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Fathers' Time Investments in Children: Do Sons Get More?

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Abstract: Evidence suggests that, from birth, fathers treat sons differently than daughters in the U.S., as well as in developing countries. Fathers' time investments in children are one channel through which differential treatment by gender may affect children's outcomes. This paper uses data from the 2003 American Time Use Survey to explore three questions about paternal time in married two-parent families: Does the gender composition of his children affect the amount of time a father spends with them? If so, does the gender of the individual child have an additional effect? And is a girl advantaged or disadvantaged by the presence of brothers in spending time with her father? Father-level and child-level regressions examine the effects of gender composition and gender. Father fixed effects specifications show that gender is important within families as well as across families. The results show that fathers of boys invest more of their time in children than those with only daughters, and reduce their leisure time without children to do so. Boys get more of this time than girls in all-girl families and compared to their own sisters. To the extent that fathers' time affects children's outcomes, girls are at a disadvantage, especially girls in all-girl families. Girls with brothers do receive more of fathers' time than girls with only sisters, but this is primarily in television watching, so whether this advantages them is open to question.

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Introduction

Sibling gender composition in the U.S. - specifically the presence of boys relative to girls - has been found to reduce the likelihood of divorce and to increase men's labor supply and wages, challenging the conventional wisdom that son preference is a more important phenomenon in developing countries than in the U.S.¹ Much of the work on the influence of child gender composition has focused on the behavior of fathers and their presumed preference for boys. This study uses the American Time Use Survey (ATUS) to examine whether the gender composition of the children in married-parent families influences fathers' allocation of time to those children.

The determinants of parental investment in children are an important area of study because childhood circumstances influence both children's current well-being and their economic outcomes in adult life.² Economists have traditionally viewed parental time as one of the most important investments in children (Becker 1960), implying that differences by child gender may have important implications for the relative well-being of girls and boys. This study examines three questions about paternal time: 1) does the gender composition of his children affect the total amount of time a father spends with them? 2) If so, does the gender of the individual child have an additional effect? and 3) is a girl advantaged or disadvantaged by the presence of brothers in spending time with her father? The first two questions build on the two strands of research which examine whether fathers have a preference for boys, and whether child gender or sibling gender composition affects their involvement with their children (*e.g.*, Harris and Morgan 1991, Yeung *et al.* 2001). The third question explores the resulting implications for girls, and ties in with previous work that has found that girls with relatively more brothers are advantaged in terms of increased involvement from fathers as well as in educational outcomes (*e.g.*, Harris and Morgan 1991; Butcher and Case 1994). Unlike some other parental investments, fathers' time is potentially

¹ *e.g.*, Dahl and Moretti 2008, Morgan, Lye and Condran 1988; Lundberg and Rose 2002.

² *e.g.*, Case, Fertig, and Paxson 2005, Garces, Thomas and Currie 2002.

nonrival, so girls may benefit if boys are getting more time.

This paper makes a number of contributions to the literature. The large, nationally representative sample in ATUS provides more generalizable estimates for the United States than earlier studies of gender effects on fathers' involvement, many of which have used small, nonrepresentative samples and sometimes found inconsistent results (described below). ATUS also provides time diary data, considered more accurate than other methods used in many previous studies of father involvement (Robinson 1985). In addition, a unique strength of ATUS among time diary data sets world wide is that it records the individual time a father spends with every resident child regardless of age, as well the sum of time with all of his children (Bureau of Labor Statistics (BLS) and U.S. Census Bureau (Census) 2004a).³ The large datasets in the Harmonized European Time Use Surveys (HETUS), for example, collect information about the presence of children by age group but not individually (Eurostat 2009 p. 109). Other surveys limit information to the amount of time the father spent with one or two target children; with any or all children, not individual children; or with individual children above a particular age cut-off (*e.g.*, Marsiglio 1991, Yeung *et al.* 2001). With the complete information on children's characteristics and time with fathers, this study can address not just the effect of an individual child's gender, but also the effect of the gender composition of the sibling set, and the effect of having brothers for girls. Knowledge of time with all children allows the estimation of family fixed effects, which shows whether gender effects occur within families as well as across families. The observability of fathers' individual time with younger children is also important because parents spend more time with younger children (Yeung *et al.* 2001), and investments in children at younger ages are thought to be particularly important to children's development (Shonkoff and Phillips 2000).

This study builds on two recent papers which utilized time diary data. Yeung *et al.* (2001)

³ Fisher *et al.* (2006) provide a valuable compendium of information on existing time use data sets.

find that being a boy increased a child's time in play and companionship activities with fathers by 18 minutes on weekdays, with a near-significant effect on weekends. However, their data, the 1997 Child Development Supplement to the Panel Study of Income Dynamics (PSID-CDS), collects information from only one or two target children in the household, so they are unable to look at gender composition effects or estimate family fixed effects. Another study complementary to this one is Lundberg, Pabilonia and Ward-Batts (2008), which uses both the PSID-CDS and ATUS data to examine how fathers' and mothers' time use and time inputs to children differ, within single mother families as well as mother-father families. They find a same-sex gendered pattern of activities where fathers and mothers do stereotypically "boy" and "girl" things with their children. The current investigation builds more directly on the literature on fathers' involvement with children. It provides a detailed analysis of fathers' time with children with a stronger focus on the types of time considered to be important in the developmental literature. It also directly addresses the brother-advantage question.

The results in this paper show that gender composition does matter to fathers' time investments in children: they allocate more of their time to children if they have at least one boy, and they reduce their leisure time without children present to do so. The gender of the individual child matters: boys get more of fathers' time. Girls are somewhat advantaged by having brothers: they get more television watching time with dad than girls in all-girl families. A brief comparison to mothers shows that children's gender has a weaker effect on mothers' time use: girls get more time alone with mother than boys, but in contrast to fathers, mothers' total time investment in children and leisure time without children are the same regardless of the gender composition of their children. Researchers have argued that fathers' time is important to children's development, and that their play with children can be more stimulating and unpredictable than mothers' (Lamb and Lewis 2004). To the extent that fathers' time improves children's outcomes, girls are at a

disadvantage, especially girls in all-girl families.

In the next section I discuss the relevant previous research. I then describe the data, the sample and the categorizations of fathers' time with children used in the analysis. Following are the primary results, robustness checks, discussion, and the conclusion.

Previous Research

Research on "boy preference"

How gender correlates with measures of well-being is an important area of study for economists, with much research having focused on the developing world (King and Mason 2001). But in the United States as well, a person's gender has affected the level of education she is likely to receive, the occupation she will take up, and the wages she will be paid (*e.g.*, Blau 1998). Women are much more likely than men to be poor (Proctor and Dalaker 2003), so that gender continues to be an important marker of well-being. Evidence suggests that children's gender affects parental behavior from birth (see Raley and Bianchi 2006 for a useful review), raising the question as to whether this a channel to differential adult outcomes. Lundberg and Rose (2002, 2003) find that men's labor supply and wage rates increase more in response to the births of sons than to the births of daughters, and that a woman is more likely to marry the child's father after a nonmarital birth if the child is a son. The gender of children and their siblings can affect the likelihood of growing up with two married parents, another important correlate of well-being (McLanahan and Sandefur 1994). Morgan, Lye, and Condran (1988) find that sons reduce the risk of marital disruption relative to daughters, while the results in Dahl and Moretti (2008) show that having a girl significantly affects marriage, shotgun marriage, divorce, and child custody, resulting in a first-born daughter being 3.4% less likely to be living with her father compared to a first-born son. Morgan *et al.* present evidence that boys elicit greater involvement from fathers, contributing to marital stability; Dahl and Moretti present survey evidence that fathers report preferring boys. This

evidence suggests that the preference for boys is harmful to girls, since a greater proportion of them will grow up in single-parent homes.

Research on the effect of gender on father involvement

Research into the effects of gender on paternal involvement with children is part of a broader inquiry into both the determinants and consequences of fathers' time with children. Fathers spend less time in childcare than mothers do (*e.g.* Sayer, Bianchi, and Robinson 2004), but there is a strong consensus among developmental psychologists and sociologists that greater father involvement is beneficial for children (*e.g.*, Carlson and McLanahan 2004, Palkovitz 2002). Studies in these fields often seek to measure qualitative aspects of the father-child relationship such as warmth and closeness; the quality of time spent together is thought to be important for children's outcomes, and there is some evidence that amount and quality are correlated (Cabrera *et al.* 2000, Pleck and Masciadrelli 2004).

Previous studies have measured involvement with frequency of activities, retrospective time estimates, and time diaries, which are thought to be the most precise in quantifying time use (Robinson 1985).⁴ Psychology studies have found that fathers interact more with infant sons and are more engaged with adolescent sons than daughters (Lamb and Lewis 2004). Studies using the 1987-88 National Survey of Families and Households find that gender composition, such as all boys or fraction boys, positively affects frequency of fathers' activities with their children.⁵ Harris and Morgan (1991) use the 1981 National Survey of Children to examine paternal involvement with adolescent children, measured by two indices of closeness and frequency of activities with fathers. They find positive and significant results of gender (being a boy) and of gender composition (number of boys).

