

NBER WORKING PAPER SERIES

THE RUG RAT RACE

Garey Ramey
Valerie A. Ramey

Working Paper 15284
<http://www.nber.org/papers/w15284>

NATIONAL BUREAU OF ECONOMIC RESEARCH
1050 Massachusetts Avenue
Cambridge, MA 02138
August 2009

Valerie Ramey gratefully acknowledges financial support from National Science Foundation grant SES-0617219 through the NBER. We thank Tarek Harchaoui for helping us gain access to microdata files on Canadian time use and John Robinson for providing his 1995 U.S. time use data. We thank Julie Cullen, Nora Gordon, Daniel Hamermesh, David Schkade, Joel Sobel, Randy Wright, and participants in seminars at UCSD, Washington University, St. Louis, Statistics Canada, the University of Maryland ATUS conference, and the NBER Children's program for helpful comments. Chris Nekarda and Ben Backes provided excellent research assistance. The views expressed herein are those of the author(s) and do not necessarily reflect the views of the National Bureau of Economic Research.

NBER working papers are circulated for discussion and comment purposes. They have not been peer-reviewed or been subject to the review by the NBER Board of Directors that accompanies official NBER publications.

© 2009 by Garey Ramey and Valerie A. Ramey. All rights reserved. Short sections of text, not to exceed two paragraphs, may be quoted without explicit permission provided that full credit, including © notice, is given to the source.

The Rug Rat Race
Garey Ramey and Valerie A. Ramey
NBER Working Paper No. 15284
August 2009
JEL No. J13,J24

ABSTRACT

After three decades of decline, the amount of time spent by parents on childcare in the U.S. began to rise dramatically in the mid-1990s. Moreover, the rise in childcare time was particularly pronounced among college-educated parents. Why would highly educated parents increase the amount of time they allocate to childcare at the same time that their own market returns have skyrocketed? After finding no empirical support for standard explanations, such as selection or income effects, we offer a new explanation. We argue that increased competition for college admissions may be an important source of these trends. The number of college-bound students has surged in recent years, coincident with the rise in time spent on childcare. The resulting “cohort crowding” has led parents to compete more aggressively for college slots by spending increasing amounts of time on college preparation. Our theoretical model shows that, since college-educated parents have a comparative advantage in college preparation, rivalry leads them to increase preparation time by a greater amount than less-educated parents. We provide empirical support for our explanation with a comparison of trends between the U.S. and Canada, and a comparison across racial groups in the U.S.

Garey Ramey
Department of Economics, 0508
University of California, San Diego
La Jolla, CA 92093-0508
gramey@ucsd.edu

Valerie A. Ramey
Department of Economics, 0508
University of California, San Diego
9500 Gilman Drive
La Jolla, CA 92093-0508
and NBER
VRAMEY@UCSD.EDU

“The already crazed competition for admission to the nation’s most prestigious universities and colleges became even more intense this year, with many logging record low acceptance rates.” (*New York Times*, April 1, 2008)

“Attending the local public university is no longer a birthright. An explosion in applications has allowed the schools to reject students in record numbers.” (*CollegeJournal from the Wall Street Journal*, November 14, 2006)

“Middle- and upper-income families became engaged in an arms race with their neighbors to prepare their children for college (*Milwaukee Journal Sentinel*, July 22, 2006)

I. Introduction

One of the most surprising findings from the recent research on time use concerns trends in time spent with children in the United States. Despite shrinking families and dramatic increases in women’s time spent in the workforce, the amount of time parents spent with children rose over the last several decades (Sayer, Bianchi, and Robinson (2004); Bianchi, Robinson, and Milkie (2006)). In contrast, the amount of time spent on other types of “home production” activities, such as cleaning house and cooking, fell significantly (e.g. Robinson and Godbey (1999), Bianchi, et al. (2006), Aguiar and Hurst (2007)).

This paper takes a closer look at trends in childcare. Linking twelve time use surveys between 1965 and 2007, we show that the increase in time spent with children occurred starting in the mid-1990s. We also show that the increase in childcare has been *twice as great* for college-educated parents. This differential trend is particularly puzzling in view of the dramatic increases in wages of college-educated individuals. We also show that the most important components of the increase in childcare time was time spent on *older* children, and in particular on coordinating and transporting them to their activities.

The literature has offered several explanations, both for why childcare time increased and why educated parents spent more time with their children (e.g., Bianchi, et al. (2006, p. 87),

Aguiar and Hurst (2007), Guryan, Hurst, and Kearney (2008)). These explanations include selection effects, income effects, safety concerns, enjoyment, and more flexible work schedules. We test each of them and find that they are not consistent with the data.

The inability of existing explanations to account for the evidence leads us to offer a new explanation for the upward trends. We argue that the increase in time spent in childcare, particularly among the college educated, may be a response to an increase in the perceived return to attending a good college, coupled with an increase in competition in college admissions. Importantly, the size of college-bound cohorts rose dramatically beginning in the early 1990s, coincident with the increase in time spent on childcare. Bound and Turner (2007) have provided evidence that larger cohorts are associated with increasingly severe cohort crowding at quality schools. Increased scarcity of college slots appears to have induced heightened rivalry among parents, taking the form of more hours spent on college preparatory activities. In other words, the rise in childcare time resulted from a “rug rat race” for admission to good colleges.

In order to clarify the mechanics of this explanation, we develop a simple theoretical model in which college admission depends on parents’ choice of college preparation time. College-educated parents are assumed to have a comparative advantage in preparation time. When slots at good colleges are relatively plentiful, the marginal slots are filled by children of less-educated parents. Competition among these parents determines the preparation required for admissions. When good slots become relatively scarce, rivalry for the marginal slots shifts to the college-educated parents, who are better able to compete. A rug rat race emerges among these parents, driving up both admissions requirements and the time spent on childcare.

Our model also accounts for the observed increase in childcare time among less-educated parents. Since a rising wage premium raises the returns to a college education, these parents

raise their preparation time in order to secure the higher returns for their children. It is also true that the opportunity costs of preparation for college-educated parents rise along with the wage premium. Nevertheless, as long as the college-educated parents have an overall comparative advantage in preparation, rivalry for scarce slots drives their efforts upward relative to those of the less-educated parents. Thus, both groups invest more time in childcare, but the investments of the college-educated rise by a greater amount.

We provide support for this explanation using two comparisons. First, we compare childcare trends in the U.S. to those in Canada. The U.S. and Canada are similar in many respects, but differ in two ways that are key to our explanation: the Canadian system lacks a steep prestige hierarchy among institutions, so that Canadians do not experience the intense rivalry to gain admission into higher rated colleges; and the returns to a college degree have increased much less in Canada. Thus, our theory predicts that we should not see the same increase in time spent in childcare there, particularly among the more educated. Employing time-use data from Canada's General Social Survey, we show that time spent in childcare by educated parents in Canada changed very little over this period, corroborating our theory. Second, we show that college-educated underrepresented minority parents in the U.S., who would be expected to face less competition for college, spend less time on childcare than college-educated white parents. Moreover, the difference across educational levels is much greater for white parents than for underrepresented minority parents.

The paper proceeds as follows. Section II documents trends in childcare over the 1965-2007 period. The standard explanations are evaluated in Section III. Section IV presents evidence showing increased competition for college over this period, and develops our new explanation along with the empirical support. Section V concludes.

II. Trends in Time Spent in Childcare

Trends in time spent in care of children have been the subject of many studies in sociology (e.g. Bryant and Zick (1996), Robinson and Godbey (1999), Sayer, Bianchi, and (2004)). It has long been noted that college-educated mothers devote more time to child rearing than less educated mothers (e.g. USDA (1944), Leibowitz (1974), Bianchi, et al. (2006), Guryan, Hurst, and Kearney (2008)). Here, we document that since the mid 1990s there has been a widening of the gap between college-educated and less-educated parents.

A. Data Description

To document trends, we use information from twelve nationally representative surveys from 1965, 1975, 1985, 1992-94, 1995, 1998, 2000 and 2003-2007. All of the surveys are based on time diary information, which is considered to be the most reliable measure of how individuals spend their time. Table A1 of the data appendix provides details about the surveys. We use the American Heritage Time Use Study (AHTUS) versions of the 1965, 1975, 1985, and 1992-94 surveys (Fisher, Egerton and Gershuny (2006)), and the original versions of the other surveys.

The key measurement issue is the extent to which the studies give consistent measures over time. The potentially problematic surveys are the 1992-94 survey and the BLS surveys starting in 2003. Many childcare researchers believe that the 1992-94 survey undercounts primary childcare activities (Robinson and Godbey (1999), Bianchi, Cohen, Raley and Nomaguchi (2004), Bianchi et al (2006)). Using results from other time use studies that are not part of the AHTUS, but are considered comparable to the earlier studies, Allard, Bianchi, Stewart

and Wight (2007, footnote 19) argue that the 1992-94 study is not comparable. The 1992-94 survey suggests that time spent in childcare was one hour per week lower in the early 1990s (compared to 1985), whereas the 1995 survey suggest that it was one hour per week *higher*. Thus, any drops in childcare time between 1985 and 1992-94 may be due to problems with the 1992-94 survey. Another important drawback of the 1992-94 study is the lack of information on key controls, such as marital status.

Concerns have also been expressed about the comparability of the 2003-2007 BLS surveys with the earlier surveys. For example, recently some researchers have questioned whether the significant increase in childcare recorded in the 2003 BLS survey is due to a change in the types of questions asked (e.g. Egerton et al (2005), Aguiar and Hurst (2007)). Allard, et al. (2007) compare the 2003 BLS survey to the 2000 Survey Research Center survey of parents and finds very similar estimates of primary time spent in childcare (though not secondary time spent in childcare). The 2000 survey was designed to be comparable to the earlier surveys, so it appears that the increase in time spent on childcare in the BLS surveys relative to earlier surveys is real rather than due to methodological differences in the survey.

Fortunately, the 1965, 1975, 1985, 1995, 1998, and 2000 surveys all involved John Robinson as a principal investigator. As a result, the coding of activities is very similar across surveys. Because these studies span the time period in which childcare began trending upward, we feel confident that the trends we find in time spent in childcare reflect actual trends rather than changes in activity classification.

We use a comprehensive measure of childcare that includes care of infants, older children, medical care of children, playing with children, helping with homework, reading to and

talking with children, dealing with childcare providers, and travel related to childcare. The data appendix gives details of the activity codes used.

B. Trends in Total Childcare

To study changes in childcare over time, we regress individual-level time spent on childcare on various sets of controls. Most of our results are based on the following simple descriptive model:

$$CH_{it} = X_{it}\beta + \varepsilon_{it},$$

where CH_{it} is the number of hours per week spent on childcare for person i in year t , X_{it} is a set of controls, and ε_{it} captures omitted other factors affecting childcare time. Our sample consists of parents aged 18 to 64 who are not students, where “parent” is defined as having a child under 18 years in the household.¹ We use the recommended weights from the various studies, normalized so that a representative individual in 1965 has the same weight as a representative individual in 2007. In addition to the year of the survey, X_{it} may also include dummy variables for the age group of the individual (ages 18-24, 25-34, 35-44, 45-54, and 55-64), whether or not the individual has a college degree, the interaction of the college degree dummy with year, marital status, the number of children, the number of children squared, category variables for the age of the youngest child (age ≤ 1 , age = 2, 3-5, 6-9, 10-13, and 14-17), and the number of children under age 5.

We first consider time spent in childcare for mothers between the ages of 18 to 64. In our benchmark specification we do not condition on any choice variables that may be correlated

¹ We use this definition because most of the earlier time use studies did not specifically identify parents. In 2003-2007, the difference in average time spent in childcare by actual mothers versus all women who lived in a household with children present was only 27 minutes per week. One of the reasons we omitted students from all of our samples was to avoid recording a college student living at home with younger siblings as a parent.

with educational level; thus, the only control variables used are the five age categories of the women, as defined above. The omitted dummy variables are 1975, less-than-college education, and ages 25-34.²

Column 1 of Table 1 shows the results from this estimation. The levels effects for the year indicators show that the amount of time spent in childcare decreased from 1965 to 1975, and again in 1985 and 1992-94 (“1993” for short). Recall, though, that many believe that the 1992-94 survey undercounted childcare, so this estimate may not indicate an actual decrease. Childcare time in 1995 was 1.76 hours more per week than in 1975, and by 2000 it had risen to nearly four hours more. From 2003 through 2007, less-educated mothers spent over four hours more per week in childcare activities than they did in 1975.

Of interest to this study are the coefficients on the interactions between year and college education. After a trough in the early 1990s, the coefficients on this interaction began to grow in the late 1990s. These estimates show that from 1965 to 1995, college-educated mothers spent between 0.06 and 2.1 more hours per week on childcare than did non-college-educated mothers. Beginning in 1998, however, this differential underwent a dramatic increase: college-educated mothers spent over three hours more per week in 1998, roughly five hours more in 2000 and 2003, and over six hours more in 2004 and 2005. Between 1998 and 2007, the college differential in every year was at least double the highest differential observed between 1965 and 1995.

These trends are depicted graphically in panel A of Figure 1, which is based on the estimates from column 1 of Table 1; these numbers indicate the time spent in childcare by mothers in the 25-34 age group. For both education groups, time spent in childcare rose

² We use 1975 as the omitted year because we will later be comparing 2000 and later studies to 1975 with the more complete set of controls that are available for those studies, but not for other years.

beginning in 1995, but after 1998 the upward movement was much sharper among college-educated mothers. As discussed earlier, problems with the 1992-1994 study make it likely that the true 1993 value was somewhat higher.

Column 2 of Table 1 compares childcare by mothers in 1975, 2000, and 2003-2007 using the more complete set of controls that are available for these seven years. In addition to the age category of the mother, we also control for marital status, the number of children (using a quadratic), and the five dummy variables for the age category of the youngest discussed above. These additional controls have substantial explanatory power. In this specification, we are seeking to compare mothers with similar numbers and ages of children across education levels for the seven years. The results are similar to those without the complete controls. The amount of time spent on childcare by less-educated mothers rose by four hours per week from 1975 to the 2000s, and time spent by college-educated mothers rose by more than eight hours per week. Thus, even with the more complete sets of controls, we find that college-educated mothers increased the amount of time spent in childcare by double the amount of less-educated mothers.

Is the same true for men? Column 3 of Table 1 and panel B of Figure 1 show the results of our benchmark specification for fathers. While fathers on average spent much less time on childcare, the time spent on childcare for men also rose sharply in the late 1990s. The final column of Table 1 compares childcare of fathers in 1975 to later years and includes the full set of controls. The results are similar to those without the additional controls. We conclude that time spent on childcare by both mothers and fathers increased beginning in 1995, and that this increase was significantly steeper among the college educated.³

³ Our results differ from Bianchi, Cohen, Raley and Nomaguchi (2004). They do not find a statistically significant increase in the differential between college-educated parents and less educated parents from 1975 to 2000. On the other hand, a recent paper by Chalasani (2007) that studies married parents finds results similar to ours: a larger increase in childcare time among the college-educated between 1985 and 2003.

