Changing Effects of Education on Parents' Time with Children

by

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I examine differences based on (parents') education, in the time that American parents spend with their children, and how these differences have changed between 1985 and 2003. I also examine educational differences in the ratio of mothers' child time to fathers' child time. The results indicate that better educated parents used to and continue to spend more time with their children than the less educated. Although parents at all levels of education have increased their time with children, the better educated have made relatively larger gains. Further, the ratio of mothers' to fathers' child time was and continues to be lower for the better educated than the less educated. Finally, I find that the gap in parent-child time between mothers and fathers has narrowed at every education level between 1985 and 2003.

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INTRODUCTION:

Phrases like ‘time squeeze’ have been creeping into common parlance with greater frequency in recent years (Milkie et al, 2004; Gershuny, 2000; Hochschild, 1989). For parents, with this perceived time squeeze there invariably comes a sense that they are unable to spend as much time with their children as they would have liked to. Why is parental time important? It is a widely held belief that spending time with one’s children can benefit them in a great number of ways. This belief is amply supported in the academic literature as well. For one, Neidell (2000) found that uninterrupted time with the mother in the first year has positive effects on a baby’s cognitive outcomes, and even stronger positive effects on non-cognitive outcomes. Izzo et al (1999) found that parental involvement with children from kindergarten through third grade is positively related to student achievement, with involvement at home having the largest benefits. Fleisher (1977) and Datcher-Loury (1988) both concluded that maternal child care time significantly raises children’s years of schooling (although the impact is limited to those whose mothers had at least 12 years of schooling). Leibowitz (1974) demonstrated that there is a positive correlation between parental time inputs and children’s ability at later ages. Hofferth and Sandberg (2001), in their study of children under the age of 13, found that family time spent at meals is associated with fewer behavioral problems. McLanahan and Sandefur (1994) argue that children of single parents have a higher probability of experiencing early pregnancies and difficulties establishing themselves in the labor force,

not only because of their families' relatively poorer economic standing, but also because of reduced parent-child time.

However, it is important to note that time with parents is not the only type of time that children require. Children need to spend time outside of their home, interacting with other children in settings like the playground or at school in order to develop certain skills which cannot be learnt at home. For younger children, out-of-home alternatives to parental care can be just as beneficial as or even better than parental care when the providers are responsive and warm, and have a good understanding of child development (Guy, 1997). And once children reach a certain age, they may benefit more from structured school and non-school activities than from time with parents.

While it is true that parental time is often important for children, it is also true that there exist wide variations in how much time parents are actually able to put in. There exist variations in parent-child time by sex, age, education level, and work status of the parent, age of the child, family income and family type (Sayer, Gauthier & Furstenberg, 2004; Bryant & Zick, 1996). Apart from the variations between groups (as defined by the above-mentioned demographic traits) at a given point in time, there have been substantial changes in parental time over the years between and even within groups (Sandberg & Hofferth, 2001; Sayer, Bianchi & Robinson, 2004). My research here focuses on variations in parent-child time in two-parent families by educational attainment of the parent, and changes over time. More specifically, I will analyze (i) differences in parental

time between education groups in a given year, (ii) changes in the differences in parental time between education groups from 1985 to 2003 and, (iii) changes in parental time from 1985 to 2003 within education groups.

GENERAL MOTIVATION:

Why might it be important to study educational differences in parental time? It has already been established that parents can influence a variety of their children's outcomes. But are there educational differences in the extent to which parents can procure better life outcomes for their children?

What has repeatedly found in national studies over the last 50 years is that, as a general rule, the more highly educated the parents, the greater the chances that their children will succeed in the K-12 school system, complete high school, go on to college and achieve higher levels of literacy as an adult (Sticht & Armstrong, 1994). These relationships are generally found to be robust to the inclusion of several household, school, and community-level variables, suggesting that parental education does indeed have an independent effect on a child's human capital acquisition (Strauss & Thomas, 1995). It has been theorized that one mechanism through which this happens is the time that parents spend with their children (Leibowitz, 1974; Coleman, 1988). Assuming that this is true and that the stated hypotheses are supported i.e. educated parents do indeed spend more time with their children than less educated parents, it implies that parents with higher education, even regardless of the efficiency of their time, are able to invest more in their children. They are able to transmit more human capital to their kids, thereby ensuring better outcomes for their children than less educated parents can ensure for theirs. It is easy to see how this is one way in which inequalities are generated and

transmitted inter-generationally. Further, if the gap in parental time between the better educated parents and less educated parents has widened, this means that inequalities of the sort that start with better academic achievement, will be on the rise. Even if that fact were already known, studying educational differences in parental time allows the identification and pinpointing of one mechanism through which inequity perhaps persists and grows.

What about gender differences in parental time? Why is it important to study how much time mothers put into the care of kids versus what fathers put in, and to study how that equation has changed over time? If women are increasingly resembling men in terms of their labor force activity, it is important to understand if the two sexes are looking more alike in terms of non-market time as well, especially child care, because it speaks volumes about the intra-household bargaining process and how that has been evolving over time. The relative contributions of the two sexes to family income and domestic labor also have profound implications for the future of family. It is also important to look at the gender ratio by education groups to see if the predicted increases in gender equity in parental time are limited to certain segments of the population.