Time diary data from two child families show that fathers contribute more primary care time

⁴ See Mammen (2007) for further discussion of these studies.

⁵ Cooksey and Fondell 1996, Marsiglio 1991, Wilcox 2002, Zick, Bryant, and Osterbacka 2001.

when the children are boys; they also share more household maintenance time with older sons and more shopping time with younger sons (Bryant and Zick 1996, Zick and Bryant 1996). As noted above, Yeung *et al.* (2001) found boys spent more time with fathers; however, Hofferth (2003) and Sandberg and Hofferth (2001) also using the PSID-CDS, found that child gender had no effect on fathers' total engagement time with children. Other studies with smaller samples have also found no effect of gender.⁶

Research on "brother-advantage"

Harris and Morgan (1991) find suggestive evidence in the National Survey of Children that girls are advantaged by having brothers in terms of father involvement, and that being the only boy is an advantage for boys. Butcher and Case (1994) find that women raised only with brothers achieved higher levels of education on average, although other studies have found no advantage or a disadvantage in educational outcomes for girls from having brothers relative to sisters (*e.g.*, Kaestner 1997). In addition, a number of studies in developing countries have found that having brothers advantages girls (*e.g.*, Garg and Morduch 1998).

ATUS Data

The American Time Use Survey, sponsored by the BLS and conducted by the Census, records all activities in a 24-hour period for each respondent and lists who else was present for each activity. The ATUS time diary is a recall diary, constructed for each respondent by a computer-assisted telephone interviewer who asks what the respondent was doing yesterday at 4:00 am, how long the activity lasted, who was there, and where the activity took place, continuing through the day for 24 hours (BLS and Census 2004b). Juster (1985) concludes that with high quality interviewing, the recall diaries may even be more accurate than leave-behind diaries, where the respondent writes in activities as the day progresses. The survey also carefully measures secondary

⁶ Hossain and Roopnarine 1993, Sanderson and Sanders-Thompson 2002, Snarey 1993.

child care, collected after the main diary is completed with the question "At which times or during which activities during that time period was/were [child name(s)] in your care?" (BLS and Census 2004a). Secondary care is an important component of child care time that is not always captured in time diaries (Folbre *et al.* 2005, Zick and Bryant 1996).

Households which have completed their eighth and final month interviews for the Current Population Survey (CPS), approximately 7,500 per month, become eligible two months later for the ATUS. One household member aged 15 or over is randomly selected to complete the survey. In 2003, 3,375 of the households leaving the CPS sample each month were selected for the ATUS sample, with a response rate of 57% or an average of 1726 respondents per month. The main reason given for nonresponse is that the selected respondents are tired from participating in the CPS (BLS and Census 2004b). The limitations of the data include the usual possibility of nonsampling error and the response rate; however Abraham, Maitland, and Bianchi (2006) analyze nonresponse and conclude it is not likely to significantly bias most time use estimates. Another limitation, inherited from the CPS, is that a respondent's children ("own children") may be biological, adopted, or stepchildren. It would be useful to distinguish among these, because resident fathers are more engaged with their biological children than with stepchildren (Pleck and Masciadrelli 2004 and cites therein). Since these finer relationships are not observable I will simply refer to "fathers" and to the own household children under age 18 of the fathers as "children."

The father samples

The universe for the ATUS is that of the CPS: the civilian, non-institutionalized population of the U.S., aged 15 or over (BLS and Census 2004b). The focus of this paper is married fathers and their resident children. Note that the ATUS documentation considers children to be people aged under 18 (BLS and Census 2004b) but that the relationship code value for own household child (*terrp* = 22) is also applied to older children. I do not include resident children 18 and over in my

counts of children in the household. The estimation sample of fathers is comprised of 2,693 men aged 25 to 60, married to women, who report the presence of own household children under the age of 18.⁷ The children-of-fathers sample is comprised of the 5,236 own household children under age 18 of the father sample. Means for the demographic characteristics of these two samples are presented in Appendix Table 1.

Time use variables

Defining parental care time is no easy task. Time with children can include direct interaction but also less intense care, such as when a child is doing homework on her own. The parent may be not be involved, but she may be “on call” and certainly constrained from leaving the house if the child is young (Budig and Folbre 2004). Another complication is that time with children appears to have a consumption component for the parent as well as an investment component in the child’s well-being. Depending on the activity, parents can rate time with children from extremely enjoyable to below average (Krueger *et. al* 2008 Table 6.1, Robinson and Godbey 1997 p. 245). These nuances have not been sorted out in a clear theoretical framework. In this paper I take a pragmatic approach to the categorization of time with children. I draw on the previous parental time literature to see which activities with children researchers have considered most important, and I divide fathers’ time with children into categories which correspond to these notions. A useful overarching rubric is the conceptualization of Lamb *et al.* (1985), categorizing paternal involvement into three components: 1) interaction: fathers' direct contact with the child; 2) availability: time when the father is accessible to the child but may not be directly interacting with

⁷ Of the 20,720 respondents in the 2003 ATUS sample, 9,052 are men, with 8,573 of these being aged 18 or over. Of these 8,573, 2,902 report having no partner, married or unmarried. Of the 5,671 partnered men, we exclude 5 men who report a male as spouse, 27 who report a male as an unmarried partner, and 310 who report an unmarried female partner, leaving 5,329 men married to women. (Of these 310 men with an unmarried female partner, only 68 report having own household children, so only $68/(2782+68) = 0.024$, or 2.4% of the children of opposite sex couples are excluded because their parents are unmarried.) Of the 5,329 men married to women, 2,782 report own household children. Restricting the age to 25 - 60 excludes 79 men. Two observations with metropolitan status not defined and 8 observations where the respondent's spouse has a missing value for education are dropped, leaving 2,693 in the father sample.

her; and 3) responsibility: activities which do not necessarily involve the child, but which promote their well-being, such as "arranging for babysitters [and] making appointments with pediatricians." This concept includes sole responsibility, when the father takes care of the child in the absence of the mother. Budig and Folbre (2004), among others, have argued that childcare without another adult present can be more stressful and requires a greater degree of responsibility than does joint childcare.

Means and standard deviations for time use measures are reported in Table 1A for the father sample and their children, along with proportions of the two samples reporting positive minutes in each time use. These means are weighted with the ATUS respondent sample weights; see Appendix Table 2 for details on the time use codings. The first measure is *total time* with any or all children, defined by ATUS as the total of all periods for which the respondent named any of his children when asked "Who was with you? / Who accompanied you?" (BLS 2005) Note that the who question is not asked during sleeping, working, and personal care/grooming activities (BLS and Census 2004a). The fathers in the sample averaged a total 4.2 hours per day with their children, or 4.76 hours for the 88% of the sample who reported any time at all.

Turning to the "interaction" category of Lamb *et al.* (1985), the second row shows figures for *primary care time*. Included are all activities coded by ATUS as "caring for and helping household children," such as physical care, talking to, playing with and "looking after" children, plus travel related to caring for and helping household children; also time helping with homework and home schooling. Primary childcare is widely studied in the time use literature because of the importance of this interaction to child development (*e.g.*, Bianchi *et. al* 2004, Bianchi and Robinson 1997, Hofferth *et. al* 2002); it is likely that this time increases children's human capital and can be regarded as a measure of investment. Fathers averaged almost one hour in primary care, or 1.75 hours for the 54% of fathers who reported any primary care time.

Researchers have also focused on *achievement time*, the subset of interactions most likely to develop children's human capital: reading, talking, teaching/helping, and playing (e.g., Bianchi *et al.* 2004, Bittman, Craig and Folbre 2004, Folbre and Yoon 2007, Zick, Bryant, and Osterbacka 2001). For example, the education literature consistently finds high correlations between parent-child reading and children's literacy skills (e.g., Mikulecky 1996). Talking - about the day's activities or listening to a parent explain something complicated - is also a predictor of children's literacy (e.g., Beals, De Temple, and Dickinson 1994). Play may be a particularly important component of fathers' time with children. Researchers have argued that fathers' playful and stimulating interchanges with children are important for their social development, and therefore may influence children's development disproportionately to the amount of time spent (Parke *et al.* 2002; Lamb and Tamis-Lemonda 2004). In addition, research indicates that a greater proportion of fathers' time relative to mothers' is spent in play, as opposed to "custodial" care such as bathing and feeding (Lamb and Lewis 2004, Robinson 1989, Yeung *et al.* 2001). Robinson notes, "To the extent that this is the most enjoyable and influential time parents spend with children (*i.e.*, "quality" time) fathers get proportionately more of it." Row 3 shows that about 30% of fathers reported achievement time on their interview day.