Corroborating evidence for these trends is provided by time use studies of children. For example, Sandberg and Hofferth (2005) link time diary studies of children in 1981 and 1997 to determine trends in time spent with parents. They find that children between the ages of 3 to 12 spent 18 more hours per week with one or both parents in 1997 as compared to 1981. Thus, children's time diaries corroborate the trends found using parents' time diaries.

C. Trends in Categories of Childcare

We now break down the trends into particular categories of childcare. To produce consistent estimates of trends over time, we limited the sample to 1965, 1975, 1985, 1995, 1998, and 2000 because these six surveys (i) had the same activity codes for subsets of childcare; (ii) distinguished between basic care of young children versus care of older or mixed age children; and (iii) included key variables we could use as controls.⁴ The controls included age categories of parents, marital status, a quadratic in the number of children, and the number of young children.⁵ We construct five subcategories of childcare: (1) general care of young children; (2) general care of older children or mixed age children; (3) playing with children; (4) teaching children, which involves reading, helping with homework, disciplining and conversing; and (5) travel related to childcare, coordinating children's activities, and picking up and dropping off children.⁶

Figure 2 shows the various categories for mothers and Figure 3 shows the various categories for fathers. The estimates have been normalized to be zero in 1975. As the figures

⁴ The reason we could not construct these categories for the BLS data is that they do not distinguish between basic care of younger children and older children.

⁵ The definition of "young children" changed slightly across surveys. In 1965, it was "under 4 years of age," in 1998 it was "under 7 years of age," and in the rest it was "under 5 years of age."

⁶ We omit medical care in order to make the graph clearer. There was no noticeable trend in time spent in medical care for any group.

reveal, time spent in basic care of younger children fell for all four gender-education groups, although it recovered after the mid-1990s for college-educated mothers. The childcare category with the greatest increase for all four gender-education groups is general care of older children. Time spent in this category increased by four hours for college-educated mothers and by three hours for college-educated fathers. The second most important category was travel and children's extracurricular activities.

The BLS surveys offer further evidence concerning differences in childcare time allocation between college- and less-educated parents during the post-2003 period. Although these surveys do not distinguish time spent with younger children versus older children, they do contain other detailed categories of interest. We examined the following categories for 2007: (1) physical care of children and supervision; (2) educating and teaching children, including reading, helping with homework, meeting with teachers, and associated travel; (3) playing with children, including sports and arts and crafts; (4) health care, including associated travel; (5) organizing activities and attending child's events; and (6) chauffeuring, which includes dropping off/picking up, waiting, and other travel (excluding travel associated with education or health).

Figure 4 shows time spent by parents whose youngest child is less than five years old. The bulk of time spent by mothers is physical care and supervision, followed by playing. College-educated mothers spend substantially more time on these two categories than less-educated mothers, almost 12 hours in physical care and supervision and seven hours in playing. The other categories for this age group are much lower, two hours or less per week. The time spent by education level does not differ much for the other categories, with the exception of educational activities where college-educated mothers spend more time. The story is similar for

fathers, but at lower levels of hours. College-educated fathers spend more time in both categories than less-educated fathers.

Figure 5 shows time spent by parents whose youngest child is five years or older. Note that the scale is different on this graph: time spent in physical care and supervision has shrunk to 3.5 hours per week for college-educated mothers. The second most important category for mothers with older children is chauffeuring, with college-educated mothers spending an hour more in childcare-related travel than less-educated mothers. This category excludes travel associated with education and health. Activities and travel associated with education constitute the third most important category for college-educated mothers. Also important are organizing and attending extracurricular activities. Fathers spend less time than mothers in all categories except playing. The three most important categories for fathers are physical care, traveling, and playing. Overall, college-educated parents spend more time in each category except for health care. The most important sources of the extra time spent by college-educated parents, however, are in chauffeuring, education- and activity-related categories.⁷

The patterns highlighted in Figure 5 mirror the differences highlighted in other research. For example, Mahoney, Harris, and Eccles (2006) used pooled data from the 1997 and 2002 Child Development Survey of the PSID to show that children of college-educated parents spend at least three more hours per week on organized activities than children of less-educated parents. Hofferth (2008) found an increase in time spent in academic activities from 1997 to 2003. Lareau's (2003) ethnographic study, *Unequal Childhoods*, documents the dramatic differences in how educated parents raise their children compared to less educated parents. The children of less-educated parents spend most of their free time playing with friends and relatives in their

⁷ One should not infer from these results that pure travel time accounts for most of the increase in childcare time. Total travel time associated with childcare increased by approximately one hour from 1975 to the 2000s.

neighborhood, unsupervised by adults. Lareau calls this the “natural development” approach. On the other hand, more-educated parents take a “concerted cultivation” approach, which requires significant commitments of parental time:

Children’s activities create substantial work for their parents. Parents fill out enrollment forms, write checks, call to arrange car pools, wash uniforms, drive children to events, and make refreshments.... Simply getting ready for an activity – collecting the equipment, organizing the children, loading the car – can be exhausting..., in addition to the labor of preparing, there is the labor of watching. (page 47)

In sum, it appears that college-educated parents with children age 5 or over spend a good deal of their time on education and children’s activities.

D. Trends in Overall Time Use of Mothers

Figure 6 sheds light on the source of the extra time devoted to children by mothers. We have categorized other time expenditures into “work,” “chores,” and “free and personal care time.” “Chores” include housekeeping, cooking, and shopping. “Free and personal care time” includes any time not included in the other categories, such as sleeping, personal care time, and leisure activities. All time use surveys are used and the only controls are the age category. We have subtracted 65 hours from personal and free care time so that magnitudes are similar.

Work time of less-educated mothers increased until the late 1990s, and then fell somewhat. Work time of college-educated mothers increased between 1985 and the mid-1990s, and then flattened out. Time spent on “Chores” fell steadily over the entire sample for both education levels. “Free time” for both types of mothers fell starting in the mid-1990s. For college-educated mothers, free time in 2007 was 10 hours less per week than in 1975 and 1985. Thus, the decline in free time makes up for all of the increase in childcare time.

In sum, the evidence suggests that all time spent in childcare has increased since 1975, but it increased much more for higher educated parents. Moreover, with the caveats about the 1993 study in mind, it appears that these increases began in the mid 1990s, and a substantial proportion of the rising college differential was due to travel and activities of older children. The trends we highlight are consistent with descriptions from popular books, such as Judith Warner's *Perfect Madness: Motherhood in the Age of Anxiety* (2005). The key question is, why have educated parents decided to spend their time in this way? The next section will evaluate various possible explanations.

III. Conventional Explanations

As discussed in the Introduction, Bianchi, et al. (2006, p. 87) and others have offered several potential explanations that could explain the rise in time spent on childcare. We find, however, that none of these explanations is consistent with the evidence.

A. Selection Effects

One possible explanation for this time reallocation involves the declining incidence of parenthood over this time period. Since fewer individuals choose to be parents, those who do choose to be parents might be those persons who enjoy childcare more. This selection effect could account for the observed trends in childcare hours per week spent by parents.

To test this argument, we obtained a new set of estimates using an expanded sample that included all adults aged 18-64 who were not students. Results are presented in column 1 of Table 2, and panel A of Figure 7. The trends in total childcare and the college differential are clearly present among the general population of women; in particular, the rise in childcare

beginning in 1995 continues to be much steeper for college-education women. Thus, our findings are not an artifact of selection into motherhood.

B. Income Effects

A second possible explanation for the increase in childcare time pertains to income effects. If childcare is a normal good, then increases in income should raise the time spent in childcare. Since the incomes of households with college-educated adults have grown much faster since the early 1980s than incomes of households with less-educated adults (owing to the increase in the skill premium), this explanation could also potentially explain the widening gap in childcare time across education levels.

To investigate this possibility, we analyze the cross section relationship between time spent on childcare and income and then use the estimates to determine whether they can explain the time series trends. According to our time use surveys, average real household income in households with children rose by \$21,300 from about \$70,000 in 1975 to \$91,300 in 2007 (in \$2007). Thus, real income rose by about 30 percent from 1975 to 2007.

We pooled the BLS surveys from 2003-2007 and focused on parents. We used real household income in thousands of 2007 dollars. See the data appendix for how we constructed income. In the regressions, we controlled for year fixed effects, age category dummy variables, dummy variables for education (high school dropouts, college graduates, and those with a graduate degree), the full set of dummy variables for the age of youngest child, a quadratic in the number of children, and marital status.

Table 3 shows the effects of income for numerous specifications, Panel A for mothers and Panel B for fathers. We considered both a quadratic in income and the logarithm of income.

Because household income is related to hours of work, and hours of work are probably negatively related to time spent in childcare, in some specifications we also included controls for usual hours of work of the respondent as well as the spouse. Also, in order to try to estimate the pure income effect of childcare, we show results where the sample was limited to just nonworking mothers.

Table 3 shows that while a number of the income coefficients are statistically different from zero, all of them are miniscule in terms of economic impact. The fourth column uses the estimated cross-sectional coefficients combined with the actual change in income from 1975 to 2007 to see how much of the increase in childcare could have been induced by an increase in real income. Every number in the column is a mere fraction of an hour. Thus, income cannot explain the increase in childcare.⁸

C. Safety Concerns

Bianchi, Robinson, and Milkie (2006) suggest that heightened concerns about safety may induce parents to accompany their children in their activities and to substitute structured activities for the free, unaccompanied play on neighborhood streets that was the norm in earlier times. This explanation is problematic for two reasons. First, the violent crime rate rose from 200 (per 100,000 population) in 1965 to a peak of 758 in 1991, and then began declining again (*Statistical Abstract, Historical Statistics, HS-23*). Thus, the violent crime rate moves *negatively* with time spent in childcare, which is contrary to the hypothesis of a positive crime-childcare link. Second, educated parents tend to live in safer neighborhoods than less educated parents.

⁸ The results are even weaker if we instead use the 1975 survey. Most of the income coefficients are not statistically significant, and all are near zero. We find similarly small coefficients if we instead use earnings as Kimmel and Connelly (2007) and Guryan, Hurst, and Kearney (2008) did.

Thus, if this explanation were important, then we would expect the educated parents to spend less time on childcare, which is inconsistent with the evidence.

Of course, what matters is parents' *perceptions* of safety. However, the evidence suggests that parents now worry less about numerous safety issues. Safe Kids USA (2008) reported the results of Harris polls in 1987 and 2007, which asked parents about their major concerns about raising kids. Among the categories were concerns about children being involved in accidents, kidnapped by strangers, influenced adversely by friends, and exposed to street drugs. In every case, parents were significantly *less* concerned in 2007 than they were in 1987 (Safe Kids USA (2008), page 9). Thus, trends in safety perceptions cannot be the source of trends in time spent in childcare.

D. Enjoyment

A fourth possible explanation is that parents now experience greater enjoyment from childcare. However, measures of enjoyment do not indicate rising enjoyment of most types of childcare. Robinson and Godbey (1999) report enjoyment ratings for various activities from the 1985 survey. In this survey, which covered both men and women, basic childcare ranked below work and cooking, but above housework. Krueger, Kahneman, Schkade, Schwarz, and Stone (2007) report measures of enjoyment of various activities by women in 2004 and 2005. According to their Table 8.3, basic childcare ranked below both cooking and housework. Thus, there is no evidence that basic childcare has become more pleasant.

One caveat is that playing with children has always ranked highly in terms of enjoyment. We have followed the standard practice of including these activities in our measure of childcare because they are considered to be crucial activities for investment in children's human capital.

However, it might alter the interpretation of the results if one believes that the increase in childcare time is simply a redirection of time from one high enjoyment activity to another.

To investigate this possibility, we re-estimated the regressions for the subsample of parents, excluding time spent playing with children from our measure of childcare. Only parents' ages are used as controls. The results for mothers are shown in the first two columns of Table 4. Column 1 reproduces the first column of Table 1, while column 2 gives the results using the restricted childcare variable. By comparing the columns, one can see that omitting playing with children reduces the amount of the increase by about one hour for less-educated mothers, and by about three hours for college-educated mothers. Nevertheless, most of the increase over time and across education levels remains even when playing with children is omitted. The results are similar for fathers, as seen in columns 3 and 4.

E. More Flexible Work Schedules

Yet another possible explanation is that parents now have more flexible work schedules, and can thus reallocate their time in a way that allows them to spend more time with their children even when they are working. Unfortunately, we do not have measures of work schedule flexibility, either in our time use data or to gauge aggregate trends. However, one implication of this hypothesis is that the biggest increases in childcare time should be among working mothers rather than stay-at-home mothers.

To test this implication, we split the sample by work status and re-ran our basic regressions. We found that the increase in childcare is much greater for those mothers who do *not* work, and that the gap is much greater across educational levels. One might worry about selection effects since the labor force participation rate of mothers has increased since 1975,

which is our usual comparison year. However, even when we compare to 1985, a year when the labor force participation rate for college-educated mothers was about the same as in 2007, we find that the increase in childcare time among college-educated nonworking mothers was around 15 hours per week as compared to an increase around 8 hours per week for college-educated working mothers. Thus, some other factor must have been at play to lead even nonworking mothers to increase their childcare time so much.

IV. A New Explanation: The Rug Rat Race

We now offer a new explanation for the trends in time spent in childcare, tied to increased competition for college admissions, particularly among the college educated. Our claim is that increased competition was driven by a steep rise in demand for college admissions together with a relatively constant number of slots in the more attractive colleges. The resulting “cohort crowding” for college admissions gave rise to heightened competition among parents for attractive slots, manifesting itself in greater time spent on college preparation of their children. This expenditure of childcare time in dissipative rivalry may be dubbed the “rug rat race.”

A. Evidence on the Increase in College Competition and its Effects

Empirical trends in demand for college have displayed a remarkable agreement with trends in time spent on childcare. The top panel of Figure 8 shows the number of high school graduates each year since 1965.⁹ The initial large hump is due to the large size of the baby boom generation. The number of high school graduates fell to a low around 1990, and have since spiked up as a result of the “baby boomlet.” The number of high school graduates is expected to peak in 2009 before decreasing again.

⁹ These data are from the 2007 *Digest of Education Statistics*, Table 191.

The second panel of Figure 8 indicates the number of recent high school graduates who have enrolled in college. This graph shows a somewhat different pattern because of the long-run upward trend in the propensity for high school graduates to go to college. As the figure reveals, after declining from 1980 to 1990, this number increased dramatically during the 1990s and, while fluctuating from year to year, has stayed high through the present. Observe that the jump in college enrollment occurs at the same time as the rise in childcare time that we estimated previously.

An additional reason for the increased demand for college slots is the dramatic increase in the college wage premium over the last three decades. Autor, Katz, and Kearney (2008) update the trends first highlighted by Katz and Murphy (1992), documenting that the college/high school wage premium for full-time workers has increased by 25 percentage points since 1980. Thus, the rise in the demand for college entrance can be viewed as a response to the dramatic changes in the returns to going to college.

Of course, the rise in the college premium also means that the opportunity cost of time for college-educated parents has grown at the same time that these parents have increased the amount of time spent on childcare. Other things equal, this rise in opportunity cost should have led to a smaller increase for these parents. We argue, however, that college-educated parents have had a lower overall marginal disutility of devoting time to childcare, even after accounting for the opportunity cost of work. In the next section we present a theoretical model that rationalizes these various factors.

