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Educational Stratification in Increased Weekend Childcare Time in Japan

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Abstract

Objective: We decompose the change in weekend childcare time into two parts, structural changes (such as an increase in the number of college degree–holding parents), and nonstructural changes (changes in behavior), to examine why the educational stratification in weekend childcare has widened.

Background: In Japan, as in other developed countries, parental time spent on childcare has increased. This is because parental childcare has come to be considered an investment that enhances children's abilities and hence, their future income. Our descriptive analysis shows that there was a disparity in the growth rate of weekend time spent on childcare after examining time spent on childcare in terms of the parents' combined educational backgrounds in the last two decades.

Method: Using the 1996 and 2016 instances of the Japanese time use study, we analyzed not only total parental childcare time but also its components (maternal and paternal solo childcare time and coparenting time) via estimated OLS regressions and twofold Blinder–Oaxaca decompositions.

Results: The results showed that the increase in weekend childcare time over the past 20 years was mainly explained by the overall change in parental behavior. The detailed decomposition results revealed that the behavioral changes on Sunday varied by assortative mating, with highly educated homogamous and hypogamous couples giving more enthusiasm and time to raising their children in a significant departure from other couples (especially less educated homogamous couples). Additionally, highly educated homogamous couples were more egalitarian in their sharing of childcare, with fathers spending more time in solo childcare and coparenting, while this was not the case for other couples.

Conclusion: Educational disparities among parents who spend weekend time on childcare may reproduce this inequality throughout a child's development. This concerning tendency might have even more acute effects if paternal childcare and coparenting have a positive impact on child outcomes.

Keywords: Childcare time · Educational Stratification · Educational assortative mating · Time use research · Blinder-Oaxaca decomposition

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I. Introduction

In developed countries, the amount of time parents dedicate to childcare has increased. This is due to the growing social acceptance of parental involvement in children's social and cognitive development (Altintas, 2016), as parents have become more enthusiastic about raising their children (Sayer et al., 2004; Gauthier et al., 2021).

Indeed, some rigorous analyses using microdata support the idea that parenting time increases children's cognitive and noncognitive abilities (Del Boca & Mancini, 2013; Del Bono et al., 2016). In addition, parents tend to be more involved in childcare in countries with higher returns on education. This is because parental childcare increases children's future earnings through their cognitive and noncognitive development (Doepke & Zilibotti, 2019). Thus, the importance of parental childcare as an investment is socially recognized. Because highly educated parents devote more time to their children than do less educated parents (Altintas, 2016; Craig, 2006; Guryan et al., 2008; England & Srivastava, 2013; Schulz & Engelhardt, 2017), the reproduction of disparities is a concern.

The theme this paper addresses is the educational stratification in the expansion of childcare time. In Japan, the gap in the amount of parental time spent on childcare is significant on weekends (Figure 1). In particular, the growth rate is highest when both parents have a college degree, with a difference of almost 80 minutes from non-college-educated parents. In terms of child development, weekend childcare is more important than weekday childcare. This is because parents tend to provide higher quality, educationally invested childcare on weekends when they have more time to spare (Gupta et al., 2021; Kalil et al., 2012; Schulz & Engelhardt, 2017). In other words, weekend childcare has the potential to increase the disparity more than weekday care.

However, one cannot immediately conclude that this educational stratification in weekend parenting is produced by behavioral change (nonstructural change). This is because several demographic changes (structural changes) that can affect childcare time have occurred over the past two decades. These changes include an increase in the proportion of college graduates, a decrease in three-generation households, and changes in weekend work.

The purpose of this paper is to decompose the causes of changes in childcare time over the past 20 years into structural and nonstructural factors and to determine which of these factors had a stronger effect. Using the 1996 and 2016 editions of the Survey on Time Use and Leisure Activities (hereafter referred to as STULA), we analyzed not only total parental childcare time but also its components (maternal and paternal solo childcare time and coparenting time) via estimated OLS regressions and twofold Blinder–Oaxaca decompositions. We focused on two-parent households with children under the age of six[1]. The results showed that the increase in weekend childcare time over the past 20 years

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[1] This group accounts for approximately 90% of all households with children under the age of 6. Although childcare in single-parent households has been an important topic in recent years, it was

was mainly explained by the overall change in parental behavior and that highly educated couples were found to devote more enthusiasm and time to raising their children than do less educated couples. Our findings suggest that educational disparities in parenting childcare time on weekends may reproduce this inequality throughout a child's development, hence the need to discuss parenting childcare on weekend (especially Sundays) as a social issue

Figure 1. Average daily childcare time by educational assortative mating (in Minutes)
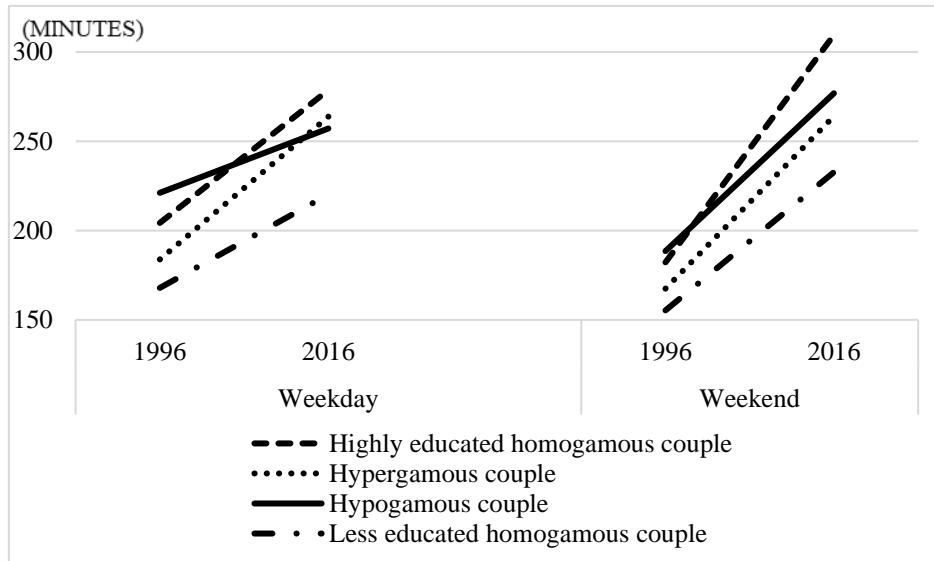
Source: Created by the author based on the STULA dataset of two-parent households with children under the age of six

II. Definition of Educational Assortative Mating

In this paper, we do not use fathers' and mothers' educational backgrounds independently but rather use a combination of parents' educational backgrounds (educational assortative mating). This is because educational background affects not only the parenting time of the individual but also the parenting time of the spouse (Bonke & Esping-Andersen, 2011; Cha & Song, 2017; England & Srivastava, 2013; Miller, 2020). Additionally, given the possibility that educational assortative mating can be transmitted from the parental generation to the child's generation via the family environment and cultural values (Uchikoshi & Raymo, 2021), this indicator is appropriate for studying the parenting time difference.

We define educational assortative mating as follows: (1) highly educated homogamous couples

not included in this study because the percentage of single-parent households is low, at 2% in STULA when limited to those with children under age 6. (It is somewhat higher at 3.4% in the population census).