Leisure time with children seeks to capture interaction time which is not included in the ATUS coding for childcare. Some activities that parents might regard as actively engaged time are not coded that way in ATUS, because "A child's presence during the respondent's activity is not enough in itself to classify the activity as childcare." (BLS and Census 2004b). ATUS defines primary childcare as only those activities that have no purpose outside the child; for instance, playing games or doing arts and crafts with a child *and* with another adult, or seeing "The Lion King" with a child, are classified as leisure, not childcare (BLS 2004). The fourth row records means for leisure activities where children are present, including socializing, relaxing, leisure,

sports, exercise, recreation, and travel to and from these activities.⁸ The next row breaks out *television-watching time*, the predominant component of free time (Robinson and Godbey 1997 p. 21).⁹ Sixty percent of fathers report leisure time with children, and 38% report watching television with their children.

The closest ATUS measure to the "availability" concept of Lamb *et al.* is *secondary care time*, care of children by an adult who is performing some other primary activity (BLS and Census 2004b). Secondary care was only recorded for respondents with at least one child less than 13 years old (BLS 2005), or 2,261 of the fathers in the sample. Fifty-two percent of these fathers reported some secondary care time (row 6). There is no corresponding measure for the children because the question did not ask which children were being cared for (BLS and Census 2004a). *Time with father, without mother* is used to measure the "sole responsibility" concept of Lamb *et al.* (1985); fifty-eight percent of fathers report time in this category in row 7.

Leisure time without children is used to measure how much free time parents are willing to give up for their children. Adult only leisure time is arguably purer and freer leisure than leisure with children, since even "leisure" time with children involves the responsibility of child-care, and is often constrained to child-appropriate activities (Bittman and Wajcman 2004, Mattingly and Bianchi 2003). A reduction in childless leisure time may be a signal of a father's motivation to invest in his children. Seventy-nine percent of fathers report some childless leisure time.

The final variable is a child-level variable - *time with father, without siblings*. It is possible

⁸ A standard definition of leisure or free time was suggested by Robinson and Godbey (1997, p. 13): the more discretionary time remaining after people have done required tasks: paid work ("contracted time"); unpaid work ("committed time" - housework, childcare and shopping); and personal care time such as sleeping and grooming. This categorization includes free time activities such as using the media, socializing, culture, hobbies, and recreation, along with "semi-leisure" activities such as religion and other organizational activities. The focus here on leisure activities is to capture activities beyond primary child care time where it is likeliest that fathers are interacting directly with children. Therefore I have restricted the definition to only socializing, relaxing, leisure, sports, exercise, and recreation along with travel to and from these activities (Bittman and Wajcman 2004), excluding adult education, religious and spiritual activities, and volunteer activities. In practice the results in this paper are robust to using definitions of leisure which include the semi-leisure activities.

⁹ Nock and Kingston (1988) find evidence that if a mother works in the evening it increases the time a father spends watching television with his children.

that this "alone time" with father is especially important for children's development, because psychologists have theorized that a higher parent-to-child ratio raises the intellectual level in a household (e.g., Zajonc and Markus 1975). These means are only for families with more than one child, since in one-child families this time measure is equivalent to total time. One-quarter of children are recorded as spending time alone with fathers.

Results

Father-level results

Table 2 presents results from ordinary least squares regressions where the unit of observation is the father, and the dependent variables are measures of time summed over any and all children. The father-level regressions address whether the gender composition of children influences a father's time use. Each cell presents the coefficient from a separate regression of the time-use dependent variable listed at the top of the column on the gender composition variable, an indicator for the father having at least one boy, and other independent variables. Coefficients are not reported for these variables: number of children, age gap from oldest to youngest child, age, household size, indicators for the age of the oldest child (0 to 3, 4 to 8, and 9 to 12); indicators for race, education (high school, some college, college or more), metropolitan area status, region, wife's education status, month of the year, and weekday. The omitted category for gender composition is families with all girls. Fathers' time allocation potentially differs by family size; therefore results are presented for all families, then stratified by whether the family has one or more than one child.

The first column shows that the presence of at least one boy among the children significantly increases the father's total time with any or all of the children by 26 minutes per day, relative to fathers of all-girl families. This is an increase of about 10% from the average of 4.2 hours (Table 1). These results are consistent with previous findings that the gender composition of families is a determinant of fathers' behavior (e.g., Harris and Morgan 1991, Marsiglio 1991,

Wilcox 2002). The coefficients for one child families and for larger families in rows 2 and 3 are of similar sign and magnitude, although not as statistically significant ($p = 0.055$ and $p = 0.117$ respectively), perhaps because of the reduced sample sizes.

The next four columns present results for time measures representing aspects of fathers' "interaction time" as described by Lamb *et al.* (1985). Having at least one boy significantly increases primary care time by fathers, although rows 2 and 3 suggest that this is driven by more time for singleton boys (those in one-child families). Unreported results indicate that the significant difference in primary care time is driven by more interactive physical care and reading, playing and teaching activities, rather than the organization, looking after, waiting and traveling activities. In column 3, having at least one boy has no significant effect on achievement time over all families; however, a singleton boy receives significantly more achievement time than a singleton girl, 9.6 minutes. The effect of at least one boy in larger families is near zero and insignificant. The major contributor to the significant difference in achievement time is play (unreported results); reading, talking and listening, and helping with homework have little effect.

Leisure time with children (column 4) is increased significantly, by 15 minutes per day or 15% of the average from Table 1, by the presence of at least one boy. When stratified by family size, the coefficients are of similar magnitude (rows 2 and 3) but lose significance. Column 5 shows that a large portion of this extra shared leisure time for fathers with at least one boy is spent watching television – 11 minutes more than the omitted category of fathers in all-girl families. Interestingly, this is driven by the families with more than one child. The extra time associated with having a son increases achievement time for singleton boys but in larger families increases television watching time. In results not shown, I calculate leisure time with children present excluding television watching time with children. In a regression of this time use variable on at least one boy and the other independent variables, no significant difference is found between fathers

with at least one boy and fathers with all girls, suggesting that the increase in leisure time in column 4 is driven by television watching time.

Columns 6 and 7 address measures of "availability" and "responsibility." Having at least one boy has no significant effect on secondary care time, a measure of availability, for the fathers who have at least one child under age 13. Note that measurement of secondary child care differs between the ATUS and earlier time use surveys; Allard *et. al* (2007) provides a useful discussion. The ATUS "in your care" question captures more passive childcare and parents accordingly report much more time in secondary childcare in the ATUS than in earlier surveys. There is a lower level of interaction between parent and child on average in the ATUS measure, which may explain the finding of no effect of child gender on this time measure. The more activity-based measures of secondary childcare in earlier surveys might show more impact of child gender. Column 7 shows that having at least one boy increases the responsibility that fathers take for their children. Fathers' time with children without his wife present increases by 22 minutes per day (about 25% of the average) over all families, while rows 2 and 3 show the effect is strong for both one-child and higher parity families.¹⁰ Unreported results show that this time without mothers includes some primary care time, but is predominantly television watching time.

Finally, in column 8 we see that fathers give up leisure time without children when they have at least one boy, almost 19 minutes per day, or about 14% of the average (Table 1). The coefficient loses significance in the regressions stratified by family size ($p = 0.145$ and $p = 0.070$), but has a similar magnitude.

The father-level regressions indicate that fathers invest more time in families where there is a son, but do not tell us whether this attention is confined to sons or benefits all of the children. The

¹⁰ Other time uses that might represent responsibility time were examined alone and in combination including organization and planning for children, picking up and taking children places, child related meetings, and obtaining medical care for children, with no significant differences found.

next results examine how time is allocated to individual children.

Child level results

Table 3 examines the effect of gender and gender composition on the experiences of individual children, presenting results of OLS regressions where the unit of observation is the child, and measures of time are summed over all periods where the particular child is present. Each panel presents the coefficient(s) from a separate regression of the time-use dependent variable listed at the top of the column on the gender or gender composition variable(s) and additional independent variables. A child's age and birth order have been shown to be important determinants of investments in children (*e.g.*, Black, Devereux, and Salvanes 2005, Yeung *et al.* 2001). True birth order cannot be assigned with the ATUS data, both because nonresident children aged 18 and over are not observed, and because data do not distinguish whether the father's relationship with the children is biological. Instead I assign "age rank" (following Edmonds 2006), where the age rank of the oldest child less than 18 in the household is one, the second oldest is two, etc. For most children this will be the same as their birth order. I also control for multiple birth status (being a twin or triplet, etc.) Consistent with previous research (*e.g.*, Zick and Bryant 1996), the unreported coefficients show that increasing child age or age rank significantly reduces fathers' time. Multiple birth status has small and insignificant effects. Other unreported controls are number of siblings, father's age, age gap oldest to youngest sibling; indicators for age of oldest child in family (0 to 3, 4 to 8, and 9 to 12), race of father, education of father (high school, some college, college or more), metropolitan area status, region, mother's education status, month of the year, and weekday. The children are weighted with the respondent's weight and the standard errors are corrected for heteroskedasticity and correlation between observations (children with the same father).