Turning to the supply side, the number of slots at the more attractive colleges has not expanded commensurately with demand. Between 1990 and 2005, total enrollment in college by recent high school completers increased by 30 percent. In contrast, the number of full-time

enrolled freshman increased only 13 percent at the ten elite universities of “The Ivy Plus” and by only 10 percent at the top 25 liberal arts colleges.¹⁰ Bound and Turner (2007) show that this “cohort crowding” extends to public institutions as well. Using variation in cohort size across states, they show that the elasticity of undergraduate enrollment with respect to the age 18 population is well below unity. According to Table 4 of their paper, two-year community colleges have the highest elasticity of 0.8, followed by non-flagship public universities with 0.56, and flagship public universities with an elasticity of only 0.2. This evidence indicates that the number of slots becomes much less responsive to enrollment pressure as the quality of the institution increases.

For the last several years, the popular press has been filled with stories of unprecedented competition for college. Some of the perceived increase in competition is simply a statistical mirage: the average student now applies to more colleges, both because of the increased ease of filling out applications and the perceived greater uncertainty about getting into a given college. However, there is ample evidence that part of the increase in competition is real. Bound, Hershbein, and Long (2009) document many facets of the increase in competition. For example, they show that test scores of entering students are higher now, particularly at the top ranked schools. They also show that the percentage of high school graduates applying to a four-year institution has increased over time. Moreover, they show that the probability of acceptance to a four-year college for a student of a given ability has declined significantly since 1982.

Although there are still many colleges that will accept most applicants, there is evidence to suggest that parents and children have increased the emphasis that they put on selective colleges. Hoxby (1997) documents that the market for higher education has changed from a

¹⁰ These numbers are based on our calculations using data extracted from Integrated Postsecondary Education Data System.

collection of local markets to a nationally integrated market. According to the *International Herald Tribune* (May 16, 2007), “the preoccupation with the top universities, once primarily a phenomenon in the Northeastern United States, has become a more countrywide obsession.” Observers note that college admissions anxiety has spread to the Midwest and Sun Belt, where enrollment in SAT/ACT prep classes has grown more than seven times the overall national growth rate over the last five years (Justin Pope (AP) October 22, 2006). In its annual report, *State of College Admission*, the National Association for College Admission Counseling (2008) documents that the group of 257 four-year colleges that accept fewer than 50 percent of applicants receive 31 percent of all applications (Table 6, page 18).

Developmental psychologists and pediatricians have drawn an explicit link between competition for college slots and the increase in time devoted to academics and extracurricular activities. For example, Luthar and Becker (2002) and Lareau (2004) argue that many middle- and upper middle-class parents see building up their children’s “after-school resumes” as absolutely necessary because of the competition for college admission. The American Academy of Pediatrics (Ginsburg (2007)) cites the increase in competition in college admissions as a key reason for the decrease in free play time and increase in scheduled activities among children nationwide.¹¹ Our evidence on trends in childcare time, which shows a sharp increase in time for this class of activities, is entirely consistent with this picture. Bound, Hershbein, and Long (2009) document the various ways that high school students are changing their behavior in response to the increase in competition. For example, they show that the fraction of seniors who have taken at least one Advanced Placement exam increased from 16.5 to 30.9 percent from 1992 to 2004, and that time spent in extra curricular activities rose. Surprisingly though, they

¹¹ An ongoing debate among child development experts asks whether the dramatic increase in extracurricular activities helps or hurts children. See, for example, Rosenfeld, Wise, and Coles (2001) and Mahoney, Harris and Eccles (2006).

find that while time spent in homework is now higher than in the early 1980s, the upward trend reversed somewhat during recent years.

Another factor that might explain the increase in extracurricular activities is the increase in college tuition. There is a good deal of anecdotal evidence that many parents hope that investing time in developing their children's sports and music abilities might result in a college scholarship. However, there is also evidence that parents over-estimate the number of scholarships that are available (e.g. *The Washington Post*, February 13, 2003).

B. Theoretical Model of the Rug Rat Race

To clarify our ideas about childcare time and competition for college slots, we develop a simple theoretical model in which parents compete for slots by investing in their children's college preparation. Each parent is assumed to have a single child. Parent's schooling may be either college- or less-educated, represented by c and l , respectively. The numbers of college- and less-educated parents are denoted by m_c and m_l , respectively, and $m = m_c + m_l$ gives the total number of parents.

We assume that a child's college preparation depends on her parent's time spent in childcare, denoted by h . A less-educated parent incurs a disutility of $d_l(h)$ from choosing h , while a college-educated parent incurs $w d_c(h)$, where $w > 1$ reflects a wage premium. The disutility functions satisfy, for $s = l, c$, $d'_s, d''_s > 0$, $d_s(0) = d'_s(0) = 0$ and $d'_s(\infty) = \infty$. Moreover, we assume that college-educated parents incur lower marginal disutility in the absence of a wage premium, i.e., $d'_c(h) < d'_l(h)$.

A child's ultimate wealth is given by wqh , where q reflects the quality of the college attended by the child. This is meant to capture both pecuniary and psychic benefits from college

attendance. For example, parents may value the prestige of sending their children to more elite institutions. Parents choose h to maximize their children's wealth net of their own disutility. Thus, the objective function of a less-educated parent is $wqh - d_l(h)$. In the absence of constraints on college attendance, the optimal preparation level, $h_l^*(q)$, is determined by

$$d'_l(h_l^*(q)) = qw.$$

For a college-educated parent, the objective function is $wqh - wd_c(h)$, and the optimal preparation level, $h_c^*(q)$, satisfies

$$d'_c(h_c^*(q)) = q.$$

The effect of parent's schooling on optimal preparation time is considered in Figure 9. For less-educated parents, the optimal decision occurs at point A, where the marginal return wq equals the marginal disutility d'_l . A parent's college education shifts the marginal disutility locus down to d'_c . This captures a *productivity effect* in preparing children for college. Countering this is an *opportunity cost effect*, whereby a given quantity of time commands a higher market wage. The marginal return to preparation, adjusted for opportunity cost, drops to q , and the optimal decision occurs at point B. We assume that the productivity effect dominates the opportunity cost effect, so that $h_c^*(q) > h_l^*(q)$ holds for every level of q . Thus, college-educated parents have a comparative advantage in investing in college preparation.

College attendance is restricted by the availability of slots. Suppose there are k_1 slots available at first-tier colleges, and k_2m slots available at second-tier colleges, where $k_1 + k_2m < m$. Thus, while college slots are scarce overall, the first-tier slots become relatively scarcer as the college-eligible population expands. Wealth obtained from attending a first-tier college is

wq_1h , while wealth from a second-tier college is wq_2h , where $q_1 > q_2 > 0$. If a child does not attend college, then wealth is q_0h , where $q_2 > q_0 > 0$.

Parents simultaneously choose h , and colleges observe the values of h for each child. The colleges then fill their slots in descending order of h . This acceptance rule may be rationalized in a number of ways. For example, children may contribute a proportion of their wealth to their alma maters, and admissions decisions may be made in order to maximize total contributions. Since first-tier slots are most valuable, they will be filled first. In equilibrium, a threshold h_1 will exist such that children with $h \geq h_1$ are accepted to first-tier colleges, and there are exactly k_1 such children. The second-tier slots are filled next: there is a threshold h_2 such that children with $h \in [h_2, h_1)$, numbering k_2m , are accepted to second-tier colleges. Finally, the remaining $m - k_1 - k_2m$ children with $h < h_2$ do not attend college.

We first consider the case in which m_c is small, in the sense that there are sufficiently many first-tier slots to accommodate the children of college-educated parents. Proposition 1 of the Theoretical Appendix characterizes the outcome for the case of $m_c < k_1$. In equilibrium, college-educated parents exploit their comparative advantage in college preparation to get their children into first-tier colleges. The children of less-educated parents take up the remaining first-tier slots along with all of the second-tier slots. The acceptance thresholds h_1 and h_2 make the latter parents just indifferent between first-tier, second-tier and no college. The thresholds are distorted upwards relative to the corresponding unconstrained optimal preparation levels $h_1^*(q_1)$ and $h_1^*(q_2)$, reflecting rivalry among these parents for scarce slots.

Now suppose that m_c rises to the point where there are too few first-tier slots for the children of college-educated parents. As shown in Proposition 2 of the Theoretical Appendix,

once $m_c > k_1$ the focus of rivalry shifts from less-educated to college-educated parents. The children of the less-educated are driven completely from the first tier, as the acceptance threshold h_1 jumps to a level that makes the college-educated parents indifferent between the first and second tiers. This new level is distorted upwards relative to unconstrained optimal preparation, $h_c^*(q_1)$.

Figure 10 illustrates the time paths of college preparation choices when m and m_c rise gradually, with $m_c = k_1$ occurring at time T . We interpret T as corresponding to a point of time in the mid 1990s. The wage premium w is also assumed to rise over time, leading to steadily increasing paths of h_1 and h_2 . Prior to T , the growth of m_c gradually squeezes the children of less-educated parents out of the first-tier colleges, shifting their parents' preparation choices from h_1 to h_2 . The average level nevertheless increases if the growth of w is sufficiently rapid. The preparation choices of college-educated parents also rise if $h_1 > h_c^*(q_1)$. At time T the latter parents jump to a discretely higher level of college preparation, while the choices of the less-educated continue to rise with h_2 .

The model shows how a combination of increasing rewards for college attendance and rivalry for ever-scarcer slots can fuel a rug rat race among parents. Rivalry is manifested in higher college preparation requirements, and in order to secure slots for their children all parents must devote increasingly large amounts of time to childcare. Once the first tier slots become sufficiently scarce, rivalry among the college-educated parents intensifies greatly, driving up their time spent in childcare relative to that of the non-college-educated.

C. Tests of the Theory

In the next two subsections, we test our theory by comparing time spent in childcare across groups with differing competitive pressures for college. The first section compares time use trends by educational attainment in Canada to the U.S. The second section compares time use across whites and underrepresented minorities in the U.S.

1. A Comparison of Trends in the U.S. and Canada

As a test of our theory, we compare trends in childcare in the U.S. and Canada. The comparison of these two countries is ideal for our purposes. Because of geographic proximity and similarity of language and culture, we would expect that changes in childcare time caused by knowledge diffusion or fads to affect both countries similarly. However, these two countries differ significantly in two key ingredients of our theory: trends in the college wage premium and the competition to get into college.

Consider first the college wage premium. Boudarbat, Lemieux, and Riddell (2006) show that between 1980 and 2000 the wage premium of a college degree relative to just a high school degree in Canada rose by about 10 percentage points for men and 5 percentage points for women. This contrasts with an average rise over both sexes of 25 percentage points in the U.S. during the same period (Autor, Katz, and Kearney (2008)). Thus, the returns to college have increased much more in the U.S.

A second key difference between the U.S. and Canada is the nature of competition in higher education. Davies and Hammack (2005) document the similarities and differences in higher education between the U.S. and Canada. The countries are similar in that just over 60 percent of high school graduates in both countries pursue a postsecondary education. Both

higher education systems have decentralized governance and both are experiencing rises in enrollments and increased competition. However, as Davies and Hammack document, the nature of the competition in the two countries is very different. They argue that while the Canadian system consists of formally equal public universities, the U.S. system is distinguished by a steep prestige hierarchy of higher education, and that this hierarchy leads to a distinctive form of competition that has increased over the last decade. The effects of this competition have been felt at all lower levels of education. In contrast, competition in Canada occurs within the post-secondary system itself and takes the form of competition to enter lucrative majors. Davies and Hammack argue “Where one studies is seen as more important in the U.S., while what one studies dominates in Canada.” In fact, many Canadian college students who cannot get into their desired programs at 4-year colleges often transfer to community colleges in order to pursue their desired field. Moreover, Canadians are much less likely to go to college outside their home province than American students.

The more muted increase in the college premium, along with the lower competition to get into the hierarchy of colleges, suggests that there should be less pressure on educated Canadian parents to invest time in preparing their children to get into college. We test this prediction by studying trends in childcare in Canada.

To this end, we use microdata from the 1986 (cycle 2), 1992 (cycle 7), 1998 (cycle 12) and 2005 (cycle 19) of the Time Use Survey from Canada’s General Social Survey (Statistics Canada) to construct trends in childcare time by education level.¹² However, there was a significant break in a definition between the two earlier surveys and the two later surveys. In

¹² We used the Statistics Canada microdata file of the 4 cycles, which contain anonymized data. All computations on these microdata were prepared by Nova Scotia Department of Finance and the responsibility for the use and interpretation of these data is entirely that of the authors. We are deeply grateful to Tarek Harchaoui for obtaining access to the data for us.

particular, the two earlier surveys counted as childcare any care of children between the ages of 0 and 18. In the two later surveys, it counted as childcare any care of children between the ages of 0 and 14. Using the standard childcare variables would therefore bias down the trends over time. We use total family care (children and adults) as the most consistent measure. The data appendix shows that the change implied by this measure lies between the lower bound using the available childcare variable and the upper bound based on some imputations we made.

Otherwise, we analyze the data similarly to the way we analyzed the U.S. data. We estimate the same baseline regressions as before, controlling for the age group of the parent and interacted year and education variables.¹³

Figure 11 and Table 5 show the results. Columns (1) and (3) of Table 5 show the results with baseline controls whereas columns (2) and (4) show the results in which controls for marital status and the age group of the youngest child. Figure 11 plots the results for the baseline regressions. We have normalized the hours to be zero in the base year in each country, 1985 in the U.S. and 1986 in Canada.

Figure 11 shows that time spent in childcare by less educated parents increased by about the same amount in both countries, about four to five hours per week for mothers and about three hours per week for fathers since the mid-1980s. The contrast is in time spent by college-educated parents. Whereas time spent by college-educated mothers rose by nine hours per week in the U.S., it rose by only one hour per week in Canada. For college-educated fathers, the increase in the U.S. was six hours per week and the increase in Canada was two hours per week. Thus, Canada did not mirror the big increases in time by educated parents. In fact, the educational gap in childcare time grew in the U.S., but shrank in the Canada.

¹³ Because of data limitations in some of the years, the youngest age category includes those ages 20-24 rather than 18-24 as in the U.S. data.

Our findings are broadly consistent with other analyses of trends in the Canadian data. Pronovost (2007) finds that the amount of time that parents spent in the presence of their children fell from 1986 to 2005. Turcotte (2008) similarly finds a decrease in time spent with family members over the period 1986 to 2005.

2. A Comparison across Racial and Ethnic Groups in the U.S

As an additional test of our theory, we compare childcare time across race and ethnic groups. One group in the U.S. that should not have felt as much increased competition to enter college is underrepresented minorities.¹⁴ Despite the overall increase in applicants, most colleges are still eager to admit underrepresented minorities. One exception is public universities in states that banned affirmative action in the late 1990s, namely California, Florida, Texas, and Washington.