(both parents with a college degree), (2) hypergamous couples (college graduate fathers and noncollege graduate mothers), (3) hypogamous couples (noncollege graduate fathers and college graduate mothers), and (4) less educated homogamous couples (both parents without a college degree).

III. Past Studies

In recent years, parenting time has increased in most developed countries (Dotti & Treas, 2016). In particular, highly educated parents spend more time with their children than do their less educated counterparts (Altintas, 2016; Dotti & Treas., 2016; England & Srivastava, 2013; Guryan et al. 2008; Schulz & Engelhardt, 2017). This seems to be a fairly universal phenomenon: both Guryan (2008), using data from 14 countries, and Dotti and Sani (2016), using time-use studies from 11 countries, found educational disparities in parenting time in most countries. Education disparities have also been identified in Asian countries, such as Korea and China (Cha & Song, 2017; Park, 2021), which were not included in the two previous international comparative studies.

Prior studies have confirmed this education gap since the late 1990s, and the gap has widened over time. That is, highly educated parents have experienced a faster growth in the amount of time spent parenting than their less educated counterparts (Altintas, 2016; Vagni, 2019; Park, 2021). This is related to the prevalent child-rearing ideology of *intensive mothering,* which idealizes mothers who spend not only money but also time and energy on child rearing and *involving fathering,* which indicates that fathers are more actively involved in child rearing (Altintas, 2016). These past studies focused on how inequalities were reproduced or reinforced through childrearing disparities based on parents' educational levels.

In a study analyzing the relationship between educational assortative mating and parenting time, Bonke and Esping-Andersen (2011) found that highly educated homogamous couples spent more time parenting and that their parenting was more intensive and gender-equal, while less educated homogamous couples tended to spend less time on childcare and had a more traditional division of labor. Cha and Song (2017), who analyzed the Korean Time Use Study, also confirmed that parenting time is longest when both parents are highly educated. England and Srivastava (2013) confirmed that fathers' parenting time is more influenced by their wives' educational attainments than by their own education. Miller (2020) confirmed that husbands in hypogamous couples spend more time raising children than husbands in hypergamous or homogamous couples. These studies show that it is necessary to consider the combined education of couples rather than looking at the educational effects of each member of couple separately.

However, as noted above, it is unclear whether this disparity in parental education was caused by behavioral changes or structural changes. Similar to this study, a few studies decompose changes in parenting time into structural and nonstructural factors (Sandberg & Hofferth, 2001; Sayer et al., 2004; Schulz & Engelhardt, 2017). Sandberg & Hofferth (2001) decompose changes in time spent with

children using "shift–share" analysis using U.S. data, and Sayer, Bianchi & Robinson (2004) use a tobit model to estimate U.S. primary parenting time and decompose the change in parenting time with a Oaxaca–type decomposition. Using OLS models, Schulz and Engelhardt (2017) estimated the duration of 6 specific parenting activities in Germany and used the results to perform a Oaxaca decomposition of the change in parenting time. All the studies revealed that most of the change was explained by behavioral changes.

While these previous studies analyzed mothers' time and fathers' time separately, they did not analyze (perhaps due to data limitations) how mothers' parenting time and fathers' parenting time are related or how that relationship is changing. Our data will allow us to determine the father's and mother's parenting times in the same household by matching male and female respondents using household IDs. Since the data come from a time use survey, they also show whether the childcare was done during the same time slot. Taking advantage of these data, we can see not only how total parenting time has changed over the past 20 years but also changes in its components (i.e., father's parenting time, mother's parenting time, and shared parenting time) and changes in the relationships among them. This allows for a deeper examination of changes in time spent parenting.

IV. Three Structural Factors That May Influence Weekend Parenting Time

Before moving on to the analysis, we describe three structural factors that may have influenced the changes in childcare time over the past 20 year, taking into account the Japanese context.

Increases in the percentage of college graduates

According to the Basic School Survey, over the 20-year period covered by this study, the percentage of female college graduates increased by 23.6 pp (from 24.6% to 48.2%), and that of men increased by 13.7 pp (from 41.9% to 55.6%).[2] This increase was accompanied by an increase in the number of highly educated homogamous and hypogamous couples and a decrease in the number of less educated homogamous and hypergamous couples. While the educational stratification in the increase in weekend parenting time may be attributed to behavior, it may also be attributed to the increase in number of college graduates who originally received more parenting time. The latter is a structural factor that increases average childcare time.

Decrease in the Number of Households Living with Grandparents

The second structural factor is the decline in the number of households in which grandparents live with younger generations. In developed countries, grandparents (especially grandmothers) provide

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[2] Data were obtained from the MEXT website.

childcare support, which contributes positively to maternal employment (Craig & Jenkins, 2016; Grey, 2005; Zanella, 2017). Three-generation households may be more likely to benefit from grandparents' childcare support, but the number of such families has been declining in recent years; using STULA to calculate the percentage of households with children under age 6 living with grandparents, the rate has declined by approximately 10 pp over the 20 years analyzed (from 22.3% to 11.1%).

Weekend Work

Parental working hours may decrease parenting time. In particular, working hours in the evening reduce parenting time (Gutierrez-Domènech, 2010; Lesnard, 2008; Nock & Kingston, 1998; Rapoport & Le Bourdais, 2008). Similar to evening work, weekend work, when children are at home and awake, is also expected to negatively impact parenting time.

There have been two changes in weekend work in Japan over the past 20 years. One is the reduction of legal working hours from 48 to 40 h in the late 1980s. According to Kuroda (2010), people shifted their work time from Saturday to weekdays in response to the reduced work week introduced by this amendment of the Labor Standard Act. The percentage of fathers in our sample who did not work on Saturday increased from 35.8% in 1996 to 45.8% in 2006. This is a structural factor that could increase time spent on childcare by fathers on Saturdays. The percentage of mothers working on Saturdays has remained unchanged over the past 20 years. The other change is the expansion of the 24/7 economy with the growth of the service sector. This has resulted in an increase in the population of weekend workers (Presser 2003). In our dataset, the percentage of women working on weekends increased slightly. In addition, the average number of hours worked is longer in 2016 than it was in 1996. This is a structural factor that could decrease the average time spent on childcare on weekends.

As discussed above, we expect different effects on Saturday and Sunday, so the analysis is conducted separately for Saturday and Sunday.

V. Data

STULA used the stratified two-stage sampling method to target household members aged 10 years and older, investigating the use of time during a typical day of ordinary life. The survey also collected demographic information and was conducted over two consecutive days. The respondents used a precoded method, selecting from 20 activities provided in advance for each 15-minute period, and an aftercoded method, in which they would specifically describe their activity. The precoded results, which have a larger sample size, are used for analysis in this study to ensure accuracy. Regarding the time dedicated to childcare, the periods for which "childcare" was selected have been multiplied by 15 minutes.

The STULA is conducted every five years. This study uses the 1996 and 2016 surveys. We chose these two time points for two reasons. First, the STULA data show that parenting time has increased

significantly in Japan since the late 1990s, especially after 2010[3]. Second, there has been a remarkable increase in the college enrollment rate, especially among women, as mentioned above.

To create our dataset, we first limited our sample to households with at least one child under the age of six. Next, the data were divided into male and female respondents who were matched via household IDs to create a dataset providing information on fathers and mothers within the same household. The number of observations after data cleaning was 14,071 for the 1996 dataset and 6,515 for the 2016 dataset.