HYPOTHESES AND THEORETICAL MOTIVATION:

It is well-documented that in the 1980s wage inequality increased sharply in the United States (Bound & Johnson, 1992; Katz & Murphy, 1992; Levy & Murnane, 1992; Murphy & Welch, 1992). Although both within-group and between-group inequality increased, it is the latter kind that is of primary concern here. Wage differentials increased along several dimensions, perhaps the most significant of which were wage differentials by education. The college premium or the earnings of a college graduate over and above the earnings of a high-school graduate saw an especially marked increase. And although the 1990s saw a slowdown in the growth of inequality, there was still an upward trend in wage inequality by education level (Mishel, Bernstein & Boushey, 2002). Essentially, in the period that is under examination in this paper i.e. the years between 1985 and 2003, there was on an average, a definite increase in the returns to education when compared to previous decades.

Paralleling this increase was an increase in the overall hours worked by American married couple families (Jacobs & Gerson, 2001). Of course the predominant component of this increase was the rise in female labor force participation. The percentage of women, aged 25-54, who worked full-time year-round rose at every education level. However, as the increase in the returns to education might suggest, the proportion of women with less than a high school education that were employed full-time year-round was significantly less than that of other women by the late 1990s. For the men it is a

different story. The share of men who were working full-time year-round has declined at all education levels. And although there was a downward trend for all men, the decrease has been especially significant for men who had less than a high-school degree. Employment rates aside, the other component of increased annual hours is an increase in weekly hours worked. For both men and women, weekly work hours in the general population tend to increase with education levels. Over the last couple of decades, the hour gap between education levels has increased i.e. the number of weekly hours worked by less educated workers and the number worked by better educated workers have diverged, with better educated workers working more hours per week and more weeks per year. This has been true for both men and women (U.S. Department of Labor, 1999; Bluestone & Rose, 1997).

That then leads to several questions. If better educated people work longer hours than less educated people do, how does the distribution of the rest of their time over other activities differ from the distribution among less educated parents? Focusing on the element of their time that is of interest here, how does the time that better educated parents spend with their children differ from the time that less educated parents spend with theirs? The second question is that if hours worked are different for men and women, are there education-related gender differences in parental time? Lastly, if hours worked have been changing differently for men and women, and for parents of different education levels, have the differences in parental time between the sexes and between education categories also been changing, and if so how? These questions then lead to a set of hypotheses.

The first of the hypotheses concerns educational differences in parental time.

Better educated people spend more time with their children than less educated people do. This should be true of both 1985 and 2003 and this should be true of both fathers and mothers separately i.e. better educated fathers spend more time with kids than less educated fathers, better educated mothers spend more time with kids than less educated mothers.

Why might one think that better educated people spend more time with their children than less educated people do? Since better educated parents earn more per hour than less educated parents, and work more hours than the latter do, they obviously have higher incomes. A higher income means that they have the ability to purchase substitutes to their own labor in household production. Household production is defined to include child care but also activities like meal preparation, house cleaning, doing laundry, and grocery shopping. Given that parents would purchase market substitutes to these other household activities sooner than they would purchase substitutes to child care, the time that they thus buy-off can be used in child care, in personal care, or for their own leisure activities. Assuming that parents prefer spending time with children to other non-market activities (Juster & Stafford, 1985), one expects time spent in child care to go up before time in other activities does.

The second hypothesis concerns changes in parental time over the years.

Parents at all levels of education are spending more time with their children in 2003 than

they did in 1985. Education has a greater effect on parent-child time in 2003 than it did in 1985. This should hold true for both fathers and mothers.

If the real wages and work hours of college educated men and women have increased in this 18 year period, it facilitates an argument similar to the earlier one about higher incomes, and the increased ability to buy-off time from household production by purchasing market substitutes to their own domestic labor. The decline in real wages of the lower percentiles from 1985 to 2003 barring the late 1990s (Katz & Autor,1999) means that the non-market time of the less educated has become cheaper, and so one would expect the time that less educated parents spend in non-market activities to go up. Coupled with the assumption stated earlier (that time with children is preferred to time in other non-work activities), these points lead one to expect an increase in time spent with children for parents of all education levels between 1985 and 2003.

The third hypothesis concerns educational differences in changes in parental time.
Better educated parents have made greater increases in their time with children than less educated parents have. The effect of education on parent-child time increased more for better educated parents.

It follows from the previous hypothesis that since the wages of the better educated have risen faster than the wages of less educated parents, their time with children should have increased more than the parent-child time of the less educated.

The fourth hypothesis concerns educational differences in the gender ratio.

The ratio of mothers' time to fathers' time is smaller for better educated parents than it is for less educated parents. This should be true of both 1985 and 2003.

The ratio of women's wages to men's wages is higher for workers with at least some college education when compared to workers who are high school graduates or less (Blau, 1998). One would then expect the distribution of the non-market time of better educated men and women to be more similar when compared to less educated men and women. A second explanation exists for why this may be true. Given that egalitarian values about the division of household labor are positively correlated with education (Inglehart & Norris, 2003), although mothers still spend considerably more time in child care than fathers do, one would expect mothers and father to be more similar in terms of their child time as one moved up the education ladder.

The fifth hypothesis concerns changes in the gender ratio of parental time.

The ratio of mothers' time to fathers' time is lower in 2003 than it was in 1985 at all levels of education.