The first column in Table 3 investigates fathers' total time with children. The coefficient in Panel A shows that the extra time invested by the father in households with at least one boy makes a

significant difference to the time that each of the children in the household spends with his or her father, adding an average of 23 minutes (about 10% over the average of 3.76 hours) relative to girls in all-girl families, the omitted category. Panel B shows whether this average increase is spread across all children or is concentrated on the boys, following the strand of research that has found the gender of a child to be a determinant of father behavior.¹¹ The coefficient on the indicator for being a son is positive and significant (at $p = 0.052$), indicating that being male gains a child 12 minutes of father's time per day, relative to being a girl. Panel C shows that this is driven by one-child families with a coefficient for "I am a boy" of 26 minutes (significant at $p = 0.053$); the sample of larger families in Panel D has an insignificant coefficient one third this size.

Panel E explores in greater detail the interaction of gender and birth order in families with more than one child.¹² Panel C suggested that first-born boys receive more time than first-born girls. Does the first son get more time even if he is not the first child? The specification here categorizes boys into indicators for the highest age rank boy - the oldest boy less than 18 in the household, whether or not he is the oldest child - and lower age rank boys, with the omitted category girls.¹³ The highest age rank boys get 12 more minutes of fathers' time ($p = 0.051$). Although this coefficient is statistically indistinguishable from that on lower age rank boys it does suggest that earlier born boys are advantaged in terms of father's total time.¹⁴

Panel F addresses the question of whether having brothers is advantageous, categorizing children into indicators for being a boy with no brothers, being a boy with at least one brother, and being a girl with at least one brother. The sample is families with more than one child and the

¹¹ *e.g.*, Barnett and Baruch 1987, Crouter and Crowley 1990, Harris and Morgan 1991, Harris *et al.* 1998, Ishii-Kuntz 1994, Yeung *et al.* 2001.

¹² Results for one-child families are already shown in Panel C – "I am a boy" is the same as "I am the highest age rank boy" for one-child families.

¹³ In an unreported specification I include an indicator for highest age rank girl, which was insignificant and did not change the significance or relative magnitudes of the coefficient on the boy indicators. I omit it here for parsimony.

¹⁴ The F-test of the null hypothesis that the coefficient for higher age rank boys is equal to the coefficient for lower age rank boys shows they are not significantly different with a p-value of 0.25.

omitted category is girls with no brothers. Boys without brothers gain significantly compared to the girls in all-girl families. Although the coefficients for both girls and boys with brothers are not precisely estimated, their magnitudes suggest that these children also gain compared to girls with only sisters.

Column 2 results show that singleton boys benefit from extra primary care time with fathers. The significant coefficient on being a boy for all families (row 2) appears to be driven by the singleton-boy families (*cf.* Panels C and D). Highest age rank boys and boys with no brothers also get extra primary care time, although these coefficients are marginally significant. For achievement time, Column 3 of Table 3 confirms the results from Table 2 that fathers invest more of this time only in singleton-boy families. Unreported results show the extra achievement time is primarily play time. The highest age rank boy receives no extra achievement time in families with more than one child and having brothers does not offer an advantage to either boys or girls.

Columns 4 and 5 consider children's time with fathers in leisure and television watching. Individual children in households with at least one son get significantly more of these kinds of time compared to all-girl families (leisure at the 10% level). Having at least one boy in the family, being the highest age rank boy, and being a boy with no brothers is associated with marginally significant increases in leisure time. Gender has stronger effects on television time: having at least one boy in the family significantly increase this time, as does being a boy, driven by families with more than one child. The highest age rank boy receives significantly more television watching time compared to girls, and interestingly, all children gain television time compared to girls with no brothers (panel F). These child-level results tie in with those in Table 2 - the additional fathers' time associated with having a son(s) increases achievement time for a singleton boy, but the increase is in television watching time in larger families.

Table 2 showed that fathers with at least one boy spend more time with their children

without their wife being present in all family sizes. Here column 6 shows how that time is distributed among the children in the families. On average, children in the families with at least one son get significantly more time (18 minutes) compared to children in all girl families, although boys get significantly more than girls (panels B, C, and D). The highest age rank boy gets significantly more of this time than both all girls (the omitted category) and lower age rank boys (panel E).¹⁵ Panel F indicates that having brothers increases both girls' and boys' time with fathers in the absence of mothers, relative to families with all girls (the coefficient for girls with any brothers is significant at $p = 0.057$). This suggests that although the highest age rank boys get more of this time, girls (and boys) are advantaged by having brothers.

The last column examines "alone time" with fathers, without the presence of siblings. The regressions here are only for families with more than one child, since for one-child families, any time with dad is time without the presence of siblings. Panel D indicates that for individual children, this time with fathers is not significantly influenced by being a boy. However, panels E and F show that the highest age rank boys and boys with no brothers receive significantly more alone time with fathers than do the other categories of children.¹⁶ Having brothers does not increase this time for either boys or girls.

Table 4 investigates whether the effects of child gender change with a child's age, reporting child-level regressions equivalent to Panels C and D of Table 3, here with the children stratified into age groups 0-3, 4-8, 9-12 and 13-17. The gender coefficient is "I am a boy" and results are displayed separately for one-child families and larger families. Taken together the results show that gender effects on fathers' time are stronger for older children. For 0-3 year olds, being a singleton

¹⁵ The F-test of the null hypothesis that the coefficient for lower age rank boys is equal to the coefficient for the highest age rank boys shows they are significantly different at $p=0.06$.

¹⁶ The F-test of the null hypothesis that the coefficient for lower age rank boys is equal to the coefficient for the highest age rank boys shows they are significantly different at $p = 0.00$. The boy with no brothers coefficient is significantly different from both the boy with at least one brother coefficient and the girl with at least one brother coefficient, also at $p = 0.00$.

boy does not affect total time with dad, but increases the amount of that time that is achievement oriented. The extra achievement time is mostly play (unreported results); teaching, talking, reading and of course helping with homework do not play a large role, which is perhaps consistent with how young this group is. In larger families, the youngest boys get more time with dad without siblings. Singleton boys aged 4 -8 appear to get more total time and time with fathers without mothers, although the coefficients are marginally significant. Gender makes a difference most consistently for the 9 -12 year olds, where boys get more total time, primary childcare, and time with dad without mom regardless of family size. Singleton boys get more achievement time (with play, talking and helping with homework all contributing (unreported)), while in larger families leisure and television watching with dad increase. For the teenagers, boys get more time with father without mother and singleton boys get more television watching time.

Father fixed effects results

The child-level OLS results indicate that boys do better than girls in terms of fathers' time, especially if they are a singleton boy or the highest age rank boy in a family. However, these comparisons are across families, and could be driven by differences between all-girl families and families with boys. When the omitted category is "I am a girl", for instance, it includes girls in all-girl families and girls in families with sons. If boys get more time, it could be because they get more time than both of these types of girls; or it could be that they get more time than the girls in all-girl families and the same average time as girls in families with sons, with the former driving the significant differences for boys. One source of these across-family differences could be unobserved heterogeneity across fathers, such as an unobservable preference for sons that might contribute both to the gender composition of the children and to a father's propensity to spend more time with children. A father fixed effects specification will control for these characteristics to the extent that they do not vary across children.

The ATUS data is the first to collect information on time respondents spend with each and every child on the survey day, allowing for fixed effects to examine differences in time allocated to all boys and girls within the same family. Table 5 presents these results, where the coefficient on "I am a boy" is interpreted as the extra time a father spends with a son relative to a daughter, after controlling for differences in age, age rank, and multiple birth status (coefficients unreported). The results show that the gender effects seen in the OLS specifications also hold true within families: boys do better than their own sisters in terms of fathers' time, in every measure except for primary care time and achievement time, especially highest age rank boys.¹⁷

What about mothers?

Although the focus of the current study is fathers, it is intuitive to ask whether gender of children also affects mothers' time. Perhaps fathers spend less time with girls because mothers spend more (Bryant and Zick 1996, Lundberg, Pabilonia and Ward-Batts 2008, Zick and Bryant 1996). I investigate this question using a sample of 2,987 married mothers from the ATUS and their 5,820 children. Means for the demographic characteristics of these two samples are presented in Appendix Table 1, and for time use measures in Table 1B.¹⁸ Note that the mother sample is not the wives of the father sample, since time use is recorded for only one respondent in each household. Friedberg and Webb (2006) show that on observable characteristics the wives of male

¹⁷ For total time, the "I am a boy" coefficient is significant at $p = 0.071$ and the "highest age rank boy" coefficient is significant at $p = 0.074$. The lower age rank boy coefficient is not statistically significantly different than the higher age rank boy coefficient for any of the regressions.