VI. Analytical Strategy

First, we perform a descriptive analysis using our dataset to observe how average parenting time changed. Next, we estimate parenting time using OLS models and use the results to decompose the data into structural and nonstructural factors in Oaxaca decompositions.

The change in childcare time is decomposed as follows:

$$
\overline{time}_{2016} - \overline{time}_{1996} = F(X_{2016}\beta_{2016} - X_{1996}\beta_{1996})
$$
$$
= \{F(X_{2016}\beta_{2016}) - F(X_{1996}\beta_{2016})\} + \{F(X_{1996}\beta_{2016}) - F(X_{1996}\beta_{1996})\}
$$

(1)

The first term on the right-hand side refers to the part that is attributable to differences in endowments or characteristics, and the second term refers to the part that is attributable to differences in coefficients. In other words, the former is a change that is attributable to structural factors, and the latter is attributable to nonstructural factors. Since Equation (1) is linear, it can be rewritten as Equation (2). Equation (2) shows that the decomposition of total childcare time is equal to the sum of the decompositions of the three components. By performing the decomposition according to Equation (2), we can observe what changes have occurred for each component.

$$
\overline{totaltime}_{2016} - \overline{totaltime}_{1996}
$$
$$
= \left(\overline{Msolotime}_{2016} - \overline{Msolotime}_{1996}\right) + \left(\overline{Fsolotime}_{2016} - \overline{Fsolotime}_{1996}\right)
$$
$$
+ \left(\overline{Coparentingtime}_{2016} - \overline{Coparentingtime}_{1996}\right)
$$
$$
= \{F_{Msolo}(X_{2016}\beta_{2016}) - F_{Msolo}(X_{1996}\beta_{2016})\} + \{F_{Msolo}(X_{1996}\beta_{2016}) - F_{Msolo}(X_{1996}\beta_{1996})\}
$$
$$
+ \{F_{Fsolo}(X_{2016}\beta_{2016}) - F_{Fsolo}(X_{1996}\beta_{2016})\} + \{F_{Fsolo}(X_{1996}\beta_{2016}) - F_{Fsolo}(X_{1996}\beta_{1996})\}
$$
$$
+ \{F_{coparenting}(X_{2016}\beta_{2016}) - F_{coparenting}(X_{1996}\beta_{2016})\} + \{F_{coparenting}(X_{1996}\beta_{2016}) -
$$
$$
F_{coparenting}(X_{1996}\beta_{1996})\}
$$

(2)

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[3] Statistics Bureau of Japan, 2023.

As explanatory variables, we use the couple's combination of education, cohabitation with grandparents, and mothers' and fathers' weekend work hours as structural factors that affect the average time spent on childcare. The age of the youngest child is also used as a control variable. The number of children, a commonly used control variable for estimating parenting time, is not available because it was not investigated in the 1996 survey. Information on the use of childcare facilities and babysitters on weekends is also unavailable but is not expected to have much of an effect because of the low rate of use on weekends.[4]

A couple's combined education and cohabitation with grandparents are categorical variables. Normally, they can be used as dummy variables, omitting one of the categories as a reference category in OLS estimation, but when dummy variables are used in the same way in the Oaxaca decomposition, we face an identification problem in that the results change depending on the omitted category. To address this problem, we introduce the normalization restriction proposed by Gardeazabal & Ugidos (2004). This method normalizes the coefficients of dummy variables by imposing a restriction of $\sum \beta_j = 0$ for each set of dummy variables, where j represents the jth category. By this method, it is no longer necessary to omit any category as a reference; thus, we can identify the contribution of each individual dummy variable.

VII. Descriptive Analysis

Changes in the composition of assortative mating

According to the descriptive statistics (Table 1), over the 20-year period from 1996 to 2016, the number of highly educated homogamous couples increased by 10%, that of hypergamous couples decreased by 5%, that of hypogamous couples increased by 6%, and that of less educated homogamous couples decreased by 12%.

The youngest child age variable was created according to the 1996 survey categories, with age 0 as 0, ages 1 and 2 as 1, age 3 as 2, and ages 4 and 5 as 3. The average age of the youngest child was slightly older in 2016 than in 1996. The average weekend hours worked decreased for fathers on Saturdays following the amendment of the Labor Standard Act and increased for all others. Explanations for the others are omitted here because they were discussed earlier.

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[4] There are no official data available for the utilization rate of childcare on weekends. The author estimates that the Saturday utilization rate is 12.8% and the Sunday utilization rate is 0.2%. Details of these estimates are available on request.

Table 1. Descriptive statistics

	Saturday		Sunday	
Explained variables	1996	2016	1996	2016
Total childcare time (in minutes)	165.31	245.58	151.97	242.79
Mother's solo childcare time (in minutes)	137.68	173.78	114.07	160.36
Father's solo childcare time (in minutes)	19.27	45.41	24.04	52.28
Coparenting time (in minutes)	8.36	26.40	13.86	30.15
Explanatory variables				
Age of youngest child *	1.47	1.53	1.46	1.52
Father's working time	337.30	289.48	145.74	165.42
Mother's working time	63.79	68.00	27.47	34.56
Household with grandparents	23%	13%	24%	12%
Household without grandparents	77%	87%	76%	88%
Highly educated homogamous couple	9%	19%	9%	20%
Hypergamous couple	26%	21%	26%	21%
Hypogamous couple	2%	8%	2%	8%
Less educated homogamous couple	64%	52%	64%	52%
Number of observations	7013	3258	7058	3257

* The age of the youngest child is represented by 0 for age 0, 1 for ages 1 and 2, 2 for age 3, and 3 for ages 4 and 5.

Educational stratification and childcare time

Figure 2 shows weekend parenting time by educational assortative mating. The height of each bar indicates the total parenting time, which consists of (from the bottom) mothers' sole parenting time, fathers' sole parenting time, and coparenting time.

In 1996, most of the total parenting time in every family was carried out by mothers alone. In 2016, the percentage of mothers' solo childcare decreased, while the percentage of fathers' solo childcare and coparenting increased. However, the degree of that change varied by family, resulting in highly educated homogamous families having the most balanced parenting (father's solo childcare and coparenting time were longer than those of other families) and less educated homogamous families being the most unbalanced, with a bias toward maternal solo childcare.[5] This trend is consistent with Bonke and Esping-Andersen (2011), who, using Danish data, concluded that highly educated homogamous couples had more egalitarian parenting and that less educated homogamous couples had

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[5] This result differs from those of Miller (2020), where fathers who spent the most time parenting were in hypogamous couples. This discrepancy will be discussed below.

more traditional parenting.

Several studies have confirmed that paternal involvement has a positive impact on child outcomes (Carlson & Magnuson, 2011; Miller et al., 2020; Sarkadi et al., 2008).[6] Coparenting has a positive impact when parents share values in child rearing (Bonke & Esping-Andersen, 2011; Cabrera et al., 2012).[7] Thus, the educational stratification in childrearing is not only a matter of length of time but also of components; from Figure 2, we can say that children from less educated homogamous couples are at a double disadvantage in Japan.