Why might one think that the gender ratio of parental time has narrowed over the years? It has to do with the closing of the gender wage gap over the past two decades. The 1980s were a time of dramatic decline in the gender difference with the difference declining by one percent every year. The wage-gap literature concludes that the main reason for this

dramatic decrease in the 1980s was an increase in women's marketable skill levels relative to men's. The 1990s saw a definite slowdown in the convergence of wages between the sexes, but declines in the gap were still registered. This phenomenon was common to workers of all education levels (O'Neill & Polacheck, 1993; Polachek, 2003). As was mentioned earlier, the more similar the wages, the more similar the distribution of market and non-market time. So it is reasonable to expect that the gender ratio in parental time has declined for all education levels.

LITERATURE REVIEW:

The subject of parental time is one that has received a fair amount of attention in various studies over the years. In many of these, researchers have looked at the effects of education on parental time, and how time spent on children differs between parents belonging to different categories as defined by education. Most find that education has a positive effect on time spent with children, and that better educated parents do indeed spend more time with children (Hill & Stafford, 1980; Leibowitz, 1977; Gronau 1977). Sayer, Gauthier, and Furstenberg (2004) analyze educational differences in parental time across select industrialized countries, namely Canada, Germany, Italy and Norway. What they find again supports this idea of education being an important determinant of parental time. Almost across the board, they find that for both mothers and fathers, parental time trends upwards with increases in education.

What does a glance at the literature on gender differences reveal? Sayer, Bianchi, and Robinson (2003) find that mothers are hands down still the more active of the two genders when it comes to taking care of children, but the gender gap in parental time has narrowed over the years. Gauthier, Smeeding, and Furstenberg (2004) too find evidence in support of a narrowing gender gap in parent-child time.

When it comes to changes over the years, there are few studies which have followed trends in parental time, and even fewer of them have followed recent trends. One of the

earliest studies to show that parental time might actually be increasing was that of Bryant and Zick (1986) who used U.S. Department of Agriculture surveys from the late 1920s and early 1930s that asked married women about time devoted to family care and compared these to data from the National Time-Use in Economic and Social Accounts samples collected at the University of Michigan for 1975 and 1981. Sayer, Bianchi, and Robinson (2004) used time diary data to assess trends in mothers' and fathers' child care time from the mid-1960s to the late 1990s. They also look at changes in the ratio of mothers' child time to fathers' child time. Hofferth and Sandberg (2001), and Sandberg and Hofferth (2001) have extensively analyzed the 1997 Child Development Supplement to the Panel Study of Income Dynamics which collected data on children's activities, and compared these to the 1981 University of Michigan study. Their analyses based on these data sets show that the time that parents spend with and around their children has clearly increased over time.

All the aforementioned papers are important contributions to the study of parental time but there is certainly always scope for variations of and additions to the existing literature, all of which can provide other valuable insights into parental behavior. The first contribution of this paper is that it looks at parental time trends up until 2003. The latest analysis in any of the aforementioned papers is of data from 1998. Although a five year period (1998-2003) may not have seen substantial changes, it is definitely worth knowing if earlier trends in parent-child time are still continuing or if new ones are emerging. Secondly, there has been no research yet that studies changes across time in

the effects of education on parent-child time. The farthest existing papers go is to check if better educated parents do indeed spend more time than less educated ones, and whether there are cross-national differences in education effects. Lastly, although papers exist that have looked at the gender ratio over time, none has examined educational differences in the gender ratio of parent-child time.

DATA AND VARIABLES:

The two main data sets that I use in my analysis are the Americans' Use of Time project and the American Time Use Survey (ATUS). The first data set, the Americans' Use of Time project, originated in the University of Maryland in 1985. According to the codebook for the data,

> For this data collection, respondents were asked to record in single-day time diaries each activity they engaged in over a 24-hour period. The time diary data were gathered through three different data collection methods: mail-back, telephone, and personal interviews. Respondents were instructed to describe in the diaries when the activity began, the time the activity ended, where it occurred, and who was present when the activity took place.

The data for this project came mainly from a sample of Americans who were first contacted by telephone using a Waksberg-Mitofsky two stage random digit dial design. Both the mail-in diaries and telephone diaries came from this sample. The in-person interviews came from a sample that was drawn from a subset of 20 primary sampling units randomly chosen from the continuing national samples of the Institute for Survey Research at Temple University in Philadelphia. A total of 4939 diaries were collected from persons of age 18 or older, 2921 diaries using the mail collection procedures, 1210 using the telephone procedures, and 808 using the personal data collection mode. Since I examine only married two parent families with at least one child, I retained 1218 of the total number of observations.

The American Time Use Survey is conducted by the Bureau of Labor Statistics and the first set of data was released in 2005. According to the official documentation for the data,

> Reporting days are pre-assigned to respondents in order to eliminate any bias in the data that might exist if respondents reported at their convenience. Respondents are contacted for up to 8 weeks to conduct an interview on one of their pre-designated days. All interviews are conducted over the telephone, with interviewers using Computer Assisted Telephone Interviewing.

The sample for this survey was drawn from households that had completed their final month of interviews for the Current Population Survey (CPS). The sample in 2003 consisted of around 3,000 cases per month with 1,700 interviews being completed. By the time it was first released, the ATUS contained a total of 20,720 observations from individuals aged 15 or over. Again, I only retained respondents who were husbands or wives from married two-parent families with at least one child. This yielded a total of 6084 observations.

The dependent variable for the whole analysis is the total amount of time in minutes that a respondent spends with his or her child/children in a 24 hour time period. It includes all sorts of activities like the physical care of children, dressing and feeding a child, playing with a child, talking to and disciplining a child, helping him or her with homework, attending to a child's health, traveling and waiting primarily associated with children etc. Appendix Table 2 lists the response categories that were used to compute total time spent

in child care. Other demographic and economic information was available in both data sets, which was used to construct variables needed in this analysis.