¹⁸ The mother sample is comprised of 2,987 women aged 25 to 60, married to men, who report the presence of own household children under the age of 18. The children of mothers sample is comprised of the 5,820 own household children under age 18 of the mother sample. Of the 20,720 respondents in the 2003 ATUS sample, 11,668 are women, with 11,186 of these being aged 18 or over. Of these 11,186 women, 942 report having no partner, married or unmarried. Of the 6,226 partnered women, I exclude 8 women who report a female as spouse, 38 women who report a female as an unmarried partner, and 374 women who report an unmarried male partner, leaving 5,827 women married to men. (Of these 374 women with an unmarried male partner, 137 women report having own household children, so $137/(3146+137)=137/3283$ or 4% of the children of opposite sex couples are excluded because their parents are unmarried in the mother sample.) Of the 5,827 women married to men, 3,146 report own household children. Restricting the age to 25 - 60 excludes 136 women. Seven observations with metropolitan status not defined and 16 observations where the respondent's spouse has a missing value for education are dropped, leaving 2,987 in the mother sample.

respondents resemble female respondents, and the husbands of female respondents resemble male respondents. Compared to the averages for fathers, the fraction of mothers reporting positive minutes and the average durations are greater for most of the time measures. The exceptions are in leisure time with children and its subset television watching time with children. The mothers' averages are similar to the fathers', indicating that a smaller proportion of their time with children is spent in these activities.

To investigate whether the gender composition of the children affects how much time mothers spend with them, the top panel of Table 6 shows the results of ordinary least squares regressions where the unit of observation is the mother, and the dependent variables are measures of time summed over any and all children. The gender variable of interest is the presence of at least one girl.¹⁹ For completeness the results for the same time uses as for fathers in Table 2 are presented, but the overall message is that the gender composition of her family has little effect on the time that a mother spends in these activities. Column 1 in Panel A shows that having at least one girl does not cause mothers to increase the total time they allocate to children. Column 7 in Panel B shows that mothers in one child families spend 28 more minutes per day with their child with husbands absent if they have a daughter rather than a son, a statistically significant difference of about 12% compared to the average of 3.91 hours per day (Table 1). However, since mothers are not significantly increasing total time with their child based on gender, this suggests the change in one-child families is in the father's behavior; he is more likely to leave a daughter alone with the mother than a son.

The lower panel of Table 6 presents mother fixed effects results for the children-of-the-mothers sample, addressing whether the gender of individual children affects their time allocation

¹⁹ These regressions were replicated looking at the effect of having at least one girl on fathers' time use, and at least one boy on mothers' time use; the results are not reported because they provide no additional information. All gender variable coefficients in these regressions were insignificant, except for the one-child family regressions, where, as would be expected, the effect of at least one girl (at least one boy) on fathers (mothers) was the negative of the effect of at least one boy (at least one girl).

from mother. The variable of interest is an indicator for being a girl and the measures of time are summed over all periods where the mother reports the particular child being present. Girls get significantly more total time with mothers than do boys, and it is in the form of time with mothers without fathers being present. Disaggregated results (unreported) show that this time is not made up of the most child-focused activities, primary care and leisure with children; rather girls spend most of this time shopping, traveling and doing chores with their mothers. Unreported OLS regressions give qualitatively similar results.

To investigate the influence of child's age on mothers, I ran regressions equivalent to those in Table 4: OLS regressions on the children of the mothers sample, with the gender variable "I am a girl" (results unreported). The stratification by age groups show that the additional total time for girls is driven by teen girls spending more time with mothers than do teen boys; at younger ages, both boys and girls get the same total time from mothers.

Overall, the results for fathers and mothers support the argument that child gender has a weaker influence on mothers' time than on fathers'. Mothers spend the same total time with their children and take the same amount of leisure without children regardless of gender composition, whereas fathers invest more total time and reduce childless leisure if there is at least one boy. The fixed effects show that girls get more of mothers' time within families than boys do, but this arguably results from changes in fathers' behavior when they have sons, rather than mothers' behavior. Mothers spend a certain amount of time with children regardless of their gender, but fathers will increase their childcare time for sons and take sons - but not daughters - off of mom's hands.

Robustness Checks

As can be seen in Table 1, varying proportions of fathers report zero time in the different time use categories. For all the results in the paper, Tobit regressions produced results that were

qualitatively similar to OLS. The OLS results are presented for ease in interpreting the coefficients. Concerns also arise because aspects of the current household structure which are included as right-hand side variables, such as the number and age profile of the children, may be endogenous. In most of my results I find that the inclusion or exclusion of the other demographic controls has little effect on the gender and gender composition coefficients. Similarly, although fathers' work time is excluded from the regressions because of its potential endogeneity with respect to child gender, results are similar when it is included. I have tried different specifications for gender composition of the sibling set which have been used in previous research, *e.g.*, entering number of boys and number of girls linearly or as indicators. The "at least one boy" specification captured the effects best.

The results here are robust to using slightly different definitions seen in the literature for the various time categories. For example, results for primary care time are robust to using the definition of "primary activity time in childcare" in Bianchi *et. al* (2004), which excludes organization and planning for children and waiting with/for children but adds obtaining medical care for children. Leisure time results are also robust to different definitions (see footnote 8).

Finally, I explore whether the differences in fathers' time in one-child families and higher-parity families may be driven by the heterogeneity of these families. Fathers of singletons are a mix of those who have completed their fertility and those who will have more children. It is useful to know whether the results for singletons are driven by the transitional families or the completed families. For instance, is it the case that fathers who spend more time with their first child are more likely to go on to have more children? There is no direct measure of which families are complete, so I look at fathers whose singleton is old enough to suggest that they will have no more children. The average age difference between the oldest and next-oldest children for the 1,751 fathers with

multiple children is 3.2 years, and for 2/3 of these fathers the age gap between their first and second child is 3 years or less. This suggests that the 651 fathers with a singleton aged 4 or more have largely completed their fertility. For this "older-singleton sample," I replicated the father-level regressions in Table 2 and the child-level regressions in Table 3 panel C and found the results are almost identical qualitatively to the results for the full one-child-family sample presented in the tables. For instance, boys in the older-singleton sample get more achievement time with dad, but there is no significant difference in television watching time. Therefore it appears that the results for singletons are not driven by the families who will go on to have more children.

Discussion and Conclusion

The results in this study show that the gender of children, the gender composition of their siblings, and specifically having brothers for girls do affect how fathers allocate their time to their children. Fathers of boys reduce childless leisure, increase time with children, and take on more childcare without the mother being present, relative to fathers of all girls. The fathers' increased child time goes to sons, not to all children - especially to singleton boys and the highest age rank boys. The fixed effects specifications show that these differences hold within families as well as across families. Girls with brothers do receive more of fathers' time than girls with only sisters, primarily in television watching time.

The ATUS data give us a comprehensive picture of how fathers' time is distributed to his children, but cannot directly address how beneficial this time is. For mental health outcomes, Pleck and Masciadrelli (2004) conclude that in the psychology literature "positive paternal engagement is associated with desirable outcomes for children, adolescents, and young adults."²⁰ However, the link between fathers' time investments and the human capital outcomes for their children typically

²⁰ Typical outcomes studied include behavior problems for children, positive school attitudes for adolescents, and self-esteem and life satisfaction in adults. Although on balance there seems to be a consensus in this literature that father involvement is important for children, Amato and Rivera (1999) point out that the more methodologically rigorous studies yield weaker evidence, and that more research is needed.

studied by economists has not been well documented due to data limitations. The limited evidence available is for children's human capital rather than adult outcomes: Zick, Bryant, and Osterbacka (2001) studied the effect of the frequency of reading and playing with young children and found positive effects on grades in school and negative effects on behavioral problems; Cooksey and Fondell (1996) find a similar result on grades.²¹

Although more research on how fathers' time affects children's long term outcomes is needed, we can speculate on the implications for children of the time uses described in this paper. Examining the types of time which are affected by the gender of children, we see that in one-child families, the increase in father's time associated with a son contributes to increased achievement time; for the youngest boys this is driven by play time, and for 9-12 year olds, play, talking and helping with homework all play a role. However, in larger families, more time from fathers is associated with more television watching time with all children. For time with father without mothers present, boys and girls with brothers both appear advantaged compared to girls with only sisters, although a large proportion of this time is television watching. For the measure of time with father without siblings, the highest age rank boys and those who are the only sons in a family get more.