Ideally, we would compare trends by race and education group over time. Unfortunately, the surveys before 2003 are too small to provide information for underrepresented minorities by education level. For example, the largest of the pre-2003 surveys includes 202 black parents, but only 34 college-educated black parents, and no Hispanic parents.¹⁵

On the other hand, the sample sizes of the BLS surveys from 2003 to 2007 are sufficiently large to provide some cross-sectional information, particularly if we pool the surveys. The problem with cross-sectional comparisons is that there may be other reasons that particular racial or ethnic groups spend more or less time on childcare. Thus, we will focus on differences by education level and state of residence (i.e. “difference-in-difference” effects)

¹⁴ We are indebted to Daniel Hamermesh for suggesting this test to us.

¹⁵ For the same reason, it is not possible to relate time use trends across states to state-level cohort crowding.

According to our theory, underrepresented minorities should feel less competitive pressure in applying for college, particularly in states that allow affirmative action in their public universities. Thus, we would expect underrepresented minorities to spend less time in childcare than white parents, and the college differential in time spent to be less within the group of minority parents. We compare time spent in childcare by underrepresented minorities to whites, distinguishing by education level and by whether they reside in the four states that banned affirmative action in university admissions before 2003.

We re-estimate our baseline specification with two modifications. First, we allow interaction terms between race, education, and whether the state bans affirmative action. Our underrepresented minority group consists of “black only” and Hispanic. Second, because the underrepresented minorities tend to be less educated within our two broad educational categories, we include additional controls for high school dropouts and those with a graduate degree.

Table 6 shows the estimates for the pooled samples from 2003 to 2007. All of the numbers shown are differentials relative to blacks and Hispanics with less than a college degree living in states that allow affirmative action. Consider first the results for mothers. Within each educational group, white mothers spend significantly more time on childcare than underrepresented minorities. Moreover, the within-race educational differential is lowest for underrepresented minorities in states that allow affirmative action and highest among whites. A college-educated minority mother in a state that allows affirmative action spends less time on childcare than a less-educated white parent in either type of state. All of these results are consistent with our theory that competition for college drives up time spent in childcare.

Another interesting finding is that all groups spend more time on childcare in states that ban affirmative action than in states that do not.

The bottom panel of Table 6 shows the results for fathers. Although white fathers with a college degree spend more time than minority fathers with a college degree, the within-group educational differential is greatest for minority fathers in states that allow affirmative action but smallest for minority fathers in states that ban affirmative action. Thus, some of the results for fathers are consistent with our theory, but the estimate for one key group is not.

To summarize, the results for mothers are consistent with our theory, with the groups least likely to face increased competition spending the least time on childcare. The results for fathers are mixed, with some rankings consistent with our theory but other rankings inconsistent with our theory.

V. Conclusion

This paper has documented a dramatic increase in time spent in childcare by college-educated parents since the early 1990s. While time spent in childcare rose for all parents, the rise was far more pronounced for college-educated parents. Since the early 1990s, college-education mothers have reallocated more than nine hours per week from leisure time to childcare time. This reallocation occurred at the same time that competition to get into college intensified, as a combination of demographic forces and the increase in the college premium led to a surge in the demand for college slots. In contrast, time spent in childcare by educated parents in Canada changed very little over this period.

We have explained these trends using a model in which the rise in time devoted to childcare is the optimal response to the increase in rivalry for scarce college slots. We postulate

that college-educated parents have a comparative advantage in preparing their children for college, which they exploit to get their children into the most attractive colleges. When slots are plentiful relative to demand, the required amount of child preparation is relatively low. However, when demand rises, rivalry among the college-educated parents drives the required preparation upwards. Less-educated parents also raise their childcare effort, but to a lesser extent.

In this paper we have focused on explaining observed trends in time use, but our results also have implications for socially efficient time allocation. To the extent that the private costs and benefits of college preparation reflect social costs and benefits, the rivalry for college slots implies wasteful overinvestment in preparation. Overinvestment may be mitigated by expanding the number of slots, or by modifying college acceptance rules to place greater emphasis on criteria that cannot be directly influenced by parents. In a broader context, however, parents may not fully internalize the social benefits of preparing their children, which raises the possibility that the rug rat race provides a useful stimulus to human capital investment. These issues warrant closer investigation in future work.

Data Appendix

Table A1. U.S. Time Use Surveys

Study Title and Survey Organization	Time Period	Sample Parents, 18-64, not students	Notes
“1965-66 Americans’ Use of Time” * Survey Research Center †	Fall 1965 – Spring 1966	1,196	Some oversampling
“1975-76 Time Use in Economic and Social Accounts” * Survey Research Center †	Fall 1975 – Summer 1976	3,354	Panel aspect
“1985 Americans’ Use of Time” * Survey Research Center †	Jan. 1985 – Dec. 1985	928	
“National Human Activity Pattern Survey” * Survey Research Center †	Fall 1992 – Summer 1994	1,629	Methodology led to undercount of childcare
“1995 Electric Power Research Institute Study” EPRI †	Jan. 1995 – Dec. 1995	478	
“Family Interaction, Social Capital, and Trends in Time Use” Survey Research Center †	Mar. 1998 – Dec. 1999	456	
“National Survey of Parents” Survey Research Center †	May 1999 – Jun 2000	974	Includes only parents
“American Time Use Survey” Bureau of Labor Statistics	Jan. 2003 – Dec. 2007	03: 7,771 04: 5,082 05: 5,335 06: 5,264 07: 4,859	Activity codes are different from earlier codes

* indicates that the study is part of the American Heritage Time Use Study.

† indicates that John Robinson was a principal investigator for the survey.

U.S. Activity Codes

A. Total Childcare

AHTUS (1965, 1975, 1985, 1992-94)	tmain33 - tmain39, tmain65, tmain96
1995, 1998, 2000	act20 – act27, act29
ATHUS (2003-2007)	0301, 0302, 0303, 0399, 0401, 0402, 0403, 0499, 0801, 160107, 170301, 170401, 170801, 180301, 180302, 180303, 180401, 180402, 180403

B. Work

AHTUS (1965, 1975, 1985, 1992-94)	tmain10-tmain12, tmain92, tmain93
1995, 1998, 2000	act0, act1, act3, act5, act9
ATHUS (2003-2007)	0501, 0503, 1705, 1805

C. Chores

AHTUS (1965, 1975, 1985, 1992-94)	tmain120-tmain27, tmain30-tmain32, tmain40, tmain67-68, tmain95
1995, 1998, 2000	act10-act19, act30, act31, act34-act39, act42
ATHUS (2003-2007)	02, 0304, 0404, 07, 0802, 0803, 0806-0899, 0901-0999, 10, 160104-160106, 160108, 1702, 170302, 170402, 170802, 170803, 170806, 170807, 170901-170999, 1710, 1802, 180304, 180305, 180404, 180405, 1807, 180802, 180803, 180806, 180807, 180907, 1809, 1810

D. Subcategories of Childcare for 1965-2000

Care of younger children	tmain33 (act20)
Care of older children, or mixed age	tmain34 (act21)
Educational activities	tmain37, tmain38 (act22, act23)
Play	tmain36, tmain65 (act24, act25)
Travel, activities	tmain39, tmain96 (act27, act29)
Medical care	tmain35 (act26)

E. Subcategories of Childcare for 2007

Physical care and supervision	030101, 030106, 030109, 040101, 040106, 040109
Education and related travel	030102, 030107, 0302, 040102, 040107, 0402, 180302, 180402
Play	030103, 030104, 030105, 040103, 040104, 040105
Health and related travel	0304, 0403, 180303, 180403
Organizing & attending activities	030108, 030110, 040108, 040110
Chauffering (travel, picking up, waiting, etc.)	030111, 030112, 040111, 040112, 180301, 180401

Construction of household income

The household income variable was “hufaminc” in the CPS data set. The CPS variable gives ranges of income, with a top code of \$150,000 and above. We used the midpoints of the ranges. For the top-coded category, we used information from Saez’s (2008) annual U.S. distribution of income for families, including realized capital gains, to compute the average income for the top category. We converted income to 2007 dollars using the Consumer Price Index.

Race/ethnic group definitions: “White” is ATUS-CPS variable $ptdtrace = 1$ and $pehspnon \sim 1$. “Minority” is $ptdtrace = 2$ or $pehspnon = 1$.

Canadian Time Use Data

We use microdata from 1986 (cycle 2), 1992 (cycle 7), 1998 (cycle 12) and 2005 (cycle 19) of the Time Use Survey from Canada’s General Social Survey. There were three ways in which the sample of parents differed from the U.S. data. First, the definition of a “parent” in Canada is someone whose own child ages 0 to 18 is in the household, whereas in the U.S. it is someone who lives in a household with a child ages 0 to 18. Second, in Canada all childcare refers to household children; in the U.S. it refers to both household and nonhousehold children. Third, because of data limitations, the adults in the Canadian data are ages 20 to 64, compared to 18 to 64 in the U.S. data. To preserve cultural comparability with the U.S., we limited the sample to Canadians for whom English was one of the main languages spoken at home.

A key complication arose in constructing a consistent series of childcare across time. Time spent in childcare in 1986 and 1992 referred to children ages 0 to 18, whereas time spent in childcare in 1998 and 2005 referred to children ages 0 to 14. Using this definition would bias the time trends down.

To create a consistent variable over time, we used all childcare and adult care time. For 1986, this was variable DVCHILDC, plus variables DURAC_41 and DURAC_42. DVCHILDC included only childcare time in 1986, so we added in the two adult care variables. For 1992, 1998, and 2005, DVCHILDC included both childcare and adult care. (See the table in Appendix J of the documentation of the GSS 2005 for more details.)

We also compared this series to a constructed childcare series that we expect to give an upward bias in the trend. In particular, we constructed this series by linking several series over time. For 1986 and 1992, we used the available childcare series that covered care of children ages 0 to 18 (DVCHILDC in 1986 and CHLDDOMS in 1992). Because the childcare series in 1998 and 2005 omitted care of children ages 15 to 18, we attempted to augment the series in the cases where we thought that child of this age was present. In particular, in 1998 and 2005, we substituted total family care time for childcare time in those households that had a nonzero probability of having a child ages 15 to 18. We determined that probability as follows:

1998 survey: The variable CHR1518C indicated the number of children ages 15 to 18. If this variable was positive, we substituted total family care time for childcare time.

2005 survey: This survey did not contain the variable CHR1518C. We had to use other variables to indicate a probability of a child between the ages of 15 to 18. These cases were:

(1) The respondent had a child below the age of 19 (CHRTIME6=1) and no children ages 0 to 14 (CHR0014C=0) in the household.

(2) The respondent likely had a child between the ages of 12 and 18 in the household (CHRTIME6=4, 5, or 6), the number of respondent's children of any age in the household (CHRINHSDC) was greater than the number of respondent's children ages 0 to 14 (CHR0014C), and the respondent had a child ages 0 to 24 in the household (LIVARR12 = 3 or 4).

The table below gives the change in each measure for all parents from 1986 to 2005

Measure	Change (in hours per week)
1. Childcare of ages 0-14 in 2005 and childcare of ages 0-18 in 1986	2.39
2. Total family care (children and adults)	2.45
3. Constructed childcare variable that substitutes total family care in some households in 2005	2.84

We know that Measure 1 will bias the estimate of the change downward because of the change in definition. We know that Measure 3 will bias the estimate of the change upward because of the substitution of total family care in some households in 2005. The change in total family care, the consistent measure, lies between the upper and lower bound.

Theoretical Appendix

Proposition 1. If $m_c < k_1$, then the equilibrium acceptance threshold h_1 is uniquely determined by $h_1 = h_1^A > h_l^*(q_0)$ and

$$wq_1 h_1^A - d_l(h_1^A) = h_l^*(q_0) - d_l(h_l^*(q_0)),$$

and the equilibrium threshold h_2 is uniquely determined by $h_2 > h_l^*(q_2)$ and

$$wq_2 h_2 - d_l(h_2) = h_l^*(q_0) - d_l(h_l^*(q_0)).$$

Moreover, $h_1^A > h_2$, and:

- College-educated parents choose $h = \max\{h_c^*(q_1), h_1^A\}$;
- Less-educated parents divide themselves between $h = h_1^A$, $h = h_2$ and $h = h_l^*(q_0)$, where $h_l^*(q_0)$ is the optimal preparation choice when a child does not attend college.

Proof. Let $G_l(h|q) = wqh - d_n(h)$ and $G_c(h|q) = wqh - wd_c(h)$ represent the objective functions of less- and college-educated mothers, respectively. Under our assumptions, these functions are strictly concave in h and decrease without bound as h approaches infinity. Since $G_l(h_l^*(q_1)|q_1) > G_l(h_l^*(q_0)|q_0/w)$, there is a unique point $h_1^A > h_l^*(q_1)$ satisfying $G_l(h_1^A|q_1) = G_l(h_l^*(q_0)|q_0/w)$. Similarly, $G_l(h_l^*(q_2)|q_2) > G_l(h_l^*(q_0)|q_0/w)$ implies that there is a unique point $h_2 > h_l^*(q_2)$ satisfying $G_l(h_2|q_2) = G_l(h_l^*(q_0)|q_0/w)$. Furthermore, $G_l(h_2|q_1) > G_l(h_2|q_2) = G_l(h_l^*(q_0)|q_0/w)$ implies $h_2 < h_1^A$.

Consider the h choices of college-educated mothers when $h_c^*(q_1) \geq h_1^A$. Clearly, $h_c^*(q_1)$ is optimal among $h \geq h_1^A$. Moreover, for all $h \in [h_2, h_1^A)$, $G_c(h_c^*(q_1)|q_1) > G_c(h_c^*(q_2)|q_2) \geq$

$G_c(h|q_2)$, and for all $h < h_2$, $G_c(h_c^*(q_1)|q_1) > G_c(h_c^*(q_0)|q_0/w) \geq G_c(h|q_0/w)$. Thus, $h_c^*(q_1)$ is strictly preferred to any other h .