Figure 2. Childcare time by assortative mating (in minutes)
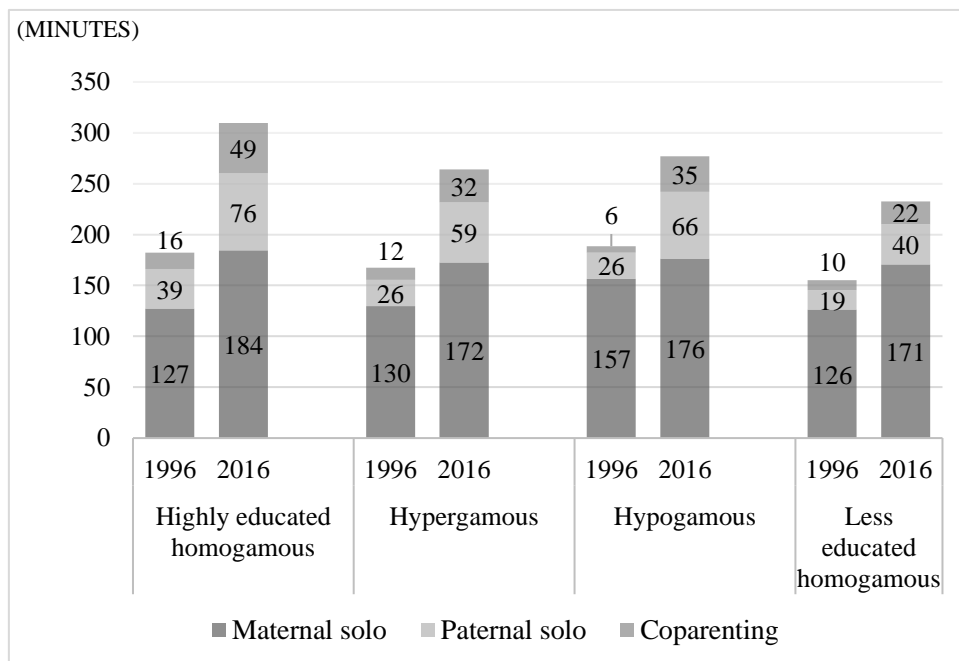
Source: Created by the author based on the STULA dataset of two-parent households with children under the age of six

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[6] Sarkadi et al. (2008) conducted a systematic review of studies ranging from biomedical to psychological and sociological studies and concluded that father involvement has a variety of positive effects on child outcomes (behavioral, social, cognitive, and psychological). Additionally, father involvement is associated with academic achievement and well-being, especially among children from lower classes, and may be a factor in mitigating class disparities (Carlson & Magnuson 2011; Miller et al.).

[7] Bonke and Esping-Andersen (2011) argue that highly educated parents who share values and preferences tend to share resources and parenting tasks together. Cabrera et al. (2012) also found positive effects on children's academic achievements and social skills when fathers and mothers share decision-making in parenting and negative effects when they are in conflict in childrearing.

VIII. Multivariate Analysis Results

Table 2 shows the OLS results of the estimated time spent on childcare.[8]

As Table 2 shows, an increase in the age of the youngest child reduces childcare time for both parents. Working hours also reduce childcare time for the individual and increase parenting time for the spouse. Contrary to expectations, living with grandparents increases total parenting time (but this was statistically nonsignificant in 2016). By individual, living with grandparents tends to increase maternal solo parenting time and decrease paternal solo parenting time, suggesting that living with grandparents may reinforce the division of labor by gender role.[9]

The educational assortative mating results are as follows: less educated homogamous couples had the least amount of parenting time regardless of year; in 1996, highly educated homogamous couples had the most childcare time, but in 2016, with hypogamous couples' dramatic rise in parenting time, polarizations were observed. That is, highly educated homogamous and hypogamous couples had relatively long parenting durations, and their opposite, the less educated homogamous and hypergamous couples, had relatively less time spent parenting. The difference is whether the mother has a college degree.

When comparing the coefficients for the highly educated homogamous and hypergamous couples in 2016, we notice certain differences between them. In the former, fathers spend more time in solo childcare (and more time coparenting on Sundays), while in the latter, mothers spend more time in solo childcare. This is especially true on Sundays. Miller (2020), who analyzed American Time Use Study data, found that husbands from hypogamous couples spent the most time in childcare, but this is not the case in Japan.

Since the explained variable contains many zeros, we estimated childcare time with the Tobit model and compared the results with the OLS results.[10] The results showed that although the coefficients (in absolute values) obtained by OLS were smaller overall than those obtained by the Tobit estimation[11], the signs of the coefficients of the two results, the large–small relationships between the coefficients, and their statistical significance levels were approximately the same. Therefore, there is no problem as long as the discussion is limited to these elements.[12]

Next, we examined the overall results for the Oaxaca decomposition (Table 3). In all cases, the

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[8] These results were obtained in the process of executing the Oaxaca command in StataMP 18.

[9] However, there could also be reverse causality, with families with relatively traditional values choosing to live with the grandparents.

[10] The results of the Tobit estimation are available upon request.

[11] This is because the coefficients are underestimated in the OLS estimation due to the effect of zero inflation.

[12] Ideally, childcare time would be estimated in Tobit models and then decomposed, but Tobit decomposition with normalized variables is technically difficult in the sense that there is no command for it in StataMP 18.

unexplained part accounts for most of the change in childcare time over the 20-year period. The same is true for all components (the percentage contribution of the unexplained part to the increase in parenting time ranges from 80% to 124%). In other words, most of the increase in parenting time can be explained by changes in behavior. However, the results of the detailed decomposition show that the constant term is large in all cases[13]. This indicates an overall increasing trend in parenting time, as shown in Figure 1. Thus, the increase in parenting time over the past 20 years can be explained first by the overall trend that parents have changed their behavior to become more committed to parenting.

Next, to discuss the educational stratification identified in Figures 1 and 2, we selected the contributions of assortative mating from the detailed decomposition results, and the results are shown in Figure 3. These bar graphs represent the sum of the contributions of all assortative mating categories to the 20-year change in childcare time (in minutes). As expected, the explained parts (the increase in the percentage of college graduates) contribute positively to the 20-year increase in childcare time. On the other hand, the unexplained parts contribute negatively (except for paternal time spent on solo childcare on Saturdays). The unexplained part has a larger impact than the explained part in all graphs. This trend is more pronounced on Sundays. In other words, the unexplained part of assortative mating contributes negatively to the increase in childcare time over the 20-year period.

For a more detailed discussion, we look at the breakdown of the contributions of assortative mating. Since the unexplained parts on Saturday were not statistically significant overall, only the Sunday breakdown is shown in Figure 4. This finding shows that the unexplained part varies by assortative mating: highly educated homogamous couples result in a positive contribution to paternal time spent on solo childcare and coparenting; maternal time spent on solo childcare makes a negative contribution. Hypogamous couples result in a positive contribution to maternal time spent on solo childcare; hypergamous couples result in a negative contribution to maternal time spent on solo childcare and coparenting time, and less educated homogamous couples result in a negative contribution overall. The negative contributions of less educated homogamous couples are particularly large, which is why the unexplained parts have a significant negative impact, as shown in Figure 3.

Figure 2 shows that highly educated homogamous fathers have relatively longer solo parenting and coparenting times. Figure 4 shows that the former is mainly due to the contribution from the explained part, while the latter is largely due to the contribution from the unexplained part. Figure 2 also shows that mothers in hypogamous couples spend longer times in solo parenting, which is mainly due to the contribution of the unexplained part. In other words, highly educated homogamous couples change their coparenting behavior, while hypogamous couples change the maternal solo childcare behavior.

