Semiparametric Censored Regression Models," *Journal of Economic Perspectives*, **15**, 29-42. [176]
- CHENU, A., and N. HERPIN (2002): "Une pause dans la marche vers la civilisation des loisirs," *Economie et Statistique*, **352-353**, 15-37. [159]

- ERMISCH, J., and P. DI SALVO (1997): "The Economic Determinants of Young People's Household Formation," *Economica*, **64**, 627-644. [163]
- EUROSTAT (2009): *Youth in Europe*. A Statistical Portrait, Eurostat Statistical Books. [163]
- FARRÉ, L., and F. VELLA (2013): "The Intergenerational Transmission of Gender Roles Attitudes and its Implications for Female Labor Force Participation," *Economica*, **80**, 219-247. [162]
- FERNANDEZ, R., A. FOGLI, and C. OLIVETTI (2004): "Mothers and Sons: Preference Formation and Female Labor Force Dynamics," *Quarterly Journal of Economics*, **119**, 1249-1299. [160]
- GERSHUNY, J. (2000): *Changing Times Work and Leisure in Postindustrial Society*. Oxford University Press, Oxford. [159]
- GREENE, W. (2004): "Fixed Effects and Bias due to the Incidental Parameters Problem in the Tobit Model," *Econometric Reviews*, **23**, 125-147. [180]
- HERSCH, J., and L. STRATTON (1997): "Housework, Fixed Effects, and Wages of Married Workers," *Journal of Human Resources*, **32**, 285-307. [160]
- HONORÉ, B. (1992): "Trimmed Lad and Least Squares Estimation of Truncated and Censored Regression Models With Fixed Effects," *Econometrica*, **60**, 533-565. [180]
- HU, W.-Y. (2001): "Welfare and Family Stability. Do Benefits Affect When Children Leave the Nest?," *Journal of Human Resources*, **36**, 274-303. [163]
- KOOREMAN, P. (2007): "Time, Money, Peers, and Parents: Some Data and Theories on Teenage Behavior," *Journal of Population Economics*, **20**, 9-33. [161]
- LE BLANC, D., and F.-C. WOLFF (2006): "Leaving Home in Europe: The Role of Parent's and Child's Incomes," *Review of Economics of the Household*, **4**, 53-73. [163]
- LEFRANC, A. (2011): *Educational Expansion, Earnings Compression and Changes in Intergenerational Economic Mobility : Evidence from French Cohorts 1931-1976*. University of Cergy Pontoise. [160]
- LIN, T.-C., and A. ADSERA (2012): *Son Preference and Children's Housework: The Case of India*. **6929**. IZA Discussion Paper. [160]
- LUNDBERG, S., and E. ROSE (1999): *The Determinants of Specialization Within Marriage*. UWEC-2005-07. [161]
- MARTINEZ-GRANADO, M., and J. RUIZ-CASTILLO (2002): "The Decisions of Spanish Youth: A Cross-Section Study," *Journal of Population Economics*, **15**, 305-330. [163]
- POWELL, J. (1984): "Least Absolute Deviations Estimation for the Censored Regression Model," *Journal of Econometrics*, **25**, 303-325. [176]
- RALEY, S., and S. BIANCHI (2006): "Sons, Daughters, and Family Processes: Does Gender of Children Matter?," *Annual Review of Sociology*, **32**, 401-421. [181]
- RICROCH, L., and B. ROUMIER (2011): *Depuis 11 ans, moins de tâches ménagères, plus d'Internet*. **1377**. Insee Première. [159]

ROODMAN, D. (2011): "Fitting Fully Observed Recursive Mixed-Process Models With CMP," *Stata Journal*, **11**, 159-206. [176]

SHELTON, B., and D. JOHN (1996): "The Division of Household Labor," *Annual Review of Sociology*, **22**, 299-322. [159, 164]

VOICU, M., B. VOICU, and K. STRAPCOVA (2009): "Housework and Gender Inequality in European Countries," *European Sociological Review*, **25**, 365-377. [159]

VU, T. (2012): *Are Daughters Always the Losers in the Chore War? Evidence Using Household and Twin Data from Vietnam*. OSIPP Discussion paper DP-2012-E-002. [160]

WOLFINGER, N. (2000): "Beyond the Intergenerational Transmission of Divorce: Do People Replicate the Patterns of Marital Instability They Grew Up With?," *Journal of Family Issues*, **21**, 1061-1086. [160]