Sex Differences in the Care of Young Children in Canada and the U.S.

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Abstract: Drawing on a number of U.S. and Canadian data sets, we paint a portrait of sex differences in the care of and provision for young children born in the 2000s. While some sex differences in developing countries have been documented, evidence from developed countries is limited. We find several sex differences in several early inputs important for child development. We show these inputs can account for up to 40 percent of the sex-difference in PPVT scores at ages 4 and 5. Our results inform and contribute to the literature finding sex differences in social and economic outcomes at older ages.

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Introduction

Sex differences in economic and social outcomes are evident at almost every age. Men and women tend to work in different occupations leading to so-called "female jobs" (Macpherson and Hirsch 1995, Baker and Fortin 2001). They also tend to study different subjects in school (e.g., Brown and Corcoran 1997). Recent research argues there may be sex differences in measured cognitive skills that emerge early in life (Fryer and Levitt 2010). Of course, sex differences in wages and earnings have been studied extensively for decades.

Against this background is evidence that differences in adult economic outcomes have precursors at young ages (e.g. Almond and Currie 2011). The belief that childhood developmental deficits spawn adult economic and social problems has led to widespread adoption of early childhood investments by governments in developed countries.

The question we ask in this paper is very simple: is there a connection between these two literatures? Do the sex differences documented in youth and adult outcomes have antecedents in sex differences in the developmental inputs young children receive?

Previous evidence of differences in the developmental inputs boys and girls receive is primarily for developing countries. It is typically offered as the consequence of the son preference that parents in many of these countries exhibit. Implicit in this interpretation is the assumption that in the absence of son preference the provision of inputs to males and females would be equal.

While appealing on a priori equity grounds, there is little empirical evidence that this assumption or any other is correct. Certainly there are "common sense" arguments why some inputs might be supplied to boys in different amounts than to girls. For example, boys grow at a faster rate in the first months and therefore might be introduced to foods other than breast milk at an earlier age. But evidence of any difference, or differences, in any input is hard to find.

We draw on an array of Canadian and American data sources to provide this evidence. We examine a range of variables from parental attitudes about the conception of a child through to the amount of parental time a child receives. The children we examine were born in the 2000s.

We find a number of sex differences in these developmental inputs in samples of first born children. We begin examining parental preferences for children of a specific sex. In the U.S., we find that the male partner of the mother is less likely to view a pregnancy as unwanted and more likely to view it as correctly timed, if the outcome is a boy. Importantly, however, this opinion evolves over time and is not evident in U.S or Canadian samples of children aged 2 or younger.

We find consistent evidence across a number of data sets that males are breastfed roughly one week less than females. Also, other foods are introduced to their diets 1 to 2 weeks earlier. However, we find no sex differences in the vaccination rates of American children.

Canadian data indicate that boys are more likely to be admitted to special care units after birth and be marginally less healthy in their first year. Also, immediately after birth mothers are less likely to believe their first contact with their child was at the right time if the child is a boy, and the contact is less likely to be skin to skin. Mothers of boys are more likely to report post partum depression and problems, and are more likely subsequently to be depressed.

The parenting of Canadian children also varies by sex. The parenting of first born boys is more likely to be hostile and aversive, and parents are more likely to view boys as difficult.

Finally, we find no significant sex differences in parental time spent caring for American first born children under the age of 5. This finding contrasts with previous evidence for older children. For Canada we find both mothers and fathers report they play more frequently with boys than with girls at ages 4 and 5. However, these parents also report that they less frequently participate in activities that promote literacy with boys. We close by exploring the extent to which these sex differences can account for the sex difference in Peabody Picture Vocabulary Test scores at age 4 and 5, finding that a substantial proportion of the test score sex gap is related to inputs that vary by sex.

Previous Literature

There is a large and active literature on gender differences in the developmental inputs received by children in developing countries. Some of this research finds gender differences in nutrition (e.g., Das Gupta 1987), healthcare (e.g., Ganadtra and Hirve 1994) and vaccination rates (e.g., Borooah 2004). However other research challenges these findings (e.g., Deaton 1997, 2003). Jayachandran and Kuziemko (2009) and Barcellos et al. (2010) are two recent contributions to this literature finding gender differences in breastfeeding duration, childcare, vaccination rates and vitamin supplementation.

As noted above, these findings are typically interpreted within the context that many parents in these societies have an explicit preference for male offspring. This preference is thought to impact not only the amounts of inputs parents provide to children of different genders, but also to affect birth intervals and family size.