To summarize the results of the decomposition analysis, (1) the 20-year increase in time spent on

childcare reflects an overall trend of behavioral changes in parenting enthusiasm; (2) differences in time spent on childcare due to educational stratification are seen in behavioral changes on Sundays (less educated homogamous couples lagging far behind others); and (3) parenting enthusiasm was found in coparenting among highly educated homogamous couples and in maternal solo childcare among hypogamous couples.

Table 2. Results of childcare time estimation (OLS)
a. Saturday
Upper values: Marginal effects, *Lower values (in parentheses)*: Robust standard errors

	Total childcare time		Father's solo childcare time		Mother's solo childcare time		Coparenting time	
	1996	2016	1996	2016	1996	2016	1996	2016
Age of youngest child	-71.16***	-77.69***	-6.00***	-6.85***	62.24***	-59.91***	-2.92***	-10.93***
	(1.59)	(3.33)	(0.57)	(1.46)	(1.39)	(2.77)	(0.43)	(1.23)
Father's working time	0.01†	0.00	-0.05***	-0.10***	0.09***	0.16***	-0.02***	-0.05***
	(0.01)	(0.01)	(0.00)	(0.01)	(0.01)	(0.01)	(0.00)	(0.00)
Mother's working time	-0.16***	-0.19***	0.04***	0.09***	-0.20***	-0.26***	-0.01***	-0.02***
	(0.01)	(0.02)	(0.01)	(0.01)	(0.01)	(0.01)	(0.00)	(0.00)
Household with grandparents	8.88***	4.71	-0.39	-5.45**	9.10***	11.92**	0.18	-1.76
	(2.20)	(5.52)	(0.82)	(2.17)	(1.97)	(4.72)	(0.52)	(1.72)
Household without grandparents	-8.88***	-4.71	0.39	5.45**	-9.10***	-11.92**	-0.18	1.76
	(2.19)	(5.52)	(0.82)	(2.17)	(1.97)	(4.72)	(0.52)	(1.72)
Highly educated homogamous	12.94*	15.21*	2.70	5.24	7.68	7.32	2.56†	2.65
	(6.17)	(7.39)	(2.95)	(3.68)	(5.12)	(5.95)	(1.45)	(2.96)
Hypergamous	-7.76	-13.78*	-4.23†	-0.04	-3.83	-10.20†	0.29	-3.54
	(4.94)	(7.08)	(2.38)	(3.44)	(4.18)	(5.77)	(1.01)	(2.68)
Hypogamous	9.62	25.25**	8.58	0.91	2.68	18.70*	-1.64	5.64
	(11.89)	(10.22)	(6.17)	(4.53)	(9.95)	(8.35)	(1.63)	(4.08)
Lesseducated homogamous	-14.80***	-26.67***	-7.06**	-6.11**	-6.53†	-15.82***	-1.21	-4.75*
	(4.61)	(5.85)	(2.26)	(2.63)	(3.89)	(4.82)	(0.83)	(2.15)
Constant	291.29***	392.23***	48.40***	77.54***	222.16***	253.89***	20.73***	60.80***
	(5.85)	(9.42)	(2.82)	(3.96)	(4.96)	(7.90)	(1.32)	(4.02)
N	7013	3258	7013	3258	7013	3258	7013	3258

***, **, *, and † indicate statistical significance at the 0.1%, 1%, 5%, and 10% levels, respectively.

b. Sunday
Upper values: Marginal effects, *Lower values (in parentheses)*: Robust standard errors

	Total childcare time		Father's solo childcare time		Mother's solo childcare time		Coparenting time	
	1996	2016	1996	2016	1996	2016	1996	2016
Age of youngest child	-66.93***	-82.78***	-8.41***	-10.36***	-56.35***	-60.92***	-2.17***	-11.50***
	(1.64)	(3.32)	(0.62)	(1.55)	(1.36)	(2.70)	(0.59)	(1.20)
Father's working time	0.03***	0.03†	-0.04***	-0.09***	0.09***	0.16***	-0.02***	-0.05***
	(0.01)	(0.01)	(0.00)	(0.00)	(0.01)	(0.01)	(0.00)	(0.00)
Mother's working time	-0.13***	-0.08**	0.04***	0.14***	-0.16***	-0.20***	-0.02***	-0.02***
	(0.01)	(0.03)	(0.01)	(0.02)	(0.01)	(0.02)	(0.00)	(0.01)
Household with grandparents	8.25***	0.84	-1.93*	-3.74	10.24***	4.36	-0.06	0.22
	(2.20)	(5.67)	(0.80)	(2.59)	(1.86)	(4.77)	(0.70)	(1.78)
Household without grandparents	-8.25***	-0.84	1.93*	3.74	-10.24***	-4.36	0.06	-0.22
	(2.20)	(5.67)	(0.80)	(2.59)	(1.86)	(4.77)	(0.70)	(1.78)
Highly educated homogamous	26.45***	22.05**	10.82***	12.30**	12.13**	-3.38	3.51†	13.12***
	(5.99)	(7.70)	(2.87)	(3.94)	(4.87)	(5.84)	(1.96)	(3.17)
Hypergamous	-3.98	-18.65**	-1.47	-2.42	-1.69	-12.72*	-0.82	-3.51
	(4.53)	(7.06)	(1.96)	(3.62)	(3.78)	(5.69)	(1.37)	(2.56)
Hypogamous	-7.85	31.26**	-1.79	3.69	-3.50	27.70**	-2.57	-0.13
	(10.03)	(10.93)	(4.16)	(5.40)	(8.58)	(9.02)	(2.78)	(3.65)
Lesseducated homogamous	-14.62***	-34.66***	-7.56***	-13.58***	-6.94*	-11.60*	-0.12	-9.48***
	(4.14)	(5.93)	(1.73)	(2.89)	(3.49)	(4.85)	(1.25)	(2.06)
Constant	260.57***	382.67***	44.08***	79.94***	195.81***	243.63***	20.67***	59.10***
	(5.12)	(9.10)	(2.14)	(4.11)	(4.34)	(7.68)	(1.56)	(3.40)
N	7058	3257	7058	3257	7058	3257	7058	3258

***, **, *, and † indicate statistical significance at the 0.1%, 1%, 5%, and 10% levels, respectively.

Table 3. Childcare time (in minutes): the difference and overall decomposition results   *Values in parentheses*: percentage contributions

	Saturday				Sunday			
	Total time	Paternal solo time	Maternal solo time	Coparenting time	Total time	Paternal solo time	Maternal solo time	Coparenting time
Year 1996	165.31	19.27	137.68	8.36	151.97	24.04	114.07	13.86
Year 2016	245.58	45.41	173.78	26.40	242.79	52.28	160.36	30.15
Difference	80.27 (100.0%)	26.13 (100.0%)	36.10 (100.0%)	18.04 (100.0%)	90.82 (100.0%)	28.24 (100.0%)	46.29 (100.0%)	16.29 (100.0%)
Explained	-1.32 (-1.6%)	5.14 *** (19.7%)	-8.71 *** (-24.1%)	2.25 *** (12.5%)	1.08 *** (1.2%)	2.14 *** (7.6%)	-1.53 (-3.3%)	0.48 (2.9%)
Unexplained	81.60 *** (101.7%)	21.00 *** (80.4%)	44.81 *** (124.1%)	15.79 *** (87.5%)	89.74 *** (98.8%)	26.10 *** (92.4%)	47.82 *** (103.3%)	15.81 *** (97.1%)