These results are consistent with a scenario where a father spends more time with a firstborn son in achievement time; with additional children, he devotes more time than a father with only girls, but the extra time includes more television watching, rather than more achievement time. Girls with brothers share in this TV time, while boys get time on top of this with father without mother present and/or without siblings present. Arguably the singleton boys benefit most in terms of fathers' time, getting more of the "quality" achievement activities. In larger families, the merit of

²¹ For adult outcomes, Yeung, Duncan and Hill (2000) use the PSID to look at how young adults' completed schooling, wage rates, and nonmarital childbearing were affected by some aspects of their fathers' time use during childhood (along with other characteristics of the fathers); however the time use measures in their data did not include measures of fathers' time spent with children.

the additional television time allotted to boys and girls with brothers is difficult to evaluate, as the effect of TV on children's development is a complex topic; for example, effects appear to be heterogeneous across different groups (Gentzkow and Shapiro 2008, Van Evra 2004 *e.g.* p. 74). But boys in these families get additional time with father without siblings: to the extent that the presence of other children dilutes fathers' inputs into children, this alone time with father will be beneficial. Although the contribution of fathers' time to children's development is difficult to measure precisely, to the extent that these investments of father's time affect children's outcomes, girls are at a disadvantage, especially girls in all-girl families.

Whether these observable time inequities are suboptimal for girls and if so, how public policy might work to mitigate them is not immediately obvious. An unresolved question that would affect policy prescriptions is whether fathers' greater involvement with boys stems from production constraints or from fathers' preferences (Lundberg 2005). In the first scenario, production functions for the well-being of girls and boys differ, and fathers' time with boys has a greater marginal return for a given amount of time relative to time with girls. If this is the case, differential time allocations by child gender are optimal for the children. In the second scenario, fathers' time inputs are equally beneficial for girls and boys, but fathers derive greater marginal utility from a given amount of time with a boy relative to a girl. In this case, fathers' time inequities reflect genuine deficits in investments in girls. This warrants concern, because although magnitudes of child gender effects are small, large gender inequities can result in the long term from "an accumulation of slight disadvantages" (Massachusetts Institute of Technology 1999 p. 3). In addition, if fathers take on less childcare for girls, mothers of girls may have a more burdensome "second shift" of home responsibilities, relative to mothers of boys (Hochschild 1989). Policies to promote work-life balance might especially benefit these mothers.

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Table 1A: Means for time use variables: fathers and their children

Time variable	1		2		3		4		5		6	
	Fraction who report time >0						Whole sample means		Means for those with time>0			
	Fathers		Children		Fathers		Children		Fathers		Children	
total time with children (fathers)	0.88	0.86	4.20	3.76	4.76	4.38	(0.34)	(0.38)	(4.13)	(3.52)	(3.65)	(3.49)
primary care time	0.54	0.50	0.94	0.76	1.75	1.52	(0.53)	(0.48)	(1.61)	(1.27)	(1.63)	(1.49)
achievement time	0.29	0.27	0.39	0.35	1.34	1.33	(0.48)	(0.48)	(0.97)	(0.95)	(1.22)	(1.21)
leisure time w/ children (fathers)	0.60	0.55	1.70	1.48	2.85	2.69	(0.52)	(0.48)	(2.58)	(2.13)	(2.58)	(2.34)
time watching TV w/ children (fathers)	0.38	0.35	0.86	0.77	2.24	2.22	(0.52)	(0.52)	(1.66)	(1.62)	(1.82)	(1.72)
secondary care time (for those w/ children <13)	0.52		0.88		1.67		(0.53)		(1.56)		(1.62)	
time w/ children (father w/o spouse (mother))	0.58	0.50	1.45	1.12	2.49	2.23	(0.53)	(0.55)	(2.40)	(1.99)	(2.43)	(2.23)
leisure time w/o children	0.79		2.25		2.83		(0.43)		(2.67)		(2.66)	
time w/ father w/o siblings (>1 child families only)		0.25		0.44		1.74		(0.48)	(1.30)			(2.03)

Table 1B: Means for time use variables: mothers and their children

	Mothers		Children		Mothers		Children		Mothers		Children	
total time with children (mothers)	0.96	0.95	6.44	5.64	6.72	5.94	(0.22)	(0.22)	(4.78)	(4.02)	(4.15)	(3.89)
primary care time	0.78	0.75	1.99	1.60	2.56	2.14	(0.47)	(0.44)	(2.51)	(1.93)	2.56	2.14
achievement time	0.44	0.40	0.59	0.52	1.34	1.30	(0.56)	(0.49)	(1.16)	(1.00)	(1.20)	(1.20)
leisure time w/ children (mothers)	0.67	0.61	1.81	1.55	2.71	2.54	(0.53)	(0.49)	(2.55)	(2.14)	(2.39)	(2.23)
time watching TV w/ children (mothers)	0.44	0.37	0.87	0.72	2.00	1.92	(0.56)	(0.49)	(1.66)	(1.36)	(1.70)	(1.59)
secondary care time (for those w/ children <13)	0.96		7.00		7.28		(0.22)		(4.79)		(4.15)	
time w/ children (mother w/o spouse (father))	0.87	0.84	3.91	3.21	4.48	3.83	(0.37)	(0.37)	(4.11)	(3.29)	(3.65)	(3.18)
leisure time w/o children	0.75		1.73		2.29		(0.48)		(2.24)		(2.25)	
time w/ mother w/o siblings (>1 child families only)		0.44		0.87		1.96		(0.50)	(1.83)			(2.29)

Notes: Standard deviations in parentheses. Means weighted with the respondent sample weight (*tufinwgt*). Time is measured in hours per day. Sample: Data from 2003 ATUS. The father (mother) sample is male (female) respondents aged 25 to 60, married to women, who report the presence of own household children under the age of 18; and their respective children. Sample size for fathers is 2,693 except for secondary time, n=2,261, which is collected by the survey only for those with youngest child age < 13. The sample size for the children-of-fathers is 5,236 except for time with father without siblings, n= 4,294, only reported for families with more than one child. The sample sizes for mothers and children-of-mothers are: 2,987, secondary time 2,478; 5,820, without siblings 4,791. Note that for those time uses which can be measured for both parents and children, the means for the child sample differ from the parent sample means only because of the different weighting in the child sample resulting from the fact that parents contribute different numbers of children to the child sample.

Table 2
Time use: Father-level OLS regressions

	1	2	3	4	5	6	7	8
	total with children	primary care with children	achievement with children	leisure with children	watching TV with children	secondary care time	w/ children, w/o wife	leisure w/o children
at least 1 boy (all families)	26.09 (10.58)**	10.08 (3.97)**	4.15 (2.62)	15.41 (6.97)**	11.39 (4.14)***	2.39 (13.77)	22.34 (6.09)***	-18.81 (7.48)**
at least 1 boy (one child families)	26.39 (13.72)*	13.51 (5.25)**	9.56 (3.77)**	16.32 (10.23)	7.45 (5.80)	22.10 (19.18)	19.28 (8.57)**	-16.50 (11.31)
at least 1 boy (>1 child families)	25.26 (16.1)	6.90 (5.99)	0.80 (3.75)	13.66 (9.43)	15.34 (5.82)***	-6.74 (19.37)	26.27 (8.77)***	-18.09 (9.99)*

Notes: * significant at 10%; ** 5%; *** 1%. Observations are weighted with the respondent sample weight (*tufinlwgt*). Standard errors in parentheses. Time measured in minutes per day.

Sample: Data from 2003 ATUS; male respondents aged 25 to 60, married to women, who report the presence of own household children under the age of 18. Sample size is 2,693 fathers, 942 with one-child families and 1,751 with >1 child families, except for secondary time, which is collected only for those with youngest child age < 13. Sample size in that column is 2,261, 628, and 1,633.

Each cell in the table presents a coefficient from a separate regression of the time-use dependent variable listed at the top of the column on the gender composition variable, an indicator for the father having at least one boy. The omitted category relative to at least one boy is families with all girls. R^2 varies from 0.06 to 0.25. Independent variables included in the regression for which results are not reported are number of children, age gap from oldest to youngest child, age, household size, indicators for the age of the oldest child (0 to 3, 4 to 8, and 9 to 12); indicators for race, education (high school, some college, college or more), metropolitan area, status, region, wife's education status, month of the year, and weekday.