Direct evidence on sex differences in developmental inputs in developed countries, and particularly the U.S. and Canada, is not as common (see Lundberg 2005a and Raley and Bianchi

2006 for recent reviews of the literature). For the U.S. there is evidence that men's hours of work and wages respond more to the birth of a son than the birth of a daughter (Lundberg and Rose 2002), and that males receive more time input from their parents due to extra input from their fathers (Lundberg 2005b and Lundberg et al. 2007). Yeung et al. (2001) report that boys receive relatively more of their fathers' time for play and companionship activities.[1] Aparna and Simon. (2008) report there are no sex differences in pre natal care provided by parents in the U.S. who have had a prenatal ultrasound and presumably know the sex of their baby.

There is also evidence from the U.S. that male and female children grow up in different family structures. For example, Dahl and Moretti (2008) relate family structure to the sex of the first born child. They report that among families with children aged 12 and younger, a first born female (versus male) raises the probability of an absent father by 3.1 percent, the probability that the mother has never married by 1.4 percent, the probability that parents are divorced by 1.3 percent and the probability that the mother has custody of the children in the event of a divorce by 2.9 percent. Related evidence is presented in Lundberg and Rose (2003).

To contribute to this body of work, we focus on the developmental inputs provided to children aged 5 and younger. We investigate a number of inputs that have not been previously studied. We present a comprehensive picture of the observable inputs provided to boys and girls using a common methodology. Finally, where possible we relate any sex differences in developmental inputs to observable developmental outcomes at older ages.

Do parents in developed countries exhibit sex preference?

[1] Bryant and Zick (1996) provide evidence of the types of activities mothers and fathers participate in with their children is related to the child's sex.

Sex differences in the developmental inputs provided to children could arise for a number of reasons. One reason is parental preference for children of a specific sex, typically tested by looking at fertility outcomes. There appears to be a general consensus that, on average, parents in developed countries do not exhibit a preference for children of particular sex by this measure. For example, the evidence offered in Angrist and Evans (1998) for the United States and McDougall et al. (1999) for Canada reveals that if anything parents in these counties have a preference for having a child of each sex. That said, son preference has been found in some immigrant/ethnic populations in these countries. Examining the sex ratio of births at different parities among mothers who have yet to give birth to a son, Abrevaya (2009) and Almond et al. (2010) report evidence of son preference within the East and South Asian communities of the U.S and Canada respectively.

Dahl and Moretti (2008) argue that son preference in the U.S is more widespread. They report that when the first born child is female, the total fertility of the family rises by 0.3 percent. This implies about 5500 of the roughly 4 million annual births are due to this cause.

Dahl and Moretti (2008) also report direct evidence that men have a stated preference for male over female offspring based in Gallup polls. Related evidence for Denmark (Kohler et al. 2005) reveals that the self reported happiness of fathers due to a first born son is higher than for a first born daughter. For mothers there is no relationship between the sex of the first born and the resulting happiness.

Conceptual Framework

As noted in the Introduction, many previous papers on sex differences in the treatment of young children pursue the causal effect of a child being male or female. They note that fertility and household structure can be endogenous to the sex constellation of current children for a variety of reasons. Most often the reason cited is parental preferences for children of a specific sex, but other explanations are possible. For example, girls and boys may impose different time or monetary costs on parents (e.g., Dahl and Moretti 2004) or have different biological needs (i.e., different production functions).

Unfortunately, these different explanations have many common predictions and therefore can be difficult to distinguish (e.g., Lundberg 2005a). A further complication is that a child's gender can be associated with his/her parents' subsequent fertility decisions and living arrangements, additional important determinants of the inputs a child receives and his/her outcomes. To address this complication many researchers tailor their samples to try to minimize any bias. For example, Dahl and Moretti (2008) focus on the impact of the sex of the first born child, while Barellos et al. (2010) limit their sample to very young children to limit the amount of time for any other responses to the child's sex to occur.

These concerns are of varying relevance to the purposes here. One of our objectives is to document any sex differences in the treatment of young children regardless of the source. We argue that these differences are interesting in their own right, are currently largely undocumented, and have the potential to shed light on sex differences in economic and social outcomes at older ages.

That said, the source of any sex differences we discover remains of interest. In the current draft we present estimates for first births varying the age of the children as sample sizes allow. We also rely on previous evidence that the impact of child gender on fertility, family formation and dissolution is relatively and absolutely quite small at the mean in Canadian and U.S. data. Put another way, it seems unlikely that the small associations between child gender and these factors could generate large enough impacts on important developmental inputs to account for gender differences in economic and social outcomes at older ages.