*** , ** , * , and † indicate statistical significance at the 0.1%, 1%, 5%, and 10% levels, respectively.

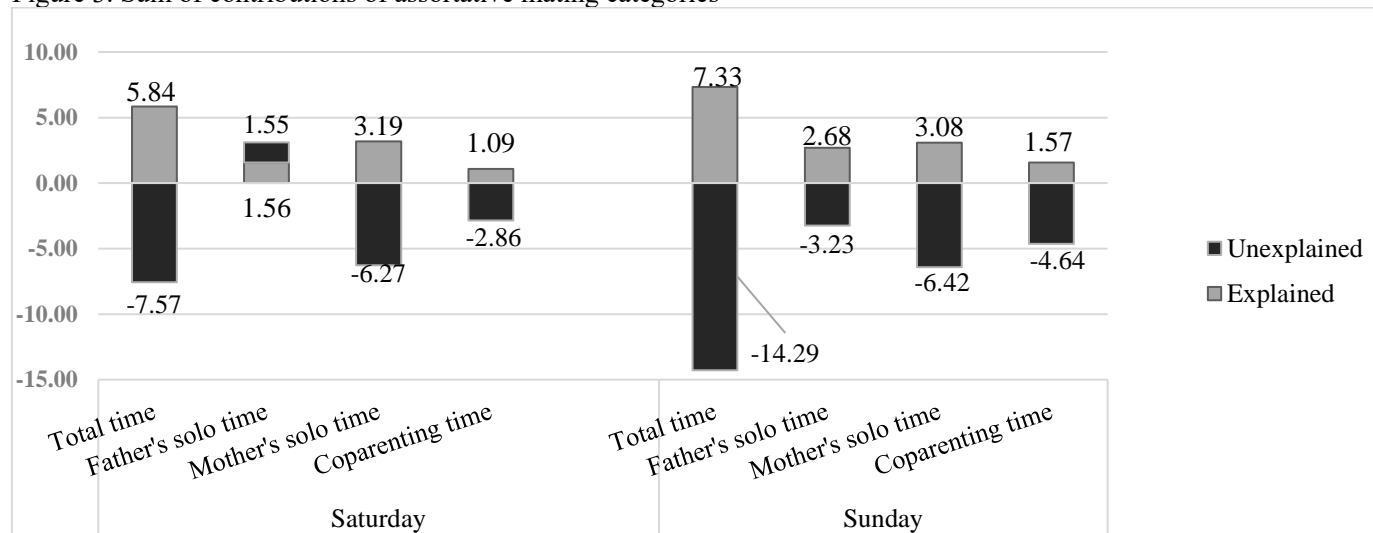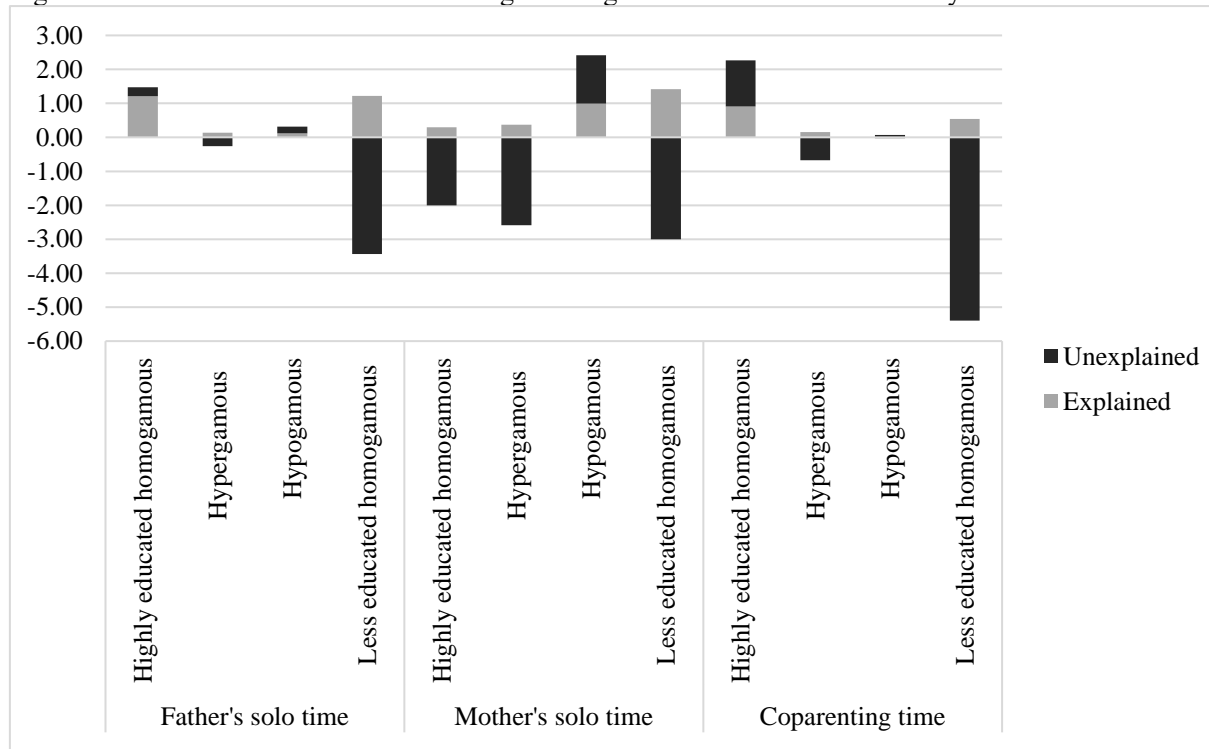Figure 3. Sum of contributions of assortative mating categories

Figure 4. Contributions of assortative mating to changes in childcare time on Sundays

IX. Discussion

This study analyzed the educational stratification in increased time spent on childcare on weekends over the past 20 years in Japan. The results show that most of the change was explained by an overall increase in parenting enthusiasm, as a behavioral change. However, there was heterogeneity in these behavioral changes, visible in assortative mating; highly educated homogamous and hypogamous couples were more enthusiastic about parenting than hypergamous and less educated homogamous couples, who were relatively less enthusiastic. As confirmed in Figure 1, the difference in parenting time between highly educated homogamous couples and less educated homogamous couples is 77 minutes. Furthermore, if weekend childcare is more educational and higher in quality than weekday childcare, this time difference on weekends implies the possibility of widening and reproducing the educational stratification.

In addition to the disparity in total childcare time, we focused on the components of childcare time. Highly educated homogamous couples experienced greater increases in paternal solo childcare and coparenting time, which increased gender-balanced parenting time. On the other hand, for hypogamous couples, although total childcare time was longer, the increase was biased toward mothers. This may be related to the strongly gendered division of labor that persists in Japan. The gendered division of labor in child rearing is undesirable in the sense that it inhibits the positive effects that paternal involvement has on children's development. Further research is needed on the interrelationship between the effects of parents' academic backgrounds and the gendered division of labor on child outcomes.