I created four categories of educational attainment based on the number of years of education completed by the respondent: those with less than 12 years, high-school graduates, those with some college, and those with a college degree or more (i.e. graduate education of some sort).

Other important variables are included in the multivariate analyses as controls. The first is the respondent's age. It is unclear whether the effect of an increase in age on parent-child time will be positive or negative. A second control included in the regression equation is the number of children that are present in the household. It is likely that certain activities can serve more than one child at once. For example, a parent can read to several children at once, and can drive more than one child to school at the same time with no extra effort so to speak. But every additional child will have certain individual demands which cannot be attended to simultaneously with other children. So an increase in the number of children is expected to have a significant positive effect on parent-child time. Additionally, a dummy is included for the presence of a child under the age of 5 because younger children and babies require more physical attention than older kids do, and they themselves have fewer competing time demands from activities like school (ideally this would have been a dummy for presence of a child under the age of 6 because

that is the age when most kids start formal schooling, but the 1985 data lack that information).

The next control is an indicator for whether the diary day is a weekday or a weekend. Although parents may have more time available on the weekend, it is possible that weekdays are more time-intensive because for instance, children may require more help with homework on a school day, may need to be driven around more on a weekday etc. Further, since an adult has more free time on weekends, it may be the case that he/she uses that time for his/her own activities. It may also be true that since socialization with friends, neighbors, and relatives occurs more on weekends than on weekdays, there may just be fewer opportunities for parents to spend time exclusively with their children.

ANALYSIS PLAN:

To start with, I will describe trends in parents' time with children. In this analysis, mean number of minutes spent in childcare per day are presented. The means (and standard deviations) for parents of different education levels are tabulated separately for 1985 and 2003, and for men and women. The ratios of mothers' to fathers' child time are also presented as part of this analysis. The ratios are tabulated separately for parents of different education levels, separately for 1985 and 2003. Descriptive analyses will be weighted for diary day. Weights will be used to correct for the over-sampling of weekends in the 2003 data.

Descriptive analyses though, are simplistic, and mask important differences in other variables which may have significant effects on child care time. In order to correct the descriptive findings for individual variations not just in education levels, but also in the age of the respondent, number of children in the household, the presence of a child under the age of 5, and diary day, a multivariate analysis is conducted. On the pre-assigned diary day, not every respondent may have engaged in providing child care. This results in the frequent occurrence of zeros in the time use data which violate the normality assumption of ordinary least squares analysis. Consequently, running an OLS regression produces biased coefficient estimates (Greene, 1997). Therefore, a tobit type I is used.

This is formulated in terms of an index function.

$$y^*_i = x_i'\beta + \varepsilon_i ,$$

$$y_i = 0 \quad \text{if} \quad y^*_i \leq 0$$

$$y_i = y^*_i \quad \text{if} \quad y^*_i > 0.$$

Since the item of interest here is the observed parent-child time and not the latent variable y^*_i , the interpretation and reporting of the tobit coefficients is different from OLS. It is done in two parts, i) changes in the conditional expected value of time spent in child care for parents reporting nonzero time in these activities and ii) changes in the probability of mothers and fathers engaging in child care activities (McDonald and Moffitt, 1980). It has been contended that since what is happening is not really negative values being censored at 0, but instead a selectivity issue, the simple tobit is inappropriate (Sigelman & Zeng, 1999). But it has also been argued that especially when the participation index cannot be correctly specified, and often otherwise, the tobit type I can often produce results just as accurate as more sophisticated methods like the Heckman's generalized tobit or Cragg's double-hurdle model (Flood & Grasjo, 1998).

The tobit gives us the marginal effects of changes in the right-hand-side variables, but it does not tell us how much of the predicted change in parent-child time between the two sample years can be attributed to changes in coefficients and how much to changes in sample characteristics. The first of the important changes in sample characteristics also referred to here as compositional or structural factors, is the increase in overall levels of

education in the past few decades (U.S. Census Bureau, 2000). This should have a positive effect on predicted parent-child time. A second major compositional factor is the increase in work hours and labor force participation rates (for the better educated and for women) which should have a negative effect on time with children. A third factor is the increase in the average age of parents which may indicate more voluntary parenthood and thus increased propensity for investing time in children. But older parents may have more competing time demands, so the effect of age is unclear. A fourth factor is number of children. The declines in fertility (averaged over the 18 years period under examination here) could increase per parental time per child but should decrease overall parent-child time. Lastly, parenthood being increasingly delayed over the past two decades means that families have more young children around, which should increase overall parent-child time. Those were the main underlying compositional/structural factors that may have changed significantly over time. There is the possibility that the change in parent-child time is not fully explained by these compositional changes alone, and that there are non-compositional changes that may have occurred. In order to understand how much of the change in parent-child time is explained by structural factors, the last part of the analysis will be a simple decomposition.

Used here is a decomposition that can be applied to nonlinear dependent variables (Barmby & Smith, 2001; Joesch & Spiess, 2002). The decomposition is performed using the following equation:

$$\textit{Predicted minutes}_{2003} - \textit{Predicted minutes}_{1985} =$$

$$Y(\beta_{2003} * X_{2003} - \beta_{2003} * X_{1985}) - Y(\beta_{2003} * X_{1985} - \beta_{1985} * X_{1985})$$

The first term on the right-hand side of the equation represents the change in fathers' (mothers') predicted mean child care time due to changes in means of the independent variables between 1985 and 2003. The second term on the right-hand side of the equation represents the change in fathers' (mothers') predicted child care time due to differences in the intercept and slopes.