Empirical Framework

The analysis reports the unconditional and conditional mean differences between male and female children in some key developmental inputs. The primary empirical framework is the linear equation

(1) $$Y_i = X\beta + \varphi M_i + \varepsilon_i$$

where M_i is a dummy variable that equals 1 if child *i* is a male, Y_i is the input of interest, and X are control variables. While the exact specification of X varies by data set and is described in the appendix, in general we include controls for child's age, mother's age, education and foreign birth, and regional and city location controls. We do not control for mother's marital status or the number of siblings because as discussed above these may be outcomes of the child being male. That said, controlling for these two additional variables has no substantive effect on the inference except where noted below.

PreBirth

We begin by examining sex differences in parental attitudes about an impending birth, and events in the prebirth period that may affect the mental health of the mother and the family circumstances into which the child is born.

The *National Survey of Family Growth* (NSFG) provides a variety of information on births in the United States. It offers national samples of men and women aged 15-44, and detailed information is collected on the history of conceptions and births for each woman. We combine data from the 2002 and 2006-08 waves. Complimentary data for Canada is provided by the 2006 *Maternity Experiences Survey* (MES). The MES is a nationally representative survey of biological mothers aged 15+ and their children. At the time of the survey the children were living with their mothers and between 5 and 14 months of age. Due to the number of data sets used in the analysis, we provide the details of our analysis samples in the appendix.

For all conceptions, the NSFG asks whether the conception was timed properly (overdue, right time or mistimed) and whether it was wanted (indifferent, unwanted, not sure). We examine whether the pregnancy was wanted or at the right time according to the sex of child born. This variable is based on questions asked about the respondents' and her partners' desire to have a child just before the pregnancy, so strictly speaking there is no reason to expect a correlation of the response with the sex of the offspring. To the extent there is a correlation, one way of interpreting the responses is as a direct solicitation of parental preferences for male or female children, conditional on their child's current age. The MES provides corresponding information for Canadian children, although only the wantedness of the pregnancy is reported for the partner. Note that in each survey the partners' response is not collected directly—the mother answers on his behalf.

In table 1 we report the variable means by the sex of the child for samples of recent first births, as well as the male/female difference in means. Given the sample sizes in the NSFG we report results for children aged 5 and younger and 2 and younger respectively at the survey date. This latter sample more closely matches the age range in our Canadian data.

In the NSFG just over 50 percent of pregnancies are viewed as being at the right time by this measure, while the proportion of unwanted pregnancies ranges from 6 to 12 percent depending on which partner is responding. In the age 5 and younger sample pregnancies that result in a male child are more likely to be viewed as timed correctly, and less likely to be unwanted, by the partner. In contrast the mothers view male and female pregnancies much the same way. The age 2 and younger sample tells a somewhat different story. Here the mother views female pregnancies more enthusiastically, while the partner views male and female pregnancies very similarly.

In Canada, the proportion of pregnancies that are at the right time is marginally lower than in the U.S. and the proportion that are unwanted is substantially so. There is no strong evidence here that the sex of the child has an impact on how the mother or her partner views the pregnancy.

In the next panel of the table is information on changes in family structure between conception and birth in the U.S. Given sample sizes, the NSFG is not the best data to investigate the impact of a child's sex on family structure, and this topic has received extensive examination elsewhere. Nevertheless there are direct questions on marital status at conception and at birth. We measure the incidence of marriage at birth among those mothers not married at conception. We might expect a correlation of the incidence of pre birth marriage and the sex of the child if there is preference for children of one sex and the sex of the child is available through ultrasound.[2]

The sex differences in the mean are small and different across the two samples. In the age 5 and younger sample there appears to be a slightly higher probability of marriage if the pregnancy results in a male, while in the age 2 or younger sample it is just the reverse.

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[2] Dahl and Moretti (2008) report a small (0.3 percentage point) reduction in the probability a mother is married at the time of birth if the child is a female and she had an ultrasound. The prevalence of ultrasound in their sample of children from the early 1990s is 38%. While we have no direct information on the use of ultrasound in our sample, its use for recent births is thought to be much higher.

Finally, the MES provides a "stress index" for the mother during pregnancy, built up from questions about stressful events such as a family member dying or arguing with their partner. Maternal stress transmitted to the child in utero can negatively impact cognitive development (O'Dinnell et al. 2009, Bergman et al. 2010). The difference in the mean levels of stress by the sex of the child, however, is very small.