Table 3
Time use: Child-level OLS regressions - children of the father sample

	1	2	3	4	5	6	7
	total with father	primary care with father	achievement with father	leisure with father	watching TV with father	with father, w/o mother	with father, w/o siblings
Panel A							
(all families)							
at least 1 boy	23.25	8.37	3.30	12.18	10.98	18.11	
<u>n = 5,236</u>	(10.58)**	(3.67)**	(2.56)	(6.30)*	(4.05)***	(5.19)***	
Panel B							
(all families)							
I am a boy	12.06	4.67	2.51	5.65	5.86	13.21	
<u>n = 5,236</u>	(6.22)*	(2.22)**	(1.45)*	(3.66)	(2.52)**	(3.32)***	
Panel C							
(1 child families)							
I am a boy	25.97	11.30	9.55	10.46	6.02	18.7	
<u>n = 942</u>	(13.42)*	(4.76)**	(3.71)**	(8.84)	(5.58)	(8.15)**	
Panel D							
(>1 child families)							
I am a boy	8.76	3.49	1.33	4.56	5.79	11.97	3.20
<u>n = 4,294</u>	(6.83)	(2.43)	(1.53)	(3.98)	(2.77)**	(3.55)***	(2.56)
Panel E							
(>1 child families)							
highest age rank	11.96	3.88	1.65	6.44	6.87	15.23	7.25
	(6.13)*	(2.20)*	(1.47)	(3.54)*	(2.36)***	(3.46)***	(2.96)**
lower age rank boy	2.42	2.72	0.68	0.83	3.64	5.51	-4.83
<u>n = 4,294</u>	(10.54)	(4.02)	(2.33)	(6.29)	(4.53)	(5.66)	(3.47)
Panel F							
(>1 child families)							
boy with no brother	29.84	9.31	3.04	17.03	15.11	27.69	15.56
	(14.83)**	(5.43)*	(3.74)	(9.10)*	(5.64)***	(7.72)***	(5.05)***
boy with brother(s)	19.88	6.33	1.65	11.42	12.94	17.10	-0.38
	(15.41)	(5.21)	(3.52)	(8.93)	(5.80)**	(6.91)**	(3.97)
girl with brother(s)	22.32	5.94	1.24	13.48	12.07	13.53	3.16
<u>n = 4,294</u>	(14.61)	(5.15)	(3.61)	(8.69)	(5.55)**	(7.12)*	(4.29)

Notes to Table 3: * significant at 10%; ** 5%; *** 1%. Observations are weighted with the respondent's weight (*tufinlwtg*). Standard errors in parentheses. OLS standard errors are corrected for heteroskedasticity and correlation between same-family observations (children with the same father). Time measured in minutes per day.

Sample: Data from 2003 ATUS. The children-of-the-fathers sample is the own household children under age 18 of the father sample, which is male respondents aged 25 to 60, married to women, who report the presence of own household children under the age of 18.

Each cell in the table presents a coefficient from a separate regression of the time-use dependent variable listed at the top of the column on the gender composition variable(s), listed in that panel, along with additional independent variables listed below. The omitted category relative to at least one boy is being in a family with all girls; to "I am a boy" is "I am a girl"; to highest age rank boy and lower age rank boys is "I am a girl"; to panel F is girls without brothers. R^2 varies from 0.05 to 0.26. Independent variables included in the regression for which results are not reported are number of siblings, father's age, child's age, age rank, age gap oldest to youngest sib, household size; indicators for multiple birth status (being a twin, triplet, etc.), age of oldest child in family (0 to 3, 4 to 8, and 9 to 12), race of father, education of father (high school, some college, college or more), metropolitan area status, region, mother's education status, month of the year, and weekday.

Table 4
Child-level OLS regressions by age - children of the father sample

	1	2	3	4	5	6	7
	total with father	primary care with father	achievement with father	leisure with father	watching TV with father	with father, w/o mother	with father, w/o siblings
Children aged 0 - 3							
I am a boy (1 child families) n = 291	8.99 (22.82)	17.50 (12.47)	24.06 (10.11)**	4.83 (14.40)	-0.38 (10.45)	6.65 (13.83)	
I am a boy (>1 child families) n = 855	-3.61 (16.93)	-5.59 (8.52)	-3.08 (5.46)	2.30 (8.67)	5.25 (6.69)	-1.18 (10.90)	13.78 (6.67)**
Children aged 4-8							
I am a boy (1 child families) n = 186	49.59 (26.73)*	10.60 (9.34)	8.41 (7.66)	-1.87 (18.0)	-6.18 (12.15)	29.75 (16.54)*	
I am a boy (>1 child families) n = 1431	7.31 (10.68)	7.28 (3.79)*	4.40 (2.76)	-1.74 (6.57)	2.36 (5.04)	7.03 (6.91)	-6.96 (4.47)
Children aged 9-12							
I am a boy (1 child families) n = 151	70.33 (37.82)*	26.96 (9.06)***	13.24 (3.89)***	0.03 (23.78)	-11.34 (11.85)	56.03 (24.30)**	
I am a boy (>1 child families) n = 1139	26.45 (11.90)**	8.27 (3.99)**	2.40 (2.72)	20.16 (8.14)**	11.02 (5.62)**	26.53 (6.86)***	7.31 (4.08)*
Children aged 13-17							
I am a boy (1 child families) n = 314	18.83 (21.85)	3.07 (2.55)	1.13 (1.45)	19.56 (16.28)	27.48 (9.42)***	18.85 (11.36)*	
I am a boy (>1 child families) n = 869	-0.88 (12.65)	0.64 (3.35)	-1.40 (2.09)	1.38 (8.88)	8.05 (6.04)	14.99 (5.83)**	4.46 (5.30)

See notes to Table 3. Average total time per day of fathers over all 0-3 year-olds is 4.6 hours; 4-8 year-olds 4.1 hours; 9-12 year-olds 3.7 hours; and 13-17 year-olds, 2.8 hours.

Table 5
Time Use: Child-level Father-Fixed Effects Regressions - children of the fathers sample

	1	2	3	4	5	6	7
	total with father	primary care with father	achievement with father	leisure with father	watching TV with father	with father, w/o mother	with father, w/o siblings
Panel A							
I am a boy	8.04 (4.45)*	2.35 (1.84)	1.32 (1.08)	5.13 (2.19)**	3.77 (1.71)**	11.27 (3.41)***	7.54 (3.58)**
Panel B							
highest age rank boy	8.36 (4.51)*	2.46 (1.84)	1.49 (1.08)	5.01 (2.26)**	3.90 (1.75)**	12.16 (3.46)***	8.40 (3.34)**
lower age rank boy	6.38 (6.59)	1.77 (2.94)	0.42 (1.76)	5.76 (2.99)*	3.07 (2.22)	6.61 (5.20)	3.07 (4.51)

Notes: * significant at 10%; ** 5%; *** 1%. Observations are weighted with the respondent sample weight (*tufinlwgt*). Standard errors in parentheses. Time measured in minutes per day.

Sample: Data from 2003 ATUS; the children of the fathers sample is the own household children under age 18 of the father sample, which is male respondents aged 25 to 60, married to women, who report the presence of own household children under the age of 18; n =5,236 (includes children in families of all parities).

Each cell in the table presents a coefficient from a separate regression of the time-use dependent variable listed at the top of the column on the gender composition variable(s) listed in the panel and child's age, age rank, and multiple birth status (coefficients not reported). The omitted category in each panel is "I am a girl." R^2 varies from 0.85 to 0.94.

Table 6
Time use: Mothers and children-of-the-mothers samples

	1	2	3	4	5	6	7	8
Mother-level OLS regressions								
	total with children	primary care with children	achievement with children	leisure with children	watching TV with children	secondary care time	w/ children, w/o husband	leisure w/o children
Panel A								
at least 1 girl (all families)	14.10 (11.03)	2.87 (6.45)	2.77 (2.62)	2.00 (6.54)	-0.37 (4.41)	9.40 (12.41)	18.54 (9.99)*	3.93 (5.80)
Panel B								
at least 1 girl (one child families)	22.51 (15.05)	1.81 (6.74)	1.09 (3.67)	6.24 (9.69)	-0.38 (6.23)	8.31 (21.00)	27.92 (12.82)**	11.82 (9.04)
Panel C								
at least 1 girl (>1 child families)	3.81 (9.52)	-0.05 (10.30)	3.47 (3.63)	-3.05 (8.66)	-1.64 (6.35)	10.86 (15.73)	9.92 (14.76)	-1.61 (7.12)
Child-level Mother fixed-effects regressions								
	total with mother	primary care with mother	achievement with mother	leisure with mother	watching TV w/ mom		with mother, w/o father	with mother, w/o siblings
Panel D								
I am a girl	17.54 (6.54)***	1.29 (3.64)	0.19 (1.05)	2.45 (2.50)	1.14 (1.63)		17.89 (6.09)***	9.33 (5.73)

Notes: * significant at 10%; ** 5%; *** 1%. Observations are weighted with the respondent sample weight (*tufinlwtg*). Standard errors in parentheses. Time is measured in minutes per day.

Sample: Data from 2003 ATUS. The mother sample is female respondents aged 25 to 60, married to men, who report the presence of own household children under the age of 18. Sample size in the mother-level panel is 2,987 mothers, 1,029 with one-child families and 1,958 with >1 child families, except for secondary time, which is collected only for those with youngest child age < 13. Sample size in that column is 2,478, 659, and 1,819. The child-level sample is their 5,820 children.