RESULTS:

Findings from the *descriptive* analysis are presented first. A look at Table 1A reveals that within a given year, for both fathers and mothers, parents with more years of education spend more time with their children in a given day than parents with fewer years of education. For example, fathers with at least 16 years of education spent double the time that the least educated fathers spent in child care, 34 minutes compared to 17 in 1985, 72 minutes compared to 36 in 2003. The same is true of mothers, just not as pronounced as it is for fathers. In 1985, mothers with at least 16 years of education spent 91 minutes in child care compared to the 49 minutes of the least educated women, a difference of 42 minutes. In 2003, that difference was 55 minutes. The minutes in child care are similarly larger for every education level when compared to every education level below it. Table 1C shows that even the proportion of parents participating in child care on a given day increases with education level for men and women, in 1985 and 2003. The descriptive results are thereby consistent with the first prediction, that better educated parents spend more time with their kids.

Looking across years, Table 1A reveals that time spent in child care has increased for every education level from 1985 to 2003. Men have had the most notable increases, with fathers at every level of education having more than doubled the time that they spend in child care between the two years. Similarly, mothers at every education level have increased their time with children. The increases were significant for both fathers and

mothers. Table 1B and 1C show that the increases in time with children come from across-the-board increases in participants' mean minutes as well as increases in proportions reporting non-zero values for child care. All these results are consistent with the second prediction that time with children would have increased for parents of all education levels in the 18-year period.

Looking at Table 1A again, the magnitudes of the increases in parent-child time from 1985 to 2003 are roughly consistent with the third prediction which suggests that the increases should become larger moving up in education levels. For fathers, except for those with some college, this pattern holds true. For mothers, although the most educated did in fact have the largest increase (64 minutes), the least educated had an anomalous increase (51 minutes). Of course, that number is not anomalous if one considers the fact that to start with, they had the lowest time spent in child care among all the women in 1985 (49 minutes). These results are fairly consistent with the third prediction.

Table 1A clearly reveals that in a given year women spend more time in child care than do men with corresponding levels of education. Table 2 gives the ratios of women's child time to men's child time in 1985 and 2003. There is partial support for the fourth prediction which says that the ratio should be lower for better educated people. In 1985, the best educated had a ratio of 2.68, lower than that of all other education levels. In 2003, the best educated had a ratio lower than that of the least educated (2.15 compared to 2.78). Parents with some college had a ratio of 1.86 which was lower than the ratio of

those with twelve years of education (2.01), and also lower than the ratio of those with less than 12 years of education (2.78).

But Table 2 shows clear support for the last hypothesis which predicts a decline in the ratio for all education levels because of a closing in the gender wage gap at all education levels. The last column of Table 2 shows negative change for every group. The decrease was biggest for the group with the largest ratio in 1985, parents with some college (a decline of -2.18 from 4.04), and next biggest for those with 12 years of education (a decline of -1.64 from 3.65).

Findings from the *multivariate* analysis are presented next. Table 3A shows the results of the separate tobits from 1985 and 2003, of men's child time on dummies for education level and other controls. In support of hypothesis 1, it reveals that education does indeed have a positive effect on parent-child time. Both in 1985 and 2003, compared to men with less than 12 years of education, men of all other education levels have a positive probability of reporting a non-zero value for minutes spent in child care, and education has a positive effect on parent-child time conditional on them having reported a positive value. Further, both these values become larger moving up in education levels. In 1985, men with 16 or more years of education are .18 times more likely than the least educated to have a non-zero value, and spend 15.7 minutes more in child care than the least educated (conditional on a positive probability), while for men with only 12 years of education those numbers are .09 and 7.2 minutes. A very similar picture emerges for

2003. Table 3B shows tobit coefficients for women. Again, both in 1985 and 2003, there is a clear increase in the positive probability of women reporting non-zero minutes with increases in education (One exception was the category of women with some college in 1985 who were .10 more likely than the least educated to have a non-zero value compared, while college graduates were only .09 more likely than the least educated to have a non-zero value). Conditional on being uncensored, better educated women clearly spend more time with children than women with lower levels of education.

To check if the relationship between parent-child time and the independent variables differed for men and women, I pooled the 1985 data for men and women. I ran a regression of child time on all the usual variables, and additionally, on interactions of all the independent variables with a sex dummy. Chow tests revealed that sex of the respondent does indeed affect the relationship between the X and Y variables. Consequently, separate regressions for men and women are justified. I found the same to be true of 2003 as well.

Table 4 presents separate results for men and women from a pooled regression of 1985 and 2003 data. In addition to earlier controls, a year dummy, and interactions between each independent variable and the year dummy are included on the right hand side. The year dummy takes on a value of 1 if the observation is from 2003. Looking first at men, the support for hypothesis 2 is clear. The coefficients on the education and year interactions show that fathers at every education level have an increased probability of

participating in child care in 2003 when compared to 1985, and conditional on a positive probability, education has an additional positive effect on parent-child time in 2003. F tests on the coefficients of the interaction terms reveal that they are indeed significant. Looking at the columns for women reveals exactly the same picture, confirming hypothesis 2 for women as well.