Regression based estimates of the sex differences in the conditional means are reported in table 2. Recall that one of the assumptions necessary for our inference is that there are no unobservable factors correlated with the sex of the first child. This has been a major concern in the study of this topic for developing countries, where the source of any differences is thought to be parental preferences. We cannot, of course, directly test for differences in unobservables, but if observable characteristics make little difference to the inference it would provide some support to our assumption that unobservable characteristics may also not matter. For each outcome the regression adjusted difference can be compared to the difference in the unconditional means reported in table 1.

The regression estimates are in fact very similar to the mean differences reported in table 1. The only statistically significant differences by the sex of the child is whether the partner views the pregnancy as wanted and at the right time in the age 5 and younger sample from the NSFG. The partner is 3 percentage points less likely to view the pregnancy as wanted, and 6 percentage points more likely to view the pregnancy as at the right time if the child is a male. Interestingly this result is also present in the corresponding sample of all births, although the sex differences (not reported) are a little smaller.

The fact that this preference for boys is not observed in the age 2 and younger sample, however, or in the Canadian sample which also surveys children at younger ages, suggests that the partner's male preference may not be "intrinsic" to the sex of the child at birth, but acquired as the child ages and the partner experiences the differences of parenting children of different sexes. This may be connected to mothers' and fathers' time inputs to children of different sexes that we report below.

Although not consistently statistically significant, there is some evidence that U.S. mothers display female preference in the younger NSFG sample—three percentage point differences in whether the pregnancy is viewed as at the right time or unwanted. The sex differences in the Canadian sample, which are closest to the birth event, are uniformly very small and statistically insignificant.

The sex differences in marriage between conception and birth are mostly quite small, statistically insignificant and "wrong signed" in the sense that a male birth reduces the probability of marriage. The one exception is the estimates in the younger sample, which shows an imprecisely estimated, 4 percentage point lower incidence of marriage if the birth is male. Finally the estimated sex differences in the MES stress index are very small and statistically insignificant.

The Circumstances of Birth

We next investigate some of the circumstances of birth. The first are some physical and health characteristics of the child. The sex differences in the unconditional means are reported in the table 3. In the first row is the incidence of low birth weight (LBW) defined as a birth weight of less than 2500 grams. In the U.S female babies are a little more likely to be born low weight. The MES data show also show a higher incidence of LBW for females but the difference is much smaller. The MES also provides information of the gestational age of the child at birth, whether the child was admitted to neonatal intensive care or special care unit and mother reports of the child's overall health. While there is no sex difference in the gestational age means, males are almost 4 percentage points more likely to be admitted to a care unit. Also, by the reported overall health measure—a higher score indicates worse health—boys are marginally less healthy.[3]

The MES also provides information on the time from birth to the mother's and child's first contact, whether the mother thought this happened at the right time, whether the contact was skin to skin and whether the mother and child were together in bed in the first hour after birth. Time to first contact is measured on a 7 point scale where a higher score means a longer wait.[4] The questions are only asked of mothers whose children are not admitted to a special care unit.

Early skin-to-skin contact between baby and child is thought to improve breastfeeding outcomes, improve maternal attachment and reduce infant crying (Moore, Anderson and Bergman 2007). There is fairly systematic evidence in the mean differences that maternal contact with a female baby is quicker, more likely to be viewed as happening at the right time and more likely to be skin to skin. Female babies are also more likely to be in bed with their mothers in the first hour after birth.

The regression results are presented in the lower panel of table 3. Overall, the differences in the conditional means compare favorably with the differences in the unconditional means. None of the sex differences in incidence of low birth is statistically significant. In the MES data males are roughly 4 percentage points more likely to be admitted to some special care unit after

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[3] The reported health index ranges from 1 (excellent) to 5 (poor).

[4] The response categories are 1-immediately/within 5 minutes, 2-6mins to <31 minutes, 3-31 minutes to <60 minutes, 4-1 hour to <6 hours, 5-6 hours to <12 hours, 6-12 hours to <24 hours, 7-24 hours or more.

birth. The sex difference in mother reported child's overall health is also statistically significant. Finally, there is fairly consistent evidence that males wait longer after birth (at least from their mother's point of view) for contact with their moms and that contact is less likely to be skin to skin.