Two challenges will need to be addressed in the future. One is that childrearing disparities must consider not only time but also the quality of childrearing; Bryant & Zick (1996) mention the possibility that childcare with greater returns may offset shortages in childcare time. Kalil, Ryan & Corey (2012) and Del Bono et al. (2016) confirm that highly educated parents vary the content of childcare with the age of their children in ways that optimize their children's development. This disparity in the quantity and quality of childcare brings a double disadvantage to the children of less educated parents. It is necessary to examine whether there is qualitative disparity in the future. Fortunately, this approach is feasible because the STULA's Form B (Form A was used in this study), although small in sample size, provides information on the content of childcare.

Another challenge is to reflect on the heterogeneity among college graduates that may have arisen as a result of the popularization of universities. Fukuda et al. (2021) found that the preference for homogamous assortative mating weakened as the number of college graduate couples in Japan increased. This suggests that college graduates of different genders no longer necessarily share the same values. Therefore, it would be desirable to distinguish between university levels, but this is difficult to do with the existing data since most surveys do not examine the quality of the university.

This study focused on the disparity in parenting time on weekends in Japan, which is not well known,

and how this disparity has changed over time. Our results suggest that disparities in childcare time may reproduce educational stratification. It also suggests that research is needed on the extent to which child care disparities affect child development and whether the disparities persist or widen in the future.

Appendix. Detailed decomposition results

Upper values: Marginal effects, *Lower values (in parentheses)*: Robust standard errors

	Saturday				Sunday			
	Total childcare time	Paternal solo childcare time	Maternal solo childcare time	Coparenting time	Total childcare time	Paternal solo childcare time	Maternal solo childcare time	Coparenting time
Explained								
Age of youngest child	-4.30 **	-0.37 **	-3.62 **	-0.32 **	-4.44 **	-0.56 **	-3.56 **	-0.32 ***
	(1.68)	(0.25)	(1.41)	(0.13)	(1.65)	(0.21)	(1.32)	(0.12)
Father's working time	-0.38	3.33 ***	-5.22 ***	1.52 ***	0.61 **	-1.14 ***	2.34 ***	-0.59 ***
	(0.28)	(0.46)	(0.74)	(0.22)	(0.22)	(0.33)	(0.68)	(0.17)
Mother's working time	-0.73	0.24	-0.92	-0.05	-0.79 **	0.57 **	-1.23 **	-0.13 ***
	(0.58)	(0.20)	(0.74)	(0.04)	(0.29)	(0.21)	(0.43)	(0.05)
Household with grandparents	-0.88 ***	0.19 *	-1.07 ***	0.00	-0.81 ***	0.29 **	-1.08 ***	-0.03
	(0.23)	(0.09)	(0.21)	(0.06)	(0.25)	(0.10)	(0.22)	(0.08)
Household without grandparents	-0.88 ***	0.19 *	-1.07 ***	0.00	-0.81 ***	0.29 **	-1.08 ***	-0.03
	(0.23)	(0.09)	(0.21)	(0.06)	(0.25)	(0.10)	(0.22)	(0.08)
Highly educated homogamous	1.43 **	0.53 *	0.60	0.31 †	2.41 ***	1.21 ***	0.29	0.91 ***
	(0.51)	(0.25)	(0.41)	(0.18)	(0.57	(0.29)	(0.42)	(0.22)
Hypergamous	0.65 **	0.13	0.39 *	0.13 †	0.66 **	0.14	0.37 *	0.15 *
	(0.23)	(0.09)	(0.18)	(0.07)	(0.22)	(0.09)	(0.17)	(0.07)
Hypogamous	1.27 **	0.21	0.84 *	0.21	1.07 *	0.11	1.00 **	-0.03
	(0.50)	(0.23)	(0.41)	(0.18)	(0.48)	(0.23)	(0.40)	(0.15)

Less educated homogamous	2.50 ***	0.70 ***	1.36 ***	0.44 ***	3.18 ***	1.22 ***	1.42 ***	0.54 ***
	(0.469	(0.19)	(0.36)	(0.14)	(0.51)	(0.23)	(0.37)	(0.15)
Unexplained								
Age of youngest child	-9.86 †	-1.28	3.52	-12.09 ***	-23.74 ***	-2.92	-6.85	-13.97 ***
	(5.57)	(2.36)	(4.68)	(1.97)	(5.55)	(2.51)	(4.52)	(2.01)
Father's working time	-3.36	-15.37 ***	22.00 ***	-9.99 ***	-1.34	-8.02 ***	10.31 ***	-3.63 ***
	(4.23)	(1.88)	(3.61)	(1.31)	(2.45)	(0.80)	(2.27)	(0.54)
Mother's working time	-1.52	3.47 ***	-4.25 ***	-0.74 *	1.70	3.17 ***	-1.25 *	-0.22
	(1.53)	(1.09)	(0.99)	(0.32)	(1.08)	(0.84)	(0.62)	(0.19)
Household with grandparents	-0.60	-0.79 *	0.45	-0.27	-1.05	-0.28	-0.84	0.07
	(0.90)	(0.35)	(0.77)	(0.27)	(0.89)	(0.40)	(0.75)	(0.28)
Household without grandparents	3.58	4.27 *	-2.37	1.68	6.36	1.53	5.04	-0.21
	(5.05)	(1.97)	(4.349	(1.53)	(5.19)	(2.32)	(4.37)	(1.63)
Highly educated homogamous	0.38	0.25	0.15	-0.02	-0.37	0.27	-2.00 †	1.36 **
	(1.31)	(0.64)	(1.06)	(0.46)	(1.35)	(0.67)	(1.05)	(0.52)
Hypergamous	-1.51	0.96	-1.53	-0.94	-3.53 †	-0.26	-2.59 †	-0.67
	(2.00)	(0.97)	(1.65)	(0.66)	(1.92)	(0.94)	(1.57)	(0.66)
Hypogamous	0.52	-0.28	0.56	0.25	1.44 **	0.20	1.17 **	0.07
	(0.56)	(0.27)	(0.46)	(0.16)	(0.56)	(0.25)	(0.47)	(0.17)
Less educated homogamous	-6.97	0.62	-5.44	-2.15	-11.83 **	-3.43 †	-3.00	-5.39 ***
	(4.32)	(2.02)	(3.60)	(1.33)	(4.19)	(1.95)	(3.46)	(1.39)
_cons	100.94 ***	29.14 ***	31.72 ***	40.07 ***	122.10 ***	35.85 ***	47.83 ***	38.42 ***
	(11.09)	(4.86)	(9.33)	(4.23)	(10.44)	(1.95)	(8.82)	(3.75)

***, **, *, and † indicate statistical significance at levels of 0.1%, 1%, 5%, and 10%, respectively.

References

Altintas, E. 2016. The Widening Education Gap in Developmental Child Care Activities in the United States, 1965-2013. *Journal of Marriage and Family*, 78, 26-42. DOI:10.1111/jomf.12254

Bonke, J., and Esping-Andersen, G. 2011. Family investments in children—productivities, preferences, and parental child care. *European Sociological Review*, 27(1), 43–55. https://doi.org/10.1093/esr/jcp054

Bryant W. Keith and Cathleen D. Zick. 1996. Are we investing less in the next generation? Historical trends in time spent. *Journal of Family and Economic Issues*, Vol.17(3/4), Winter, 365-392.