The magnitudes of the coefficients discussed above validate hypothesis 3. Looking at the education-year interaction terms, where the omitted category is parents with less than 12 years of education, the positive probabilities of reporting non-zero values of child time in 2003 (over and above the probability of reporting non-zero values in 1985) increase with education level. This is true of both men and women. Compared to the increases in probability for the least educated, high-school graduates had an increase of .06, those with some college had an increase of .1, and college graduates had an increase of .11. For women, those probabilities are .01, .02, and .10 respectively. Conditional on an individual reporting a non-zero value, the positive effects on child time specific to 2003 increase with education level. Male college graduates had an increase of 14.9 minutes compared to the increases for least educated men, while for high-school graduates that number was 7.4 minutes. The difference is even greater for women. College educated women increased their child time by 30 minutes more than the least educated women did, compared to high-school graduates who increased their child time by 2 minutes more than the least educated did.

It would be useful to mention at this point that apart from the tobits discussed so far, I ran similar regressions with one additional right hand side variable, time spent in market work. This was determined from information in the respondents' time diary about minutes spent at work, minutes spent on work-related travel, and minutes spent in own education (if respondent was under the age of 30). Presumably, time spent in the labor force should be negatively correlated with time spent in child care, and this was indeed the result. However, there is a clear case of endogeneity here. It is unclear whether parents determine their market time or child time first. Although results from these tobits including market time are not presented here, I found that the effects of education for men and women, in 1985 and 2003, were similar (in fact, almost identical) to the results presented here.

Looking briefly at the control variables included in the tobits, for men, age has a significantly negative effect on child time only in 2003, while the number of children, and the presence of a child under the age of 5 both have significant positive effects in 1985 and 2003. For women, all else constant, age has a significant negative on child time in 1985 and 2003, number of children has a significant positive effect only in 2003, and having a child under the age of 5, and the diary day being a weekday both have significant positive effects in 1985 as well as 2003.

Lastly, I present results from the *decomposition* analysis. The decomposition done separately for men and women reveals that a very small percentage of the increases in

parent-child time is explained by changes in the means of the independent variables, especially for women. For men, only 1 minute out of the 37 minute increase from 1985 to 2003 can be explained by changes in the means of the independent variables. For women, that number is 1 minute out of 46 minutes. This could be either because (i) there are other variables that influence parent-child time unaccounted for in this model whose means may have changed significantly over time, or (ii) the changes in the rates or propensities could potentially be behavioral, and may explain the increase in parental time over the years at least partially, or (iii) the way parent-child time is classified could have changed significantly in the two surveys. However, this last possibility can at most explain differences in parent-child time when comparing numbers across years. It does not explain the differences between education groups when looking at them within a given year.

CONCLUSION:

To summarize the findings, there were clear indications that education does indeed have a positive effect on child time. Better educated parents spent and continue to spend more time with their children than the less educated. The impact of education on parent-child time has become larger over the years, and parents of all education levels have increased their time with children over the years. The better educated have made greater gains however, both men and women. When it comes to gender differences in parental time, the best educated men and women clearly look more alike in terms of their time with children than do the least educated men and women. However, the gender gap in parent-child time has closed at every education level.

How much of all this change is attributable exclusively to education and how much of it is mediated by changes in the returns to education is unclear. Although the ATUS has good income data from the Current Population Survey, a lack of similar information for individuals in the 1985 data prevents the inclusion of income as a control variable. That would have served to net out the potential mediating role of income in the effects of education on parents' time with kids. Researchers should try and incorporate the income dimension into future studies of parent-child time. It would also be valuable if they could go beyond married, two-parent families and study trends in parental time among all types of families using the ATUS.

One last useful extension would be to study changes and educational differences in the types of activities that parents do with children. There may exist important differences in the amount of time that better educated and less educated parents allocate to developmental versus routine activities. Some types of activities may be more beneficial to kids than others, and it may be the case that better educated parents spend more time in activities such as reading to their children, or helping children with school work than less educated parents. Unfortunately, the size of the 1985 sample simply did not permit such a breakdown. As was discussed in an earlier section, the existence and widening of educational differences in parent-child time, and the existence and narrowing of gender differences in parent-child time both have important implications, but there is still ample room for further research.

TABLES:

Table 1A: Mean minutes spent in child care

	Men		Change	t	Women		Change	t
Education in years	1985	2003			1985	2003		
< 12	**17** (58)	**36** (82)	**+19**	g	**49** (77)	**100** (130)	**+51**	g
= 12	**23** (54)	**55** (101)	**+32**	g	**84** (108)	**111** (123)	**+27**	g
13-15	**22** (45)	**64** (108)	**+42**	g	**89** (115)	**119** (125)	**+30**	g
>= 16	**34** (64)	**72** (101)	**+38**	g	**91** (95)	**155** (135)	**+64**	g
t	c	a,b,c,d,e,f			a,b,c	b,c,d,e,f		
N	570	2860			648	3224		

a = Those with less than 12 years differ from those with 12 years at p<=.05
b = Those with less than 12 years differ from those with 13 to 15 years at p<=.05
c = Those with less than 12 years differ from those with 16 or more years at p<=.05
d = Those with 12 years differ from those with 13 to 15 years at p<=.05
e = Those with 12 years differ from those with 16 or more years at p<=.05
f = Those with 13 to 15 years differ from those with 16 or more years at p<=.05
g = 1985 mean differs from 2003 mean at p<=.05

Note: Standard deviations reported in parentheses.
Source: Compiled by author from the 1985 AUT project and 2003 ATUS.