Breastfeeding

Breast milk is among the first significant developmental inputs provided to children after birth. Observational studies indicate that breast milk has a multitude of benefits for both mother and child. Recent experimental evidence pares down this list of potential benefits, but the list still includes reductions in atopic eczema and gastrointestinal illness and increases in IQ (e.g., Kramer et al. 2001, Kramer et al. 2003 and Kramer et al. 2008).

There are a number of US data sets that follow the breastfeeding practices of the population.[5] The *National Immunization Survey* (NIS) provides the largest sample sizes. We use data from the 2004 through 2008 waves. The target population is children 19-35 months of age. The survey of breastfeeding is completed by the person most knowledgeable about the child. We select responses where the mother is the respondent. The breastfeeding questions were significantly revised in 2006, so we analyze the 2004/05 and 2006/08 data separately.

The NSFG also provides recent information on breastfeeding behavior. The sample sizes are smaller, but the questions are somewhat different allowing us to paint a more detailed picture of any sex differences in breastfeeding. We focus on the sample of children aged 1-2 to best match the NIS but still maintain reasonable sample sizes.

[5] The Infant Practices Feeding Survey II also provides recent information on breastfeeding. The target population of the survey, however, is not well identified so comparisons with other surveys are not possible.

In table 4 is a comparison of the sex differences in some key breastfeeding milestones from the different surveys. The levels of breastfeeding incidence in the NIS vary little by the sex of the child. In the NSFG there is modest evidence that males are more likely to be breastfed.

The story for breastfeeding duration in the first year is a bit more complicated. Duration is measured in days in the NIS and in months in the NSFG. In the NIS 2004-05 and NFSG there is clear evidence that females are breastfed longer than males, by just over a week in the NIS and just over two weeks in the NSFG. In the NIS 2006-08 data, however, the sex difference is much smaller, just over a day.

For exclusive breastfeeding, in the NIS 2004-05 there is a smaller sex difference of almost 3 days in favor of females. It is not possible to use the 2006/08 data NIS to investigate this issue because starting in 2006 the NIS question was changed to record the period of exclusive breast milk or formula feeding.

The NSFG data provide information on when food was first introduced to the child's diet and whether the child is still breastfeeding. The difference in means indicates that other foods are introduced 0.6 of a month earlier to males' diets. Also males are over four percentage points less likely to be breastfeeding at the survey.

The regression results for these variables are reported in table 5. Consistent with the evidence from the means, the estimates for the incidence of breastfeeding from all samples are uniformly statistically insignificant, and in the NIS very small. There is little evidence here of any meaningful difference between girls and boys in the initiation of breastfeeding

We report results for the duration of breastfeeding in the first year in the next row, and the proportion still breastfeeding at specific monthly milestones in succeeding rows. The 2004/2005 NIS data indicate that boys are breastfed over one week less on average than girls.

This plays out as lower proportions of males achieving the monthly milestones by about 1-2 percentage points. This story is corroborated by the results from the NSFG in their magnitudes, although they are not statistically significant. For example, for duration the NSFG estimate is that boys are breastfed just under one week less than girls in the first year.

As in table 3, the 2006-2008 NIS data tell a different story. Here the point estimates are smaller and none of them is statistically significant. One difference between the two NIS data sets is how the duration of breastfeeding was asked. In the 2004 and 2005 surveys the question asks about the length of time the baby was breastfed, while in the 2006-2008 surveys the question ask the age at which the child stopped breastfeeding. It is not clear, however, why this change in the question would lead to the difference in inference see here.

The next rows of table 4 investigate the duration of exclusive breastfeeding. The results from the 2004-05 NIS data again suggest males are exclusively breastfed for a shorter period of time although the magnitude is not large at between 2 and 3 days over the first year. This manifests primarily as a smaller proportion of boys making it to the 3 month milestone. As in table 3 the NSFG data suggest a larger sex difference in exclusive breastfeeding. The estimate is that foods are introduced to males just under one half a month earlier.

To shed more light on the difference in the results from the 2006-2008 NIS, we have also examined data from the *National Health and Nutrition Examination Survey* (NHANES). The NHANES also tracks breastfeeding behavior, but the sample sizes are small and it is not possible to identify first born children. We use data from the 1999/2000 through 2007/2008 waves and sample children aged 1-2. In the sample of all births males are breastfed 7.94 fewer days in the first year.[6] The regression adjusted estimate is -7.915 (7.249). Also food is introduced to male's diet 12.1 days earlier, or regression-adjusted -11.502 (5.232). Therefore the results from this data set are in line with the inference from the 2004/2005 NIS and the NSFG.