Next suppose $h_1^A > h_c^*(q_1)$. Let $\hat{h} = \max\{h_c^*(q_2), h_2\}$. Note that $h_c^*(q_2) < h_c^*(q_1)$ and $h_2 < h_1^A$ imply $\hat{h} < h_1^A$. Moreover, $\hat{h} \geq h_2$ implies $G_l(\hat{h}|q_2) \leq G_l(h_1^*(q_0)|q_0/w)$. Thus,

$$\begin{aligned} 0 &\geq G_l(\hat{h}|q_2) - G_n(h_1^*(q_0)|q_0/w) = G_l(\hat{h}|q_2) - G_l(h_1^A|q_1) \\ &= wq_2\hat{h} - wq_1h_1^A + \int_{\hat{h}}^{h_1^A} d_l'(h)dh > wq_2\hat{h} - wq_1h_1^A + \int_{\hat{h}}^{h_1^A} wd_c'(h)dh \\ &= G_c(\hat{h}|q_2) - G_c(h_1^A|q_1), \end{aligned}$$

where the strict inequality comes from the fact that $h_c^*(q) > h_l^*(q)$ for all q implies $wd_c'(q) < d_l'(q)$ for all q . Thus, $G_c(h_1^A|q_1) > G_c(\hat{h}|q_2)$, and it follows that $G_c(h_1^A|q_2) > G_c(h|q_2)$ for all $h \in [h_2, h_1^A)$ since \hat{h} maximizes $G_c(h|q_2)$ over this range of h . Finally, consider $h < h_2$. If $\hat{h} = h_c^*(q_2)$, then $G_c(\hat{h}|q_2) > G_c(h_c^*(q_0)|q_0/w) \geq G_c(h|q_0/w)$ for all $h < h_2$, whereas $\hat{h} = h_2$ implies $\hat{h} > h_c^*(q_0)$ and

$$\begin{aligned} 0 &= G_l(h_1^*(q_0)|q_0) - G_l(\hat{h}|q_2) > G_l(h_c^*(q_0)|q_2) - G_l(\hat{h}|q_2) \\ &= h_c^*(q_0) - wq_2\hat{h} + \int_{h_c^*(q_0)}^{\hat{h}} \psi_l'(h)dh > h_c^*(q_0) - wq_2\hat{h} + \int_{h_c^*(q_0)}^{\hat{h}} wd_c'(h)dh \\ &= G_c(h_c^*(q_0)|q_0/w) - G_c(\hat{h}|q_2), \end{aligned}$$

whence $G_c(\hat{h}|q_2) > G_c(h|q_0/w)$ for all $h < h_2$

Now consider the h choices of the less-educated mothers. Because of strict concavity and $h_1^A > h_l^*(q_1)$, $G_l(h|q_1) < G_l(h_1^A|q_1)$ for all $q > q_1^A$. Similarly, $G_l(q|q_2) < G_n(h_2|q_2)$ for all $h \in [h_2, h_1^A)$. Since $h_l^*(q_0) < h_2$ and $h_l^*(q_0)$ maximizes $G_l(h|q_0/w)$, it follows that

$G_l(h | q_0) < G_l(h_l^*(q_0) | q_0 / w)$ for all $h < h_2$, $h \neq h_l^*(q_0)$. Thus, the choices h_1^A , h_2 and $h_l^*(q_0)$ are strictly preferred to any others, and by construction these three are equally preferred. *Q.E.D.*

Proposition 2. If $k_1 < m_c$, then the equilibrium acceptance threshold h_1 is uniquely determined by $h_1 = h_1^B > h_c^*(q_1)$ and

$$wq_1h_1^B - wd_c(h_1^B) = q_0\hat{h} - wq_0d_c(\hat{h}), \quad (1)$$

where $\hat{h} = \max\{h_c^*(q_0), h_2\}$, and h_2 is determined as in Proposition 1. Moreover, $h_1^B > h_1^A$, and

- College-educated parents divide themselves between $h = h_1^B$ and $h = \hat{h}$;
- Less-educated parents divide themselves between $h = h_2$ and $h = h_l^*(q_0)$.

Proof. Equation (1) can be expressed as $G_c(h_1^B | q_1) = G_c(\hat{h} | q_2)$. Moreover, $G_c(h_c^*(q_1) | q_1) > G_c(h_c^*(q_2) | q_2) \geq G_c(\hat{h} | q_2)$. Since $h_1^B > h_c^*(q_1)$, it follows that h_1^B is uniquely defined, and $G_c(\hat{h} | q_1) > G_c(\hat{h} | q_2)$ implies $h_1^B > \hat{h}$.

We now verify that $h_1^B > h_1^A$.

$$\begin{aligned} 0 &= G_c(\hat{h} | q_2) - G_c(h_1^B | q_1) = wq_2\hat{h} - wq_1h_1^B + \int_{\hat{h}}^{h_1^B} wd'_c(h)dh \\ &< wq_2\hat{h} - wq_1h_1^B + \int_{\hat{h}}^{h_1^B} d'_l(h)dh = G_l(\hat{h} | q_2) - G_l(h_1^B | q_1). \end{aligned}$$

This implies $G_l(h_1^B | q_1) < G_l(\hat{h} | q_2) \leq G_l(h_2 | q_2)$, and comparison with (1) and (2) shows that $h_1^B > h_1^A$.

Consider the h choices of college-educated mothers. Since $h_1^B > h_c^*(q_1)$, $G_c(h | q_1) < G_c(h_1^B | q_1)$ for all $h > h_1^B$. If $h_c^*(q_2) \geq h_2$, then $h_c^*(q_2)$ is strictly preferred to any other

$h \in [h_2, h_1^B)$, while if $h_2 > h_c^*(q_2)$, then $G_c(h | q_2) < G_c(h_2 | q_2)$ for all $h \in (h_2, h_1^B)$. Thus, $G_c(\hat{h} | q_2)$ maximizes $G_c(h | q_2)$ over $h \in [h_2, h_1^B)$. The argument from the proof of Proposition 1 shows that $G_c(\hat{h} | q_2) > G_c(h | q_0 / w)$ for all $h < h_2$. Thus, the choices h_1^B and \hat{h} are strictly preferred to any others, and they are equally preferred by construction.

As for the non-college-educated mothers, $h \geq h_1^B$ implies $G_l(h | q_1) \leq G_l(h_1^B | q_1) < G_l(h_2 | q_2)$, so h_2 is strictly preferred to any such h . The arguments from the proof of Proposition 1 establish that h_2 and $h_n^*(1)$ are strictly preferred to any other $h < h_1^B$, and they are equally preferred by construction. *Q.E.D.*

References

- Aguiar, Mark and Erik Hurst, "Measuring Trends in Leisure: The Allocation of Time Over Five Decades," *Quarterly Journal of Economics*, 122 (2007): 969-1006.
- Allard, Mary Dorinda, Suzanne Bianchi, Jay Stewart and Vanessa R. Wight, "Comparing Childcare Measures in the ATUS and Earlier Time Use Studies," *Monthly Labor Review*, May 2007, pp. 27-36.
- Autor, David H., Lawrence F. Katz, and Melissa S. Kearney, "Trends in US Wage Inequality: Revising the Revisionists," *The Review of Economics and Statistics* 90 (May 2008): 300 – 323.
- Becker, Gary S., *A Treatise on the Family*, Cambridge, MA: Harvard University Press, 1981.
- Bianchi, Suzanne, Philip N. Cohen, Sara Raley and Kei Nomaguchi, "Inequality in Parental Investment in Child-Rearing: Expenditures, Time, and Health," in *Social Inequality*, ed. by Kathryn M. Neckerman, New York: Russell Sage Foundation, 2004.
- Bianchi, Suzanne M., John P. Robinson, and Melissa A. Milkie, *Changing Rhythms of American Family Life*, New York: Russell Sage Foundation, 2006.
- Bound, John and Sarah Turner, "Cohort Crowding: How Resources Affect Collegiate Attainment," *Journal of Public Economics* 91 (2007): 877-899.
- Bound, John, Hershbein, Brad, and Bridget Terry Long, "Playing the Admissions Game: Student Reactions to Increasing College Competition," June 2009 manuscript.
- Boudarbat, Brahim, Thomás Lemieux, and Craig Riddell, "Recent Trends in Wage Inequality and the Wage Structure in Canada," in *Dimensions of Inequality in Canada*, D. Green and J. Kesselman, eds. UBC Press, 2006.
- Bryant, W. Keith and Cathleen D. Zick, "Are We Investing Less in the Next Generation? Historical Trends in Time Spent Caring for Children," *Journal of Family and Economic Issues* 17(3/4) (1996): 365-92.
- Chalasani, Satvika, "The Changing Relationship between Parents' Education and their Time with Children," *International Journal of Time Use Research*, 4 (September 2007): 93-117.
- Davies, Scott and Floyd M. Hammack, "The Channeling of Student Competition in Higher Education: Comparing Canada and the U.S.," *Journal of Higher Education*, 76 (January/February 2005): 89-106.
- Eckstein, Zvi and Eva Nagypal, "The Evolution of U.S. Earnings Inequality: 1961 – 2002," *Federal Reserve Bank of Minneapolis Quarterly Review*, 28 (December 2004), pp. 10-29.

- Egerton, Muriel, Kimberly Fisher, and Jonathan Gershuny, "American Time Use 1965-2003: The Construction of a Historical Comparative File, and Consideration of its Usefulness in the Construction of Extended National Accounts for the USA," Institute for Social and Economic Research, Working Paper 2005-28.
- Fisher, Kimberly, Muriel Egerton and Jonathan Gershuny. 2006. *American Heritage Time Use Survey*. <http://www.timeuse.org/ahtus/> .
- Ginsburg, Kenneth R., "The Importance of Play in Promoting Healthy Child Development and Maintaining Strong Parent-Child Bonds," American Academy of Pediatrics Report, 2007.
- Guryan, Jon, Erik Hurst, and Melissa Kearney, "Parental Education and Parental Time With Children," *Journal of Economic Perspectives*, Summer 2008: 23-46.
- Hofferth, Sandra L., "Changes in American Childrens' Time, 1997 to 2003," manuscript, University of Maryland School of Public Health, October 2008.
- Hoxby, Caroline, "How the Changing Market Structure of U.S. Higher Education Explains College Tuition," NBER Working Paper 6323, December 1997.
- Krueger, Alan B., Daniel Kahneman, David Schkade, Norbert Schwarz, and Arthur A. Stone, "National Time Accounting: The Currency of Life," 2007 manuscript.
- Katz, Lawrence F. and Kevin M. Murphy, "Changes in Relative Wages, 1963-1987: Supply and Demand Factors," *Quarterly Journal of Economics* (February 1992): 35-78.
- Kimmel, Jean and Rachel Connelly, "Mothers' Time Choices: Caregiving, Leisure, Home Production, and Paid Work," *Journal of Human Resources*, Summer 2007: 643-681.
- Lareau, Annette, *Unequal Childhoods*, Berkeley: University of California Press, 2003.
- Leibowitz, Arleen, "Home Investments in Children," *Journal of Political Economy* 82(2): S111-S131.
- Luthar, Suniya S. and Bronwyn E. Becker, "Privileged But Pressured: A Study of Affluent Young," *Child Development*, 73 (2002): 1593-1610.
- Mahoney, Joseph L., Angel L. Harris, and Jacquelynne S. Eccles, "Organized Activity Participation, Positive Youth Development, and the Over-Scheduling Hypothesis," *Social Policy Report*, 10 (2006): 3-31.
- National Association of College Counseling, *State of College Admission*, author Melissa E. Clinedinst, editor David Hawkins. Arlington, VA: NCAC, 2008.
- Pronovost, Gilles, "Le temps dans tous ses états: temps de travail, temps de loisir et temps pour le famille à l'aube du XXI^e siècle," *Enjeux Public IRPP*, Février 2007.

- Robinson, John P. and Geoffrey Godbey, *Time for Life: The Surprising Ways Americans Use their Time*, University Park, Pennsylvania: The Pennsylvania State University Press, 1999, 2nd edition.
- Rosenfeld, Alvin, Nicole Wise, and Robert Coles, *The Overscheduled Child: Avoiding the Hyperparenting Trap*, St. Martin's Griffin, 2001.
- Saez, Emmanuel, "Tables and Figures Updated to 2006," July 2008. Available at: <http://elsa.berkeley.edu/~saez/> .
- Safe Kids USA, "Report to the Nation: Trends in Unintentional Childhood Injury Mortality and Parental Views on Child Safety," April 2008
<http://sk.convio.net/site/DocServer/STUDY-SKWK-08-LRApril26.pdf?docID=9561>
- Sandberg, John F. and Sandra L. Hofferth, "Changes in Childrens' Time with Parents: A Correction, *Demography* 42 (May 2005): 391-395.
- Sayer, Liana C., Suzanne M. Bianchi, and John P. Robinson, "Are Parents Investing Less in Childcare? Trends in Mothers' and Fathers' Time with Children," *American Journal of Sociology* 110 (July 2004): 1-43.
- Statistics Canada, *General Social Survey*, Cycles 2, 7, 12, and 19.
- Turcotte, Martin, "Time Spent with Family During a Typical Workday, 1986-2005," *Canadian Social Trends*, Statistics Canada Catalogue No. 11-008.
- United States Department of Agriculture, Agricultural Research Administration, Bureau of Human Nutrition and Home Economics, *The Time Costs of Homemaking – A Study of 1,500 Rural and Urban Households*, 1944 manuscript.
- Warner, Judith, *Perfect Madness: Motherhood in the Age of Anxiety*, New York: Riverhead Books, 2005.

Table 1. Trends in Weekly Hours Spent on Childcare by Parents

	(1)	(2)	(3)	(4)
	Mothers	Mothers	Fathers	Fathers
1965	1.654 (0.616)**		0.291 (0.499)	
1985	-0.349 (0.690)		0.006 (0.569)	
1993	-1.033 (0.546)		0.117 (0.488)	
1995	1.760 (0.888)*		1.231 (0.801)	
1998	1.860 (0.939)*		3.103 (0.835)**	
2000	3.943 (0.623)**	3.901 (0.588)**	4.531 (0.547)**	4.443 (0.558)**
2003	4.709 (0.400)**	4.527 (0.383)**	3.191 (0.331)**	3.398 (0.345)**
2004	4.103 (0.437)**	4.021 (0.416)**	3.481 (0.358)**	3.455 (0.371)**
2005	4.002 (0.438)**	3.559 (0.417)**	3.329 (0.363)**	3.467 (0.376)**
2006	4.337 (0.445)**	4.057 (0.424)**	3.106 (0.366)**	3.239 (0.379)**
2007	4.241 (0.454)**	3.832 (0.432)**	3.278 (0.368)**	3.353 (0.382)**
college	0.063 (0.905)	-0.666 (0.856)	0.886 (0.562)	0.876 (0.574)
(1965)*college	2.014 (2.188)		0.070 (1.198)	
(1985)*college	1.849 (1.682)		-0.347 (1.114)	
(1993)*college	1.053 (1.255)		-0.349 (0.927)	
(1995)*college	0.725 (2.167)		1.778 (1.602)	
(1998)*college	3.095 (2.065)		2.039 (1.619)	
(2000)*college	4.850 (1.449)**	4.132 (1.360)**	-0.441 (1.038)	-0.592 (1.054)
(2003)*college	4.964 (1.021)**	3.937 (0.963)**	1.907 (0.669)**	1.115 (0.683)
(2004)*college	6.316 (1.069)**	5.477 (1.008)**	1.371 (0.713)	0.861 (0.726)
(2005)*college	6.026 (1.080)**	5.302 (1.018)**	2.497 (0.726)**	2.029 (0.739)**
(2006)*college	4.065 (1.079)**	2.986 (1.017)**	2.284 (0.721)**	1.677 (0.734)*
(2007)*college	5.266 (1.080)**	4.457 (1.018)**	2.121 (0.735)**	1.466 (0.749)
Constant	11.599 (0.346)**	-3.619 (0.551)**	3.508 (0.296)**	-2.925 (0.508)**
Observations	21,535	18,793	15,791	13,754
R-squared	0.09	0.22	0.06	0.10

(Notes to Table 1 on next page.)

Notes to Table 1:

This table shows the regression of weekly hours spent on total childcare on the variables of interest. Columns (1) and (2) report results for all mothers 18-64 who are not students; columns (3) and (4) report results for fathers 18-64 who are not students. "Mother" and "father" are defined as having a child under the age of 18 in the house.