Table 1B: Participants' mean minutes in child care

	Men		Change	t	Women		Change	t
Education in years	1985	2003			1985	2003		
< 12	**80** (107)	**98** (113)	**+18**		**98** (84)	**145** (138)	**+47**	g
= 12	**67** (74)	**115** (122)	**+48**	g	**117** (111)	**151** (124)	**+34**	g
13-15	**61** (58)	**108** (122)	**+47**	g	**120** (119)	**148** (124)	**+28**	g
>= 16	**71** (77)	**109** (103)	**+38**	g	**121** (92)	**176** (131)	**+55**	g
t						c,e,f		
N	212	1575			456	2509		

a = Those with less than 12 years differ from those with 12 years at p<=.05
b = Those with less than 12 years differ from those with 13 to 15 years at p<=.05
c = Those with less than 12 years differ from those with 16 or more years at p<=.05
d = Those with 12 years differ from those with 13 to 15 years at p<=.05
e = Those with 12 years differ from those with 16 or more years at p<=.05
f = Those with 13 to 15 years differ from those with 16 or more years at p<=.05
g = 1985 mean differs from 2003 mean at p<=.05

Note: Standard deviations reported in parentheses.
Source: Compiled by author from the 1985 AUT project and 2003 ATUS.

Table 1C: Proportion reporting positive number of minutes in child care

	Men		Change	t	Women		Change	t
Education in years	1985	2003			1985	2003		
< 12	**0.21** (0.41)	**0.36** (0.48)	**+.15**	g	**0.50** (0.5)	**0.69** (0.48)	**+.19**	g
= 12	**0.35** (0.48)	**0.48** (0.5)	**+.13**	g	**0.71** (0.45)	**0.74** (0.46)	**+.03**	
13-15	**0.36** (0.48)	**0.59** (0.5)	**+.23**	g	**0.74** (0.44)	**0.81** (0.41)	**+.07**	
>= 16	**0.48** (0.5)	**0.67** (0.48)	**+.19**	g	**0.75** (0.43)	**0.88** (0.35)	**+.13**	g
t	a,b,c,e	a,b,c,d,e,f			a,b,c	b,c,d,e,f		

a = Those with less than 12 years differ from those with 12 years at p<=.05
b = Those with less than 12 years differ from those with 13 to 15 years at p<=.05
c = Those with less than 12 years differ from those with 16 or more years at p<=.05
d = Those with 12 years differ from those with 13 to 15 years at p<=.05
e = Those with 12 years differ from those with 16 or more years at p<=.05
f = Those with 13 to 15 years differ from those with 16 or more years at p<=.05
g = 1985 mean differs from 2003 mean at p<=.05

Note: Standard deviations reported in parentheses.
Source: Compiled by author from the 1985 AUT project and 2003 ATUS.

Table 2: Ratio of women's to men's time with children

	1985	2003	Change
Education in years			
< 12	2.88	2.78	-.1
= 12	3.65	2.01	-1.64
13-15	4.04	1.86	-2.18
>= 16	2.68	2.15	-.53

Table 3A: Tobit estimates of fathers' time with children

	1985			2003		
	Tobit	Conditional on being uncensored	Probability uncensored	Tobit	Conditional on being uncensored	Probability uncensored
Education in years (omitted < 12)						
= 12	**24.9** (20.4)	**7.2**	**0.09**	**53.7*** (12.5)	**21.1**	**0.14**
13-15	**31.1** (22.8)	**9.4**	**0.11**	**81.6*** (12.5)	**33.1**	**0.21**
>= 16	**51.7*** (20.7)	**15.7**	**0.18**	**109.1*** (11.9)	**42.9**	**0.28**
Age of respondent	0.3 (0.7)	0.1	0.00	-1.7* (0.4)	-0.6	0.00
Number of children	11.6* (5.0)	3.3	0.04	21.9* (3.2)	8.2	0.06
Child under age 5	51.9* (14.9)	15.5	0.18	67.2* (7.1)	25.6	0.18
Weekday	2.7 (12.1)	0.8	0.01	2.1 (6.2)	0.8	0.01
Intercept	-134.5* (41.6)	-38.4	-0.50	-73.3* (22.6)	-27.4	-0.20
-2 Log likelihood	-1474			-10956		
Censored observations	358			1285		
Uncensored observations	212			1575		

Note: Standard errors reported in parentheses.
* significant at 5%

Table 3B: Tobit estimates of mothers' time with children

	1985			2003		
	Tobit	Conditional on being uncensored	Probability uncensored	Tobit	Conditional on being uncensored	Probability uncensored
Education in years (omitted < 12)						
= 12	**22.4** (16.8)	**10.8**	**0.07**	**30.8*** (10.3)	**17.2**	**0.10**
13-15	**33.4** (18.5)	**17.0**	**0.10**	**48.5*** (10.1)	**27.4**	**0.10**
>= 16	**30.8** (18.7)	**15.6**	**0.09**	**89.6*** (9.9)	**50.8**	**0.19**
Age of respondent	-4.3* (0.7)	-2.1	0.00	-2.2* (0.4)	-1.2	0.00
Number of children	8.0 (4.1)	3.9	0.03	28.5* (2.8)	15.5	0.06
Child under age 5	87.1* (13.7)	45.3	0.25	88.1* (6.1)	48.9	0.19
Weekday	47* (10.8)	21.6	0.15	55.1* (5.1)	30.0	0.12
Intercept	101.8* (34.7)	49.4	0.32	6.9 (18.8)	3.7	0.02
-2 Log likelihood	-2928			-16535		
Censored observations	192			715		
Uncensored observations	456			2509		