Each cell in the table presents a coefficient from a separate regression of the time-use dependent variable listed at the top of the column on the gender composition variable, and independent variables whose results are not reported. The omitted category relative to at least one girl is families with all boys; to "I am a girl" is being a boy. R^2 varies from 0.05 to 0.36 for the mother-level results, 0.82 to 0.89 for the child-level fixed effects results. Independent variables included in the mother-sample regressions for which results are not reported are number of children, age gap from oldest to youngest child, age, household size, indicators for the age of the oldest child (0 to 3, 4 to 8, and 9 to 12); indicators for race, education (high school, some college, college or more), metropolitan area status, region, husband's education status, month of the year, and weekday. In the child level regressions they are child's age, age rank, and multiple birth status.

Appendix Table 1
Means for Demographic Variables

	1	2		3	4
	Father sample	Mother sample		Children of Fathers	Children of Mothers
number of children	1.96 (.99)	1.95 (1.05)	number of siblings	2.40 (1.18)	2.41 (1.11)
has only child	0.35 (.46)	0.35 (0.48)			
has two children	0.42 (0.47)	0.43 (0.50)			
has three children	0.17 (0.36)	0.16 (0.37)			
has four or more children	0.06 (0.25)	0.06 (0.26)			
has at least one boy	0.71 (0.48)	0.71 (0.51)	at least one boy in household	0.77 (0.46)	0.78 (0.42)
has at least one girl	0.68 (0.50)	0.68 (0.52)	at least one girl in household	0.75 (0.47)	0.75 (0.43)
			male	0.51 (0.55)	0.51 (0.50)
			female	0.49 (0.55)	0.49 (0.50)
			highest age rank boy	0.37 (0.46)	0.37 (0.49)
			highest age rank girl	0.35 (0.46)	0.35 (0.48)
			lower age rank boy	0.14 (0.38)	0.14 (0.35)
			lower age rank girl	0.14 (0.33)	0.13 (0.34)
			boy with no brother	0.24 (0.41)	0.25 (0.34)
			girl with no sister	0.24 (0.47)	0.24 (0.43)
			boy with brother(s)	0.27 (0.42)	0.27 (0.45)
			girl with sister(s)	0.25 (0.48)	0.25 (0.44)
			girl with brother(s)	0.27 (0.42)	0.26 (0.44)
			boy with sister(s)	0.26 (0.48)	0.27 (0.45)
			twin (or more)	0.03 (0.17)	0.03 (0.19)
			age rank	1.70 (0.84)	1.70 (0.90)
age gap oldest to youngest child	3.11 (3.63)	3.09 (3.82)	age gap oldest to youngest sib	4.38 (3.73)	4.4 (3.77)
=1 if oldest child aged 0 to 3	0.14 (0.37)	0.13 (0.38)	=1 if oldest child aged 0 to 3	0.09 (0.32)	0.09 (0.29)
=1 if oldest child aged 4 to 8	0.24 (0.46)	0.22 (0.46)	=1 if oldest child aged 4 to 8	0.24 (0.46)	0.22 (0.42)

Appendix Table 1 - continued
Means for Demographic Variables

	1	2		3	4
	Father sample	Mother sample		Children of Fathers	Children of Mothers
=1 if oldest child aged 9 to12	0.21 (0.44)	0.24 (0.48)	=1 if oldest child aged 9 to12	0.24 (0.47)	0.26 (0.44)
=1 if oldest child aged 13 to17	0.40 (0.52)	0.41 (0.55)	=1 if oldest child aged 13 to17	0.43 (0.54)	0.43 (0.50)
age	39.59 (7.88)	38.05 (7.95)	respondent parent's age	39.23 (7.59)	37.47 (6.68)
			age	8.47 (5.49)	8.50 (5.09)
less than high school ed.	0.11 (0.34)	0.10 (0.34)	respondent parent < HS ed.	0.12 (0.36)	0.11 (0.32)
high school education	0.28 (0.48)	0.27 (0.50)	respondent parent = HS ed.	0.28 (0.49)	0.26 (0.44)
some college education	0.25 (0.46)	0.27 (0.50)	resp. parent some college	0.25 (0.47)	0.28 (0.45)
college or higher education	0.36 (0.51)	0.36 (0.54)	resp. parent college or more	0.35 (0.52)	0.35 (0.48)
household size	4.30 (1.27)	4.27 (1.28)	household size	4.71 (1.44)	4.68 (1.35)
white	0.85 (0.38)	0.88 (0.37)	white	0.64 (0.48)	0.63 (0.49)
black	0.09 (0.30)	0.07 (0.28)	black	0.06 (0.23)	0.05 (0.21)
American Indian	0.01 (0.12)	0.01 (0.10)	American Indian	0.01 (0.08)	0.005 (0.07)
asian	0.04 (0.21)	0.04 (0.21)	asian	0.03 (0.16)	0.02 (0.14)
two or more races	0.01 (0.10)	0.01 (0.10)	two or more races	0.01 (0.10)	0.02 (0.14)
			race not reported	0.27 (0.44)	0.28 (0.45)
spouse less than high school ed.	0.10 (0.32)	0.11 (0.36)	other parent < HS ed.	0.11 (0.35)	0.13 (0.34)
spouse has high school ed.	0.25 (0.46)	0.26 (0.49)	other parent = HS ed.	0.25 (0.47)	0.26 (0.44)
spouse has some college	0.29 (0.48)	0.26 (0.49)	other parent some college	0.29 (0.50)	0.26 (0.44)
spouse has college or more	0.36 (0.51)	0.36 (0.54)	other parent college or more	0.35 (0.52)	0.35 (0.48)
weekday	0.71 (0.48)	0.71 (0.51)	weekday	0.71 (0.50)	0.71 (0.46)
weekend	0.29 (0.48)	0.29 (0.51)	weekend	0.29 (0.50)	0.29 (0.46)
sample size (unweighted)	2,693	2,987		5,236	5,820

Notes: Standard deviations reported in parentheses. Means are weighted with the respondent sample weight (*tufinlwgt*).
Sample: Data from 2003 ATUS. The father (mother) sample is male (female) respondents aged 25 to 60, married to women (men), who report the presence of own household children under the age of 18; and their respective children.

Appendix Table 2
Coding for Time Use Variables

variable	code
total time	ATUS variable <i>trtohhchild</i> : Any activity for which an own household child is listed as present (<i>tuwho_code</i> = 22). (All activities for which "who" information is not collected, such as sleeping, are omitted from this calculation (BLS 2005).)
primary care time	All activities with ATUS codes: <u>0301xx</u> : Caring For and Helping Household Children: physical care, reading to/with, playing with (not sports), arts and crafts, playing sports, talking with/listening to, helping/teaching, organization and planning for children, looking after (as a primary activity), attending household children's events, waiting for/with household children, picking up/dropping off. <u>030201</u> : Homework - helping with homework, reviewing homework, quizzing child for test <u>030203</u> : Home schooling. <u>170301</u> : Travel related to caring for and helping household children
achievement time	All activities with the following ATUS codes for which own household child is listed as present (<i>tuwho_code</i> = 22). <u>030102-030107</u> : reading to/with, playing with (not sports), arts and crafts, playing sports, talking with/listening to, helping/teaching <u>030201</u> : Homework <u>030203</u> : Home schooling.
leisure time	All activities with the following ATUS codes for which own household child is listed as present (<i>tuwho_code</i> = 22) <u>12xxxx</u> : Socializing, Relaxing, and Leisure: socializing and communicating, attending or hosting social events, relaxing and leisure; e.g., playing games, hobbies, reading, arts and entertainment other than sports, waiting associated with leisure <u>13xxxx</u> : Sports, Exercise, and Recreation: participating in sports, exercise, or recreation (e.g., aerobics, biking, spelunking, yoga), attending sporting/recreational events (e.g., watching baseball, gymnastics, hockey), associated waiting and security procedures. <u>1712xx and 1713xx, 1714xx, 1715xx</u> , travel to and from the above leisure activities
TV time	All activities with ATUS code 120303 (television and movies) AND for which own household child is listed as present (<i>tuwho_code</i> = 22).
secondary child care time	ATUS variable <i>trtcc</i> : Total time spent providing secondary childcare for household and own non-household children <13 (BLS 2005). Defined for parents only. This information is collected after the main diary is completed, with the interviewer probing as to whether there were children under the respondent's care during any of the activities listed in the diary (BLS and Census 2004a.)
time with children without spouse	Any activity for which own household child is listed as present (<i>tuwho_code</i> = 22) where spouse is not listed (<i>tuwho_code</i> = 20).
leisure time without children	All leisure activities (codes listed above) where own household children are not listed as present. Defined for parents only.
time with respondent parent with no other children	Any activity for which the ATUS line number (<i>tulineno</i>) for this particular own household child is listed and line numbers for any other household children are not listed. Defined for children only.

Notes: Code numbers can be found in BLS (2003). Children's time measures are summed over the activities (as categorized above) where the child's ATUS household line number (*tulineno*) appears.