The omitted year is 1975.

Controls for parents' ages (dummies for 18-24, 25-34, 35-44, 45-54, 55-64) are included in columns (1) and (3). The omitted category is age 25-34. Columns (2) and (4) also include marital status, a quadratic in the number of children, dummies for the youngest child in each of the following age categories: (i) $\text{age} \leq 1$; (ii) $\text{age} = 2$; (iii) $2 < \text{age} < 6$; (iv) $6 \leq \text{age} < 10$; (v) $10 \leq \text{age} < 14$.

Standard errors in parentheses.

* significant at 5%; ** significant at 1%.

Table 2. Trends in Weekly Hours Spent on Childcare by All Adults

	(1)	(2)		(1)	(2)	
Variables	All Women	All Men		Variables (continued)	All Women	All Men
Constant	9.396 (0.243)**	2.205 (0.184)**		college	-1.204 (0.621)	0.398 (0.350)
1965	1.123 (0.424)**	0.223 (0.318)		(1965)*college	0.117 (1.301)	0.009 (0.778)
1985	-0.835 (0.421)*	-0.063 (0.319)		(1985)*college	0.728 (0.984)	-0.645 (0.620)
1993	-1.624 (0.318)**	-0.412 (0.244)		(1993)*college	-0.569 (0.749)	-0.630 (0.464)
1995	0.598 (0.597)	0.223 (0.441)		(1995)*college	0.481 (1.401)	0.560 (0.889)
1998	1.172 (0.630)	1.668 (0.463)**		(1998)*college	1.569 (1.383)	-0.187 (0.885)
2003	2.376 (0.265)**	1.344 (0.198)**		(2003)*college	1.639 (0.683)*	0.585 (0.402)
2004	2.250 (0.287)**	1.436 (0.211)**		(2004)*college	2.183 (0.711)**	0.361 (0.423)
2005	1.991 (0.289)**	1.518 (0.214)**		(2005)*college	2.436 (0.716)**	0.429 (0.426)
2006	2.273 (0.293)**	1.253 (0.213)**		(2006)*college	1.068 (0.715)	0.963 (0.428)*
2007	1.950 (0.296)**	1.318 (0.215)**		(2007)*college	2.510 (0.718)**	0.649 (0.433)
				Observations	38,340	30,938
				R-squared	0.09	0.04

This table reports the results of regressing total childcare on the variables of interest for the sample of all men and women 18-64 who are not students.

The omitted year is 1975.

Controls for individuals' ages (dummies for 18-24, 25-34, 35-44, 45-54, 55-64) are included in all columns.

Standard errors in parentheses.

* significant at 5%; ** significant at 1%.

**Table 3. The Relationship between Childcare and Income
Regressions of Weekly Hours of Childcare on Household Income**

A. Mothers

Row	Income	Income squared	Log income	Income-induced increase in childcare from 1975 to 2007	Sample	Usual hours of work included?
1	0.0088 (0.0057)	-0.000013 (0.000013)		0.14	All	No
2	0.0273 (0.007)**	-0.000057 (0.000016)**		0.39	All	Yes
3	0.0387 (0.012)**	-0.000082 (0.000027)**		0.54	Home-makers	No
4			0.224 (0.156)	0.07	All	No
5			0.881 (0.220)* *	0.26	All	Yes
6			0.820 (0.292)* *	0.25	Home-makers	No

B. Fathers

Row	Income	Income squared	Log income	Income-induced increase in childcare from 1975 to 2007	Sample	Usual hours of work included?
1	0.0019 (0.005)**	-0.000038 (0.000011)**		0.28	All	No
2	0.020 (0.007)**	-0.000039 (0.000015)**		0.30	All	Yes
3			0.482 (0.147)**	0.14	All	No
4			0.763 (0.213)**	0.23	All	Yes

The income variable is in thousands of 2007 dollars. The income-induced increase in childcare is calculated by applying the cross-sectional income coefficients to the actual changes in average family income from 1975 to 2007. Quantities are in hours per week.

The sample consists of BLS surveys from 2003-2007. All regressions include controls for year, age categories of parents, full controls for children's ages and numbers, marital status, and dummy variables for high school dropouts, college-educated and post-college degree.

Table 4. Trends in Weekly Hours Spent on Childcare

	(1)	(2)	(3)	(4)
	Mothers		Fathers	
	Total	Excl. play	Total	Excl. play
1965	1.654 (0.616)**	1.938 (0.540)**	0.291 (0.499)	-0.185 (0.403)
1985	-0.349 (0.690)	-0.424 (0.605)	0.006 (0.569)	-0.146 (0.460)
1993	-1.033 (0.546)	-1.245 (0.479)**	0.117 (0.488)	-0.196 (0.395)
1995	1.760 (0.888)*	0.789 (0.779)	1.231 (0.801)	0.443 (0.648)
1998	1.860 (0.939)*	1.200 (0.823)	3.103 (0.835)**	2.149 (0.676)**
2000	3.943 (0.623)**	3.509 (0.546)**	4.531 (0.547)**	3.450 (0.442)**
2003	4.709 (0.400)**	3.617 (0.351)**	3.191 (0.331)**	2.249 (0.268)**
2004	4.103 (0.437)**	3.044 (0.383)**	3.481 (0.358)**	2.343 (0.289)**
2005	4.002 (0.438)**	3.125 (0.384)**	3.329 (0.363)**	2.475 (0.293)**
2006	4.337 (0.445)**	2.892 (0.390)**	3.106 (0.366)**	1.987 (0.296)**
2007	4.241 (0.454)**	2.987 (0.398)**	3.278 (0.368)**	2.168 (0.298)**
college	0.063 (0.905)	0.220 (0.794)	0.886 (0.562)	0.731 (0.455)
(1965)*college	2.014 (2.188)	1.101 (1.918)	0.070 (1.198)	0.003 (0.969)
(1985)*college	1.849 (1.682)	1.467 (1.474)	-0.347 (1.114)	-0.393 (0.901)
(1993)*college	1.053 (1.255)	0.160 (1.100)	-0.349 (0.927)	-0.379 (0.750)
(1995)*college	0.725 (2.167)	-0.039 (1.900)	1.778 (1.602)	1.384 (1.296)
(1998)*college	3.095 (2.065)	1.688 (1.810)	2.039 (1.619)	1.908 (1.309)
(2000)*college	4.850 (1.449)**	3.824 (1.270)**	-0.441 (1.038)	0.147 (0.839)
(2003)*college	4.964 (1.021)**	3.758 (0.895)**	1.907 (0.669)**	1.341 (0.541)*
(2004)*college	6.316 (1.069)**	4.087 (0.937)**	1.371 (0.713)	0.780 (0.577)
(2005)*college	6.026 (1.080)**	4.177 (0.947)**	2.497 (0.726)**	1.062 (0.587)
(2006)*college	4.065 (1.079)**	2.929 (0.946)**	2.284 (0.721)**	1.634 (0.583)**
(2007)*college	5.266 (1.080)**	3.175 (0.947)**	2.121 (0.735)**	1.040 (0.595)
Constant	11.599 (0.346)**	9.760 (0.303)**	3.508 (0.296)**	2.245 (0.239)**
Observations	21,535	21,535	15,791	15,791
R-squared	0.09	0.07	0.06	0.05

Notes to Table 4:

Columns (1) and (2) report results mothers, (3) and (4) for fathers. Columns (1) and (3) reproduce results for all childcare from Tables 1 and 2, column(3). Columns (2) and (4) show the results when playing with children is excluded from the childcare measure.

The omitted year is 1975.

Dummy variables for parents' age are also included (dummies for 18-24, 25-34, 35-44, 45-54, 55-64). The omitted category is age 25-34.

Standard errors in parentheses.

* significant at 5%; ** significant at 1%.

**Table 5. Trends in Weekly Hours Spent in Family Care
by English-Speaking Parents in Canada**

	(1)	(2)	(3)	(4)
	Mothers	Mothers	Fathers	Fathers
1992	2.235 (0.606)**	1.967 (0.561)**	1.258 (0.509)*	1.020 (0.491)*
1998	3.652 (0.5491)**	3.404 (0.547)**	3.183 (0.508)**	3.134 (0.491)**
2005	5.050 (0.533)**	4.894 (0.501)**	2.453 (0.442)**	2.476 (0.435)**
college	7.307 (1.151)**	3.037 (1.068)**	2.736 (0.841)**	1.758 (0.807)*
(1992)*college	-3.669 (1.585)**	-1.346 (1.463)	-0.712 (1.180)	-0.397 (1.130)
(1998)*college	-3.141 (1.536)*	-2.099 (1.417)	-0.784 (1.117)	-0.993 (1.070)
(2005)*college	-4.229 (1.307)**	-2.091 (1.206)	-0.553 (0.974)	-0.278 (0.933)
Constant	14.209 (0.464)**	-2.836 (1.110)**	6.508 (0.407)**	-4.215 (1.155)**
Controls for marital status and age of youngest child?	No	Yes	No	Yes
Observations	6548	6548	4671	4671
R-squared	0.12	0.25	0.06	0.14

This table shows the regression of weekly hours spent on family care on the variables of interest. Columns (1) and (2) report results for all mothers ages 20-64; columns (3) and (4) report results for fathers ages 20-64. "Mother" and "father" are defined as having one's own child under the age of 19 in the house.

The omitted year is 1986.

Controls for parents' ages (dummies for 20-24, 25-34, 35-44, 45-54, 55-64) are included in all columns. The omitted category is age 25-34. Columns (2) and (4) also include marital status and a dummy for (i) the youngest child under the age of 5; (ii) the youngest child between the ages of 5 and 9; and (iii) the youngest child between the ages 10 and 14 .

Standard errors in parentheses.

* significant at 5%; ** significant at 1%.

**Table 6. Weekly Hours Spent in Childcare, 2003-2007
Differentials across Race/Ethnic Group and Type of State**

A. Mothers

	Less than college	College Degree	Educational Differential
Black or Hispanic State allows affirmative action	0	1.84 (0.79) **	1.84 †
Black or Hispanic State bans affirmative action	0.91 (0.43) *	3.77 (0.97) **	2.86 †
Nonhispanic white State allows affirmative action	2.26 (0.35) **	6.98 (0.44) **	4.72 †
Nonhispanic white State bans affirmative action	3.02 (0.51)**	7.74 (0.65) **	4.72 †

B. Fathers

	Less than college	College Degree	Educational Differential
Black or Hispanic State allows affirmative action	0	3.23 (0.72) **	3.23 †
Black or Hispanic State bans affirmative action	0.73 (0.46) *	1.27 (0.84)	0.54
Nonhispanic white State allows affirmative action	2.03 (0.30) **	4.22 (0.47) **	2.19 †
Nonhispanic white State bans affirmative action	1.91 (0.44)**	3.91 (0.51) **	2.00 †

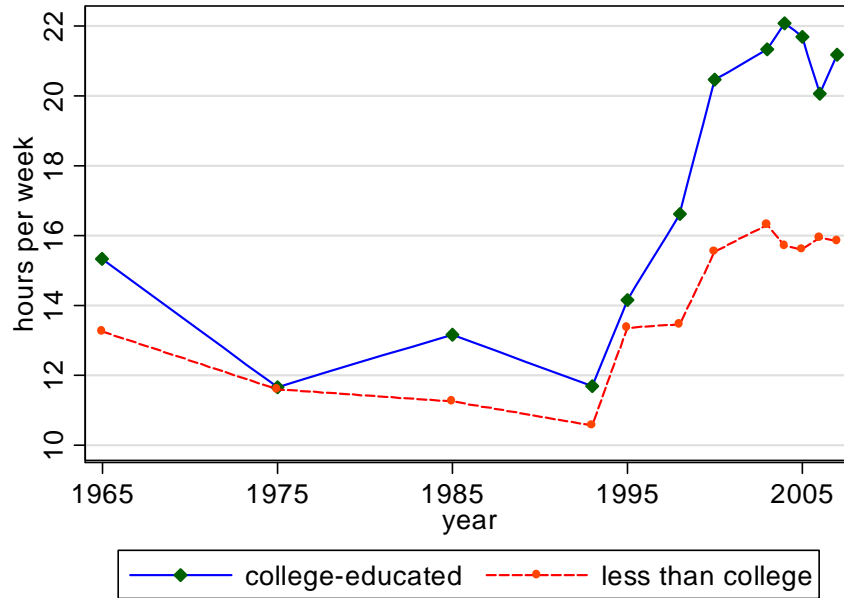
This table shows the difference in weekly hours spent in childcare relative to black or hispanic parents in states that allow affirmative action. The sample is the pooled BLS surveys from 2003-2007. Controls for parents' ages (dummies for 18-24, 25-34, 35-44, 45-54, 55-64) are included. The states that banned affirmative action in university admissions before 2003 were California, Florida, Texas, and Washington.

Standard errors in parentheses. * indicates that the differential is significant at 5%; ** significant at 1%.