Note: Standard errors reported in parentheses.
* significant at 5%

Table 4: Tobit estimates of parent-child time pooled over 1985 and 2003

	Men			Women		
	Tobit	Conditional on being uncensored	Probability uncensored	Tobit	Conditional on being uncensored	Probability uncensored
Education in years (omitted < 12)						
= 12	**32.6** (27.9)	**12.0**	**0.10**	**26.0** (20.6)	**14.1**	**0.10**
13-15	**40.9** (31.1)	**15.3**	**0.10**	**37.9** (22.7)	**20.8**	**0.10**
>= 16	**66.6*** (28.2)	**24.7**	**0.20**	**35.5** (22.9)	**19.3**	**0.10**
Age of respondent	0.3 (1.0)	0.10	0.00	-4.6* (0.9)	-2.5	-0.01
Number of children	13.3 (6.8)	4.7	0.00	9.1 (5.0)	4.8	0.00
Child under age 5	62.5* (20.2)	22.8	0.20	90.3* (16.7)	49.6	0.20
Weekday	4.5 (16.5)	1.6	0.00	50.8* (13.2)	26.9	0.10
12 years education*D2003	**20.2** (30.4)	**7.4**	**0.06**	**4.5** (22.9)	**2.4**	**0.01**
13-15 years education*D2003	**39.2** (33.3)	**14.7**	**0.1**	**10.1** (24.7)	**5.4**	**0.02**
16 or more years education*D2003	**40.5** (30.4)	**14.9**	**0.11**	**53.2*** (24.8)	**29.5**	**0.1**
Age of respondent*D2003	-1.9 (1.1)	-0.70	-0.01	2.5* (0.9)	1.3	0.00
Number of children*D2003	8.2 (7.5)	2.9	0.00	19.2* (5.7)	10.2	0.00
Child under age 5*D2003	3.7 (21.3)	1.3	0.00	-2.8 (17.7)	-1.5	-0.01

Weekday*D2003	-2.9 (17.5)	-1.0	-0.01	3.9 (14.1)	2.1	0.00
D2003	106.9 (60.1)	33.1	0.30	-90.2 (46.2)	-53.8	-0.18
Intercept	-177.2* (56.0)	-63.2	-0.49	98.2* (42.4)	52.2	0.20
-2 Log likelihood	-12444			-19480		
Censored observations	1643			907		
Uncensored observations	1787			2965		

Note: Standard errors reported in parentheses.
* significant at 5%

Table 5: Decomposition of parent-child time

	Men	Women
Predicted mean minutes in child time 2003	62	128
Predicted mean minutes in child time 1985	25	82
Raw difference	37	46
Due to coefficients	36	45
Due to endowments	1	1
Percent unexplained	97.3	97.8
Percent explained	2.7	2.2

Table 6: Summary statistics

	Men		Women	
	1985	2003	1985	2003
Child time	25.5 (2.4)	62.0 (1.9)	82.4 (4.1)	128.5 (2.6)
Education in years				
< 12	0.12	0.10	0.10	0.09
= 12	0.43	0.26	0.50	0.26
13-15	0.16	0.25	0.20	0.28
>= 16	0.29	0.39	0.19	0.37
Age of respondent	38.7 (0.4)	40.6 (0.2)	36.2 (0.3)	38.3 (0.2)
Number of children	2.3 (0.1)	2.0 (0.02)	2.3 (0.1)	1.9 (0.02)
Child under age 5	0.36	0.43	0.35	0.43
Weekday	0.72	0.71	0.73	0.71
N	570	648	2860	3224

APPENDIX:

Appendix Table 1: Variable names

Child time	Total minutes spent on child care in a 24 hour period
Education < 12 years	Respondent has completed less than 12 years of education
Education = 12 years	Respondent has completed 12 years of education
Education 13-15 years	Respondent has completed 13 to 15 years of education
Education >= 16 years	Respondent has completed 16 years of education or more
Age of respondent	Respondent's age in years
Number of children	Number of children in the household under the age of 18
Child under age of 5	Dummy for presence of child under the age of 5, =1 if present
Weekday	Dummy for diary day, =1 if weekday
D2003	Dummy for observation year, =1 if from 2003

Appendix Table 2: Survey categories used to compute child time

1985	2003
Baby care (child under 5 years old)	Physical care for household children
Child care (child 5 to 17 or mixed ages)	Reading to/with household children
Help with homework, teaching children, fixing things for children	Playing with household children, not sports
Talk to, read or discipline children	Arts and crafts with household children
Indoor playing with children	Playing sports with household children
Outdoor playing with children	Talking with/listening to household children
Activities related to child health	Helping/teaching household children (not related to education)
Other child care, babysitting	Organization and planning for household children
Travel related to above activities	Looking after household children (as a primary activity)
	Attending household children's events
	Waiting for/with household children
	Picking up/dropping off household children
	Homework (household children)
	Meetings and school conferences (household children)
	Home schooling of household children
	Waiting associated with household children's education
	Providing medical care to household children
	Obtaining medical care for household children
	Waiting associated with household children's health
	Travel related to caring for and helping household children

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