Carlson, M., & Magnuson, K. (2011). Low-income fathers' influence on children. *Annals of the American Academy of Political and Social Science*, *635*(1), 95–116. https://doi.org/10.1177/0002716210393853

Cha, S.-E., and Song, Y.-J. 2017. Time or Money: The Relationship Between Educational Attainment, Income Contribution, and Time with Children Among Korean Fathers. *Social Indicator Research*, Vol. 134 Issue 1, 195-218. DOI: 10.1007/s11205-016-1414-2

Craig, L. (2006). Parental education, time in paid work and time with children: An Australian time-diary analysis. *The British Journal of Sociology*, 57(4), 553–575. https://doi.org/10.1111/j.1468-4446.2006.00125.x

Craig L., & Jenkins B. (2016). The composition of parents' and grandparents' childcare time: gender and Generational patterns in activity, multitasking and co-presence. *Ageing and Society*, 36(4), 785-810. https://doi.org/10.1017/S0144686X14001548

Del Boca, D., & Mancini, A. L. (2013). Parental time and child outcomes: Does Gender Matter?. *Questioni di Economia e Finanza* (Occasional papers), Number 187. https://dx.doi.org/10.2139/ssrn.2303654

Del Bono, E., Francesconi, M., Kelly, Y., and Sacker, A. (2016). Early maternal time investment and early child outcomes. *The Economic Journal*. 126 (October), F.96-F135. Doi: 10.1111/ecoj.12342

Dotti Sani, G. M., & Treas, J. (2016). Educational gradients in parents' child-care time across countries, 1965–2012. *Journal of Marriage and Family*, 78(4), 1083-1096. https://doi.org/10.1111/jomf.12305

Doepke, M., & Zilibotti, F. (2019). *Love, Money, and Parenting: How Economics Explains the Way We Raise Our Kids*. Princeton University Press. https://doi.org/10.1515/9780691184210

England, P., & Srivastava, A. 2013. Educational differences in US parents' time spent in child care: The role of culture and cross-spouse influence. *Social Science Research*, 42(4), 971–988. https://doi.org/10.1016/j.ssresearch.2013.03.003

Fukuda, S., Yoda, S. and Mogi, R. (2021). Educational Assortative Mating in Japan: Evidence from the 1980-2010 Census. *The Journal of Population Studies*, 57, 1-20. https://doi.org/10.24454/jps.2101001

Gardeazabal, J., & Ugidos, A. 2004. More on identification in detailed wage decompositions. *The Review of Economics and Statistics*, Vol. 86, No. 4, 1034-1036. https://doi.org/10.1162/0034653043125239

Gauthier, A., Mynarska, M., Fadel, L., Koops, J, Bryson, C., & Haux, T. (2021) Exploring the concept of intensive parenting in a three-country study. *Demographic Research*, 44, 333-348. https://doi.org/10.4054/DemRes.2021.44.13

Gray, A. (2005). 'The Changing Availability of Grandparents as Carers and its Implications for Childcare Policy in the UK'; *Journal of Social Policy* 34/4, 557–577. https://doi.org/10.1017/S0047279405009153

Gupta Sanjiv, Sayer Liana C., and Pearlman Jessica. (2021). Educational and Type of Day Differences in Mothers' Time Availability for Child Care and Housework. *Journal of Marriage and Family*, 83(3):786–802. https://doi.org/10.1111/jomf.12754

Guryan, J., Hurst, E., & Kearney, M. (2008). Parental Education and Parental Time with Children. *Journal of Economic Perspectives*, Vol. 22, No. 3, 23-46. DOI: 10.1257/jep.22.3.23

Gutierrez-Domènech, M. (2010). Parental employment and time with children in Spain. *Review of Economics of the Household*, 8(3), 371–391. https://doi.org/10.1007/s11150-010-9096-z

Kalil, A., Ryan, R., and Corey, M. (2012). Diverging destinies: Maternal education and the development gradient in time with children. *Demography* 49(3): 1361–1383. doi:10.1007/s13524-012-0129-5.

Kuroda, S. 2010. Do Japanese Work Shorter hours than before? Measuring trends in market work and leisure using 1976-2006. *Journal of the Japanese and International Economies*, 24. 481-502. https://doi.org/10.1016/j.jjie.2010.05.001

Lesnard, L. (2008). Off scheduling within dual earner couples: An unequal and negative externality for family time. *American Journal of Sociology*, 114(2), 447–490. https://doi.org/10.1086/590648

Miller, D. P., Thomas, M. M., Waller, M. R., Nepomnyaschy, L., & Dwyer Emory, A. (2020). Father involvement and socioeconomic disparities in child academic outcomes. *Journal of Marriage and Family*, **82**(2), 515–533. https://doi.org/10.1111/jomf.12666

Miller, R. N. 2020. Educational assortative mating and time use in the home. *Social Science Research*, 90, 102440 https://doi.org/10.1016/j.ssresearch.2020.102440

Nock, S. L., & Kingston, P. W. (1988). Time with children: The impact of couples' work-time commitments. *Social Forces*, 67(1), 59–85. https://doi.org/10.2307/2579100

Park, H. (2021) Diverging gaps in childcare time by parental education in South Korea. *Demographic Research*, Vol.44 (6), 143-156. DOI: 10.4054/demres.2021.44.6.

Presser, H. B. (2003). *Working in a 24/7 economy: Challenges for American families*. Russell Sage Foundation, New York, NY.

Rapoport, B., & Le Bourdais, C. (2008). Parental time and working schedules. *Journal of Population*

Economics, 21(4), 903–932. https://doi.org/10.1007/s00148-007-0147-6

Sandberg, J. F., & Hofferth, S. L. 2001. Changes in children's time with parents: United States, 1981–1997. *Demography*, 38(3), 423-436. https://doi.org/10.2307/3088356

Sarkadi, A., Kristiansson, R., Oberklaid, F., & Bremberg, S. (2008). Fathers' involvement and children's developmental outcomes: A systematic review of longitudinal studies. *Acta Paediatrica*, **97**(2), 153–158. https://doi.org/10.1111/j.1651-2227.2007.00572.x

Sayer, L. C., Bianchi, S. M. and Robinson, J. P. 2004. Are parents investing less in children? Trends in mothers' and fathers' time with children. *American Journal of Sociology*. Vol.110, No.1, pp.1-43. https://doi.org/10.1086/386270

Schulz, F. & Engelhardt, H. 2017. The development, educational stratification and decomposition of mothers' and fathers' childcare time in Germany. An update for 2001–2013. *Zeitschrift für Familienforschung/Journal of Family Research*, 29, 3, S. 277-297. https://doi.org/10.3224/zff.v29i3.02

Statistic Bureau of Japan. (2023). *Tokei today*, No.190. (in Japanese)

Uchikoshi, F., & Raymo, J. M. 2021. *Educational assortative mating in Japan: Insights into social change and stratification*. Singapore: Springer Nature Singapore. https://doi.org/10.1007/978-981-16-3713-1

Vagni, G, 2020. The social stratification of time use patterns. *British Journal of Sociology*. 71 (4). 658-679. https://doi.org/10.1111/1468-4446.12759

Zenella, G (2017). How does grandparents childcare affect labor supply? *IZA World of Labor*, No. 337, 1-9. https://doi.org/10.15185/izawol.337