† indicates that the within-race, within-state educational differential is significant at 5%;

Figure 1. Weekly Hours Spent in Childcare
 (Based on estimates from Table 1, columns (1) and (3))

A. Mothers, Ages 25-34



B. Fathers, Ages 25-34

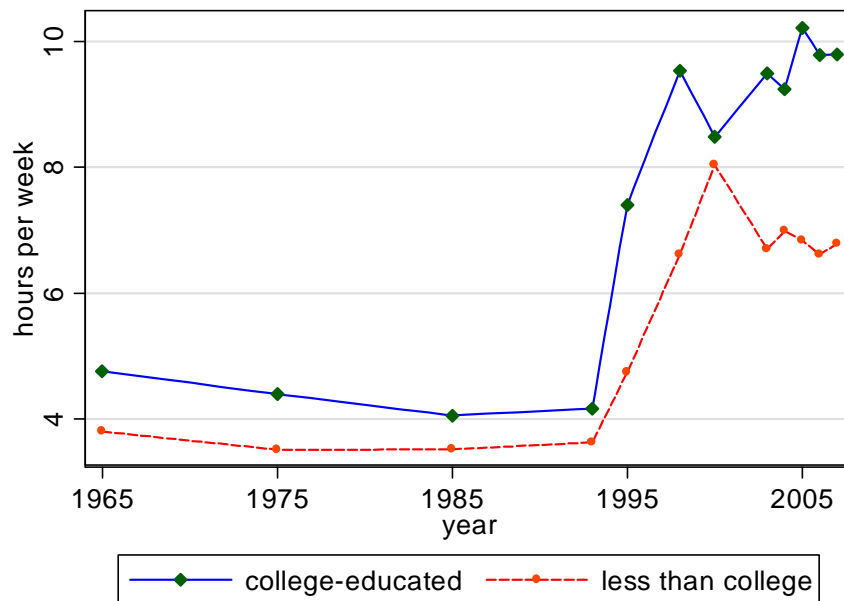
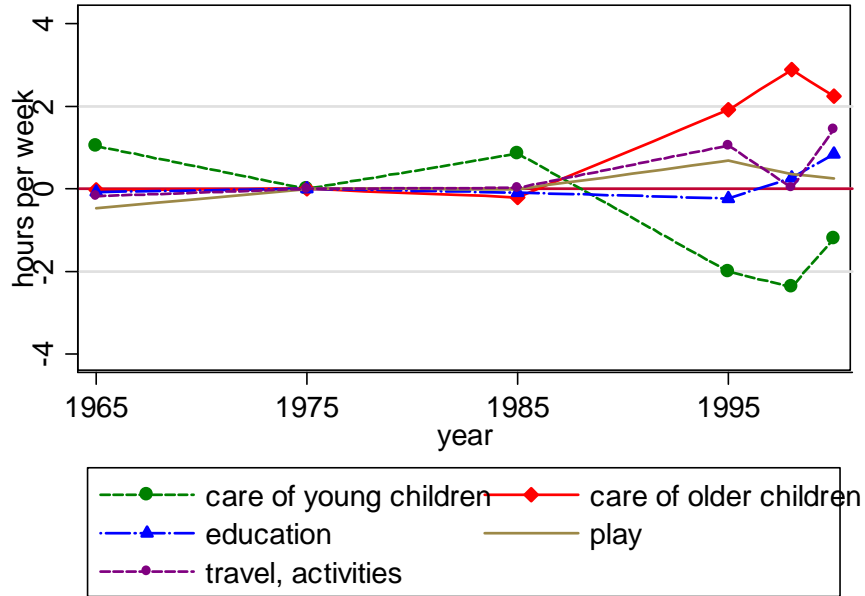


Figure 2. Trends in Time Spent by Mothers: Categories of Childcare, 1965-2000
 (Each category normalized to 0 in 1975)

A. Less than College



B. College-Educated

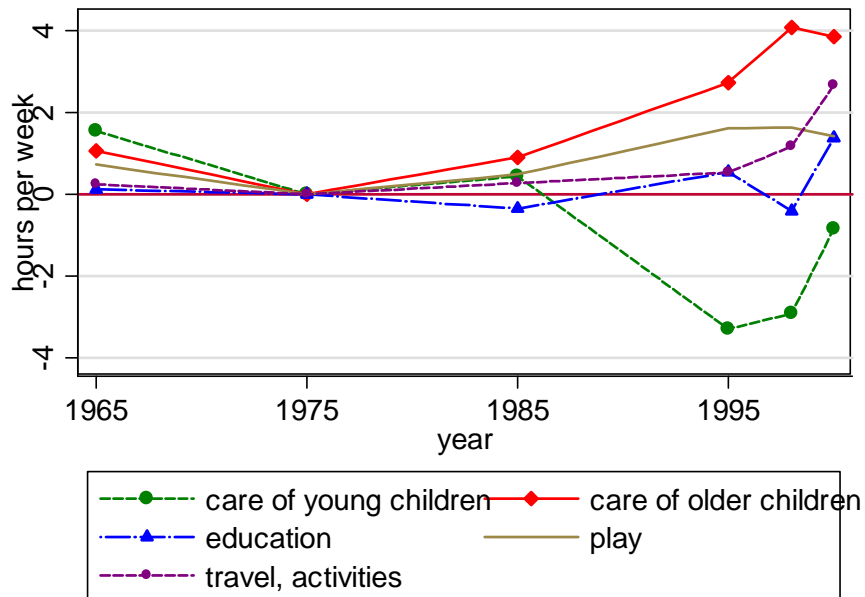
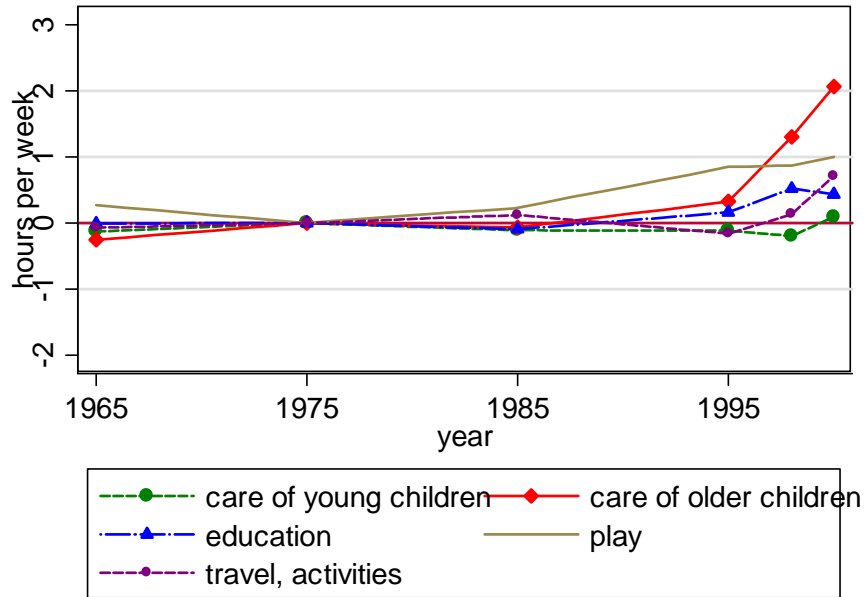


Figure 3. Trends in Time Spent by Fathers: Categories of Childcare, 1965-2000
 (Each category normalized to 0 in 1975)

A. Less than College



B. College-Educated

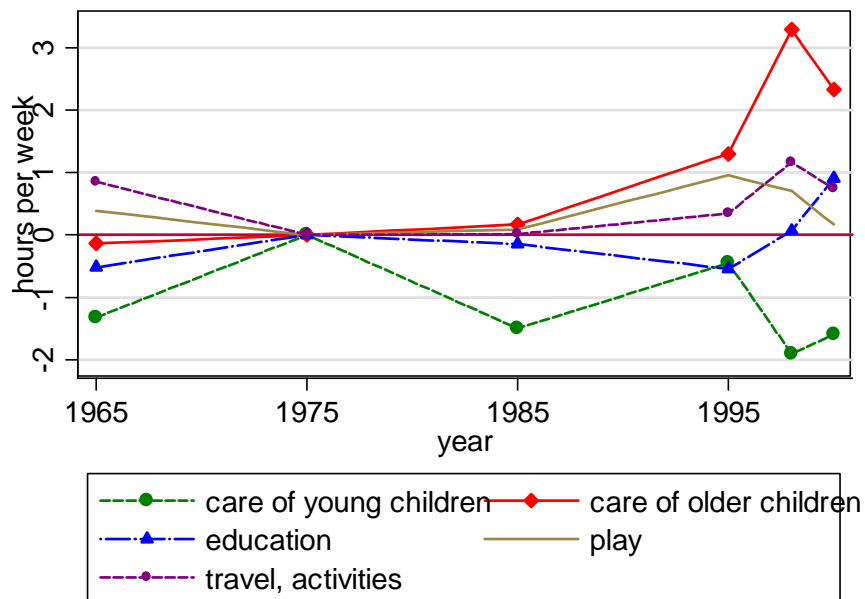
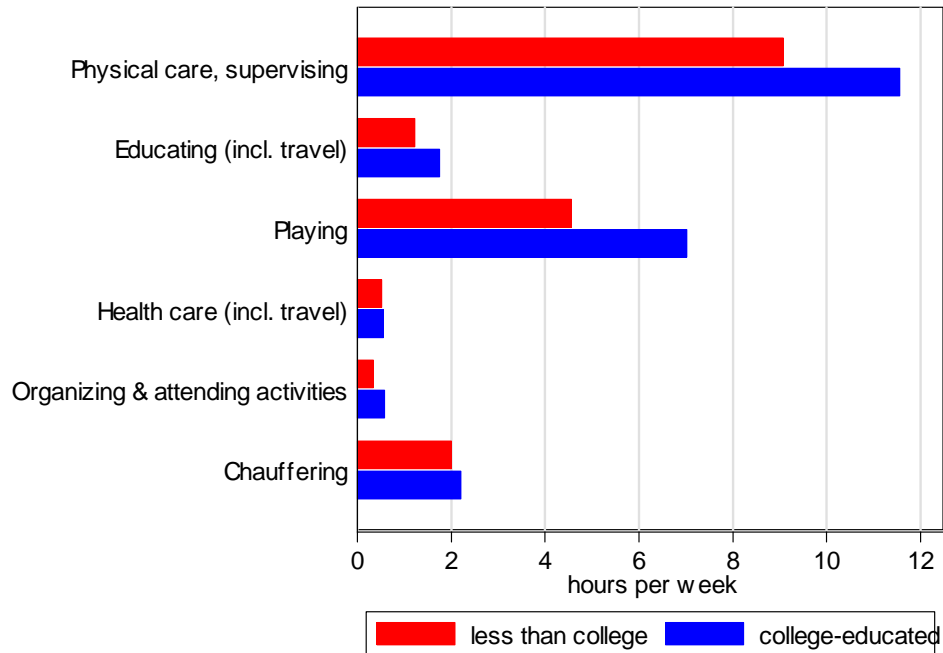


Figure 4. Time Spent Types of Childcare in 2007
(Parents with youngest child less than 5 years of age)

A. Mothers with children under 5 years of age



B. Fathers with children under 5 years of age

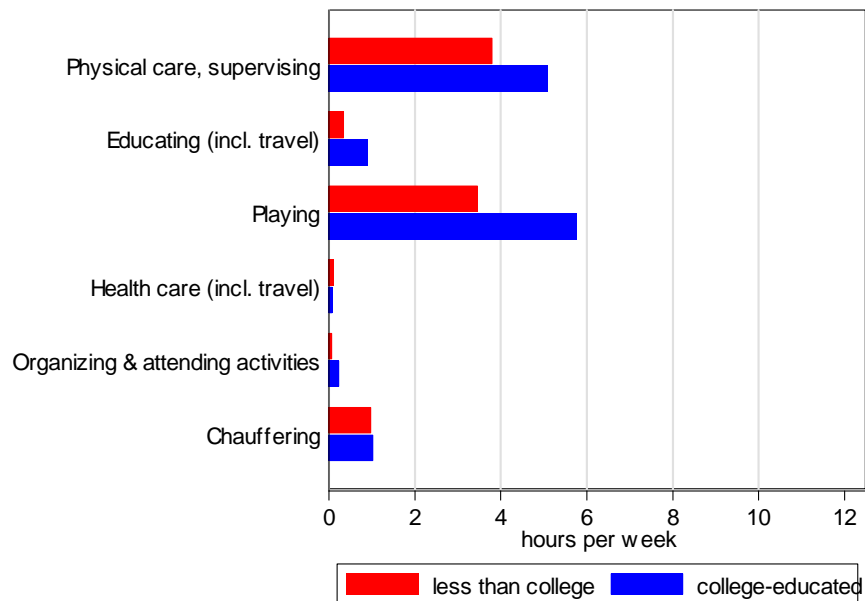
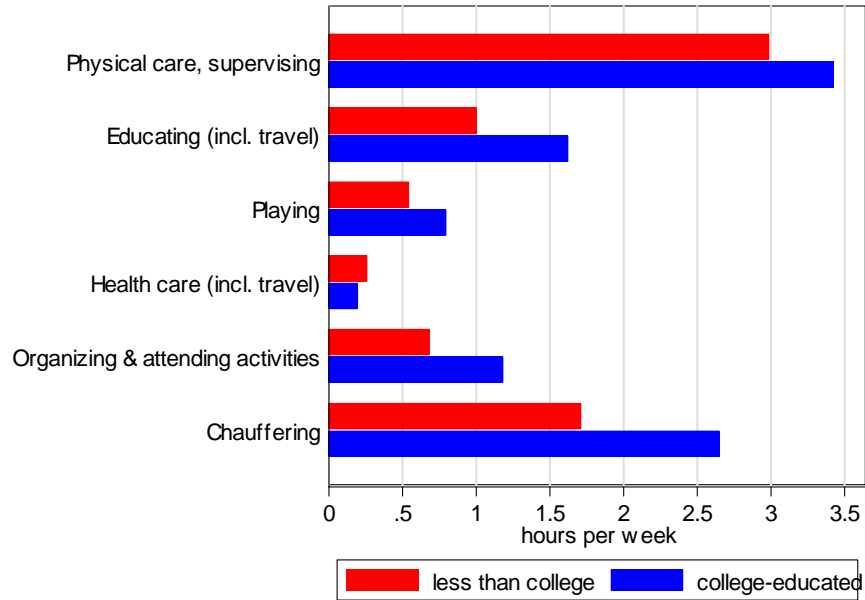


Figure 5. Time Spent Types of Childcare in 2007
(Parents with youngest child 5 years of age or older)

A. Mothers with children 5 years or older



B. Fathers with children 5 years or older

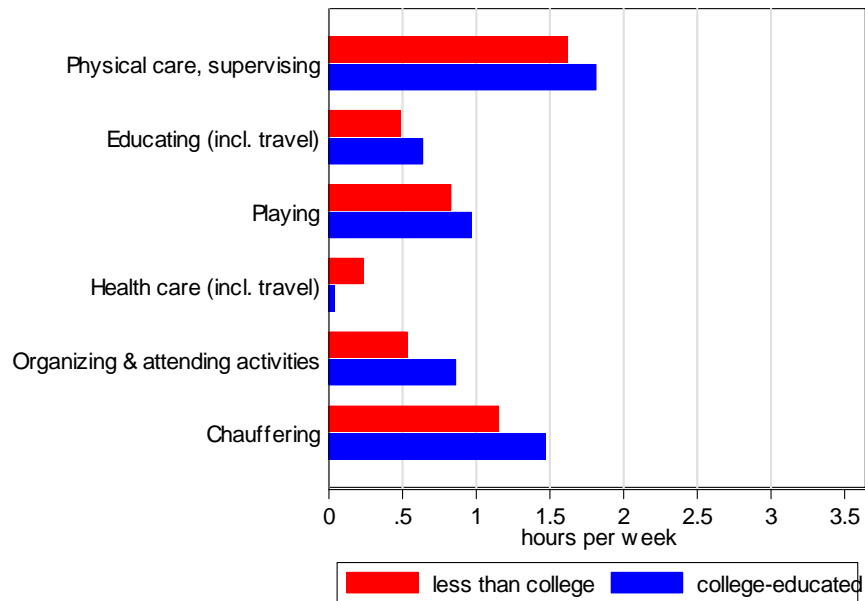
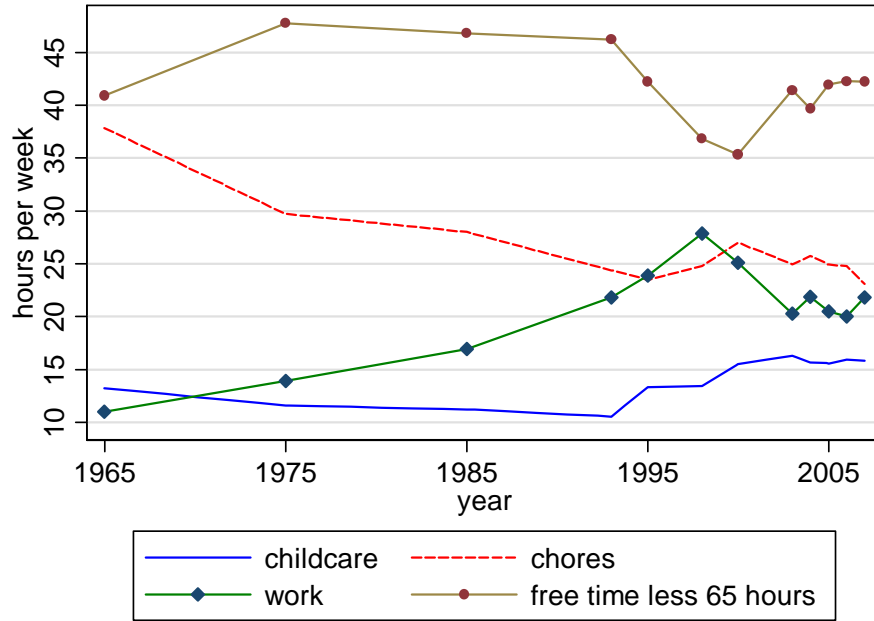


Figure 6. Time Use of Mothers, ages 25-34

A. Less than College



B. College-Educated

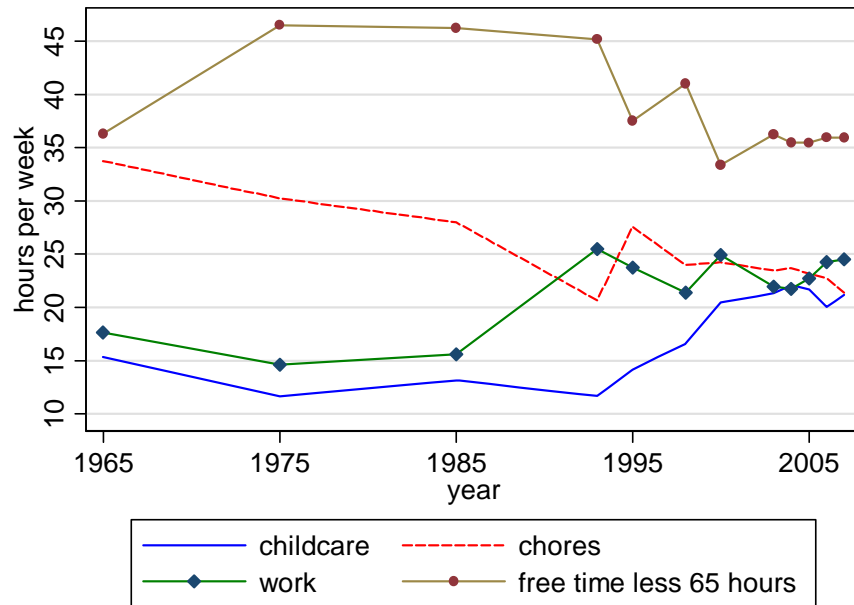
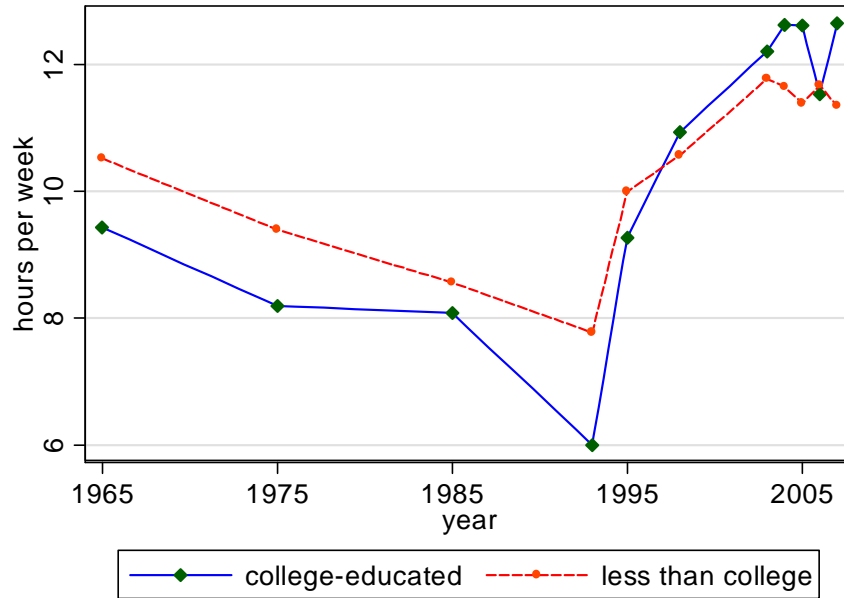


Figure 7. Weekly Hours Spent in Childcare
 (Based on estimates from Table 2, columns (1) and (3))

A. All Women, Ages 25-34



B. All Men, Ages 25-34

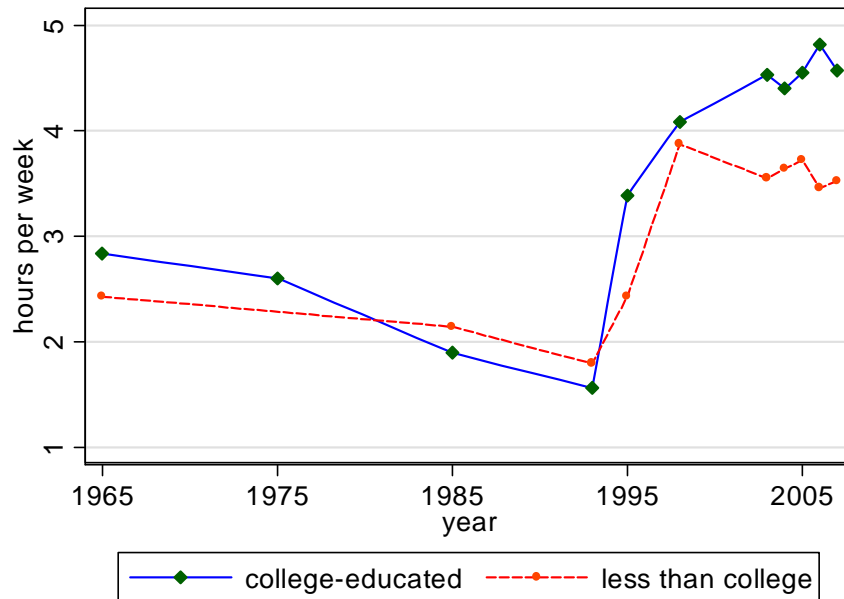
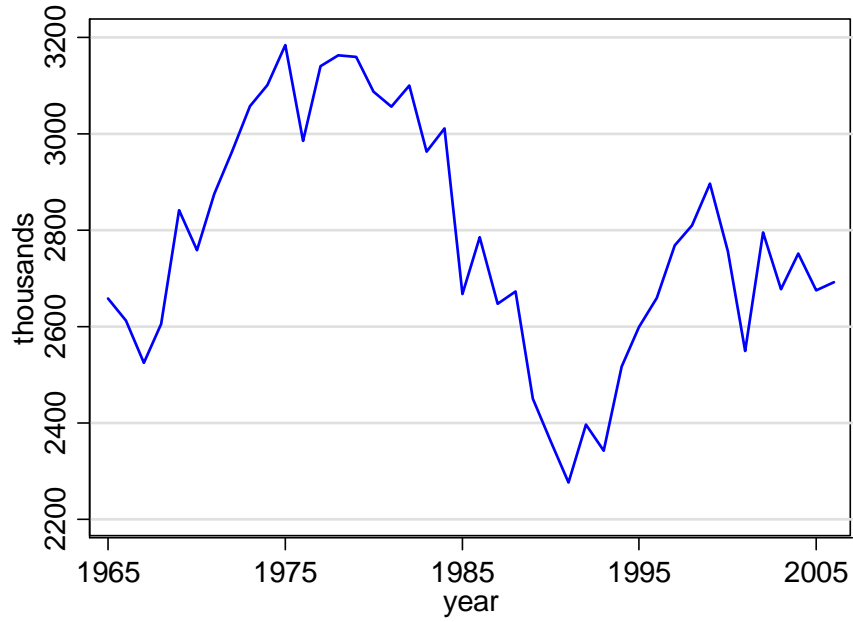


Figure 8. High School Graduates and College Enrollment

A. High School Graduates



B. Recent High School Graduates Enrolled in College

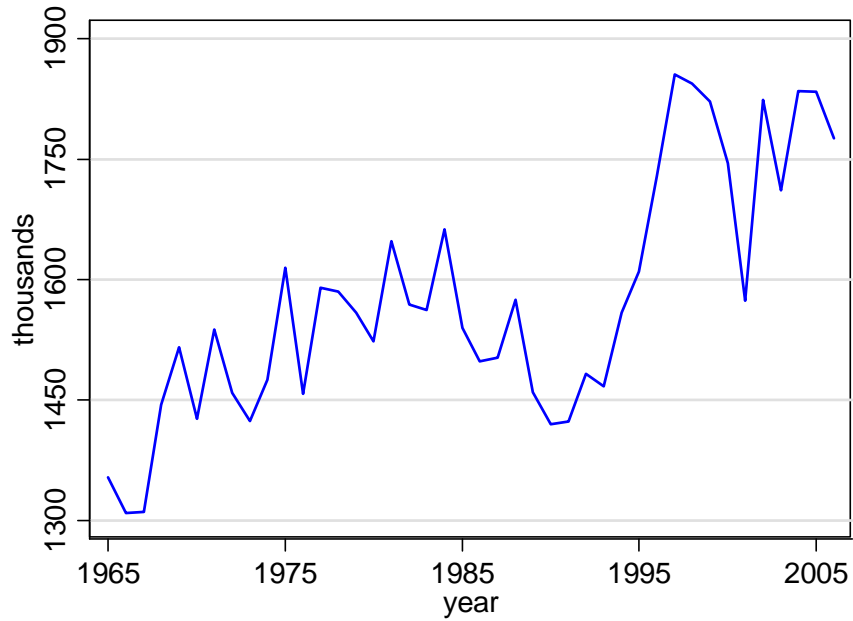


Figure 9: Choice of College Preparation

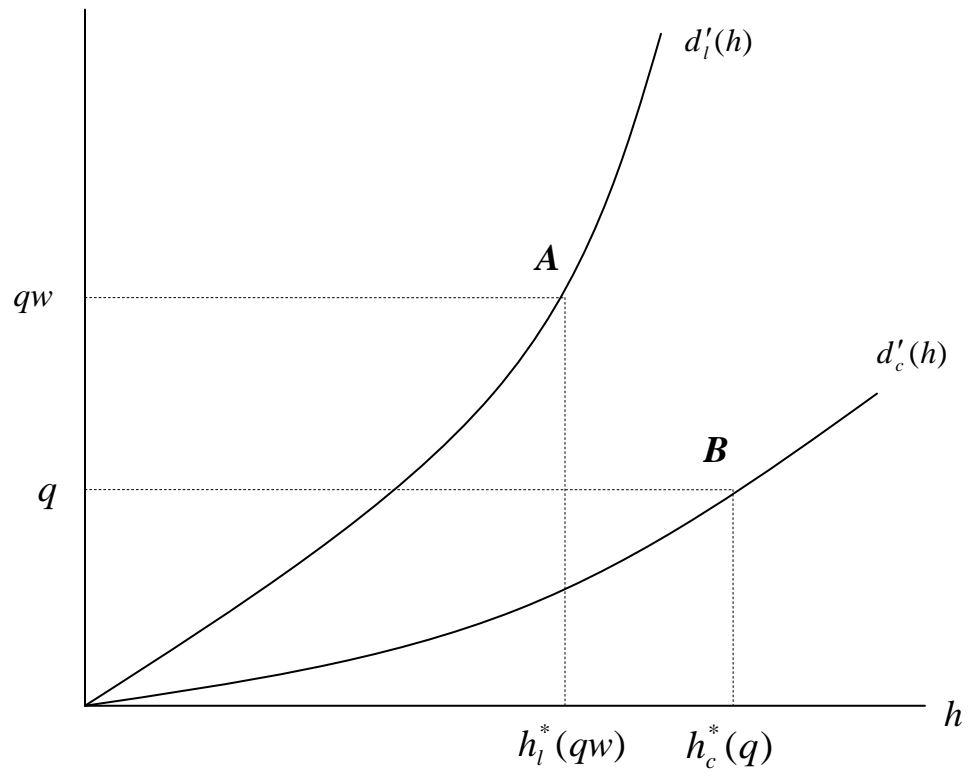


Figure 10: Time Paths of College Preparation

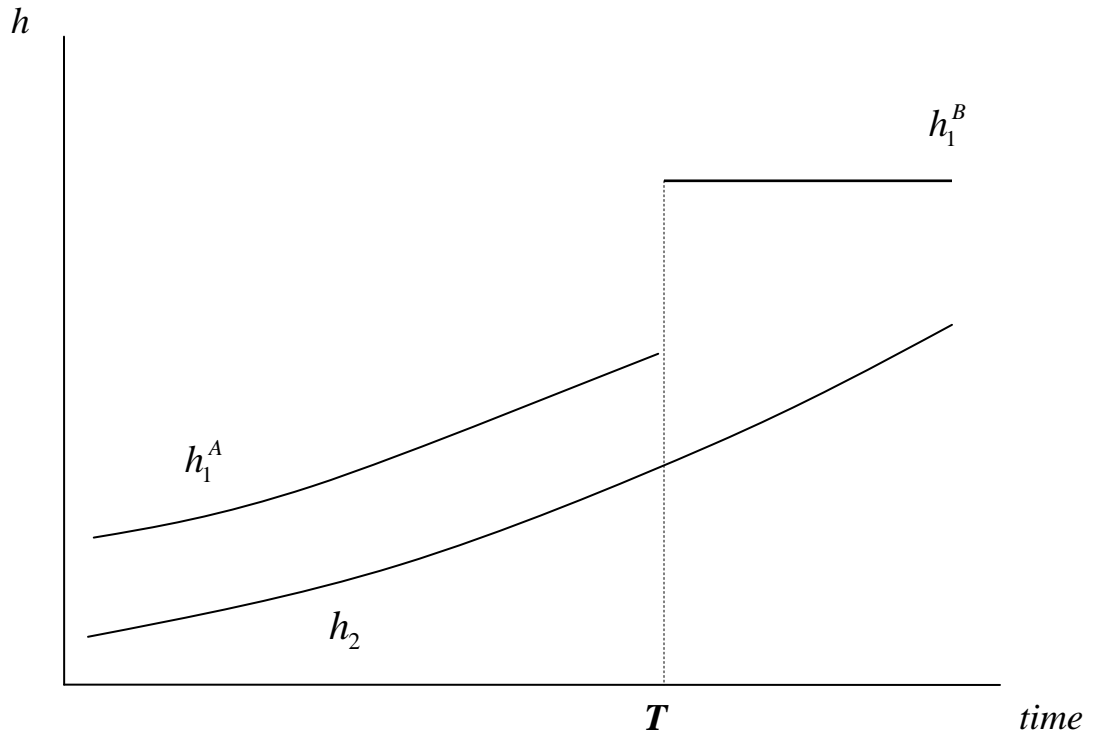


Figure 11. Change in Weekly Hours Spent in Childcare: Canada vs. US
 (Based on estimates from Table 1 and Table 5, columns (1) and (3))
 (Hours are normalized to 0 for each group in the initial year.)