Results for Canada from the MES are reported in table 6. Because of the ages of the sample children, we measure breastfeeding duration in the first 6 months rather than in the first year. As for the U.S., there is no evidence of any difference in the incidence of breastfeeding by sex. Also consistent with the 2004/2005 NIS, NSFG and NHANES data is the estimate that boys are breastfed about one week less than girls and are introduced to food earlier.

The overall message of this analysis is that while males and females are equally likely to begin breastfeeding, once started males breastfeed for a shorter period of time. The difference is just over one week in breastfeeding duration. The estimates for exclusive breastfeeding vary depending on how the question is asked. Males are exclusively breastfed just 2 days less than females when the question is asked directly. However, foods are introduced to males' diets 1-2 weeks earlier. This said, the 2006-2008 NIS offers different results. We are unable to determine whether this difference reflects a corresponding difference in sampling or a dramatic cohort change in the breastfeeding of US children.

Vaccinations

The NIS also provides information on the vaccinations that children receive. Vaccination rates have been of interest in investigations of male female differences in developing countries. The vaccination information in the NIS is collected from a child's medical providers as identified in the household survey.

[6] In the corresponding all births sample from the 2004/2005 NIS the estimate of parameter on the male dummy variable is -7.572 (1.800)

We investigate vaccinations for diphtheria/tetanus, polio, MMR (measles, mumps and rubella), haemophilus influenzae type B, hepatitis B, pneumococcal infections. In each case we define a 0/1 indicator that the child has received at least the recommended number of doses for the age group surveyed.[7] We use the record of doses in each case that excludes any doses administered between the household survey and the provider report to control for any behavioral response to the survey. The control variables are as in the analysis of breastfeeding using the NIS data.

The sex differences in average vaccination rates are reported in the first panel of table 7. For most vaccines the rates are over 90 percent for both males and females. The sex differences are consistently very slight and indicate a very small edge to males.

The corresponding regression results are reported in the bottom panel of the table. Consistent with the evidence from the means there is no significant evidence of a sex difference for most vaccinations. The one exception is a statistically significant estimate favoring males for the Diphtheria/Tetanus vaccine of just over 1 percentage point.

Mother's Return to work

Most developed counties have maternity/parental leave mandates. One of the objectives of these laws to provide infants with an extended period of maternal/parental care post birth. In the U.S. employees in firms of 50+ employees are eligible for up to 12 weeks unpaid leave under the Family and Medical Leave Act. Some states have supplementary programs that provide longer leave and/or replacement earnings, and some employers also provide other benefits. In

[7] We use the following thresholds to define recommended doses: diphtheria/tetanus 4 doses; polio 3 doses; MMR 1 dose; haemophilus influenzae type B 3 doses; hepatitis B 3 doses; pneumococcal infections 4 doses.

Canada the federal Employment Insurance program provides up to 50 weeks of income replacement after the birth of a child, and the provinces provide a corresponding period of job protection under their labor standard acts. A longer period of maternal care post birth is believed to promote child development, although the empirical evidence is mixed.[8]

The MES provides information on mothers' return to work for Canadian children. We also examine data from the Canadian *National Longitudinal Survey of Children and Youth* (NLSCY). The NLSCY is a nationally representative survey of Canadian children conducted biennially between 1994/95 and 2008/09. We use waves 6-8, which were conducted in 2004/05, 2006/07 and 2008/09. The NLSCY provides a great variety of information on the development of children as well as the households in which they live.

The results are presented in table 8. Neither data set provides any evidence of a sex difference in the timing of the return to work by 5 years of age. Also the amount of maternal care provided in both the first 6 and 12 months is very similar for males and females in the NLSCY. In the MES, however, there is some evidence that among mothers who have returned to work, mothers of boys return 2 weeks earlier than mothers of girls. It should be noted that the sample size for this inference is quite small and this is an instance of a notable difference between the unconditional and conditional mean differences.

Mothers' Health and Parenting

In this section we examine differences in mothers' health outcomes by whether the child is male or female, as well as any differences in the parenting provided boys and girls. The levels of stress or depression experienced by the mother may differ by the sex of the child because male

[8] See Dustmann and Schonberg (2008), Carneiro et al. (2010), Liu and Skans (2010), Rasmussen (2010), and Baker and Milligan (2011).

or female children are more difficult to parent. Alternatively, the mother's relationship with her partner may differ by the sex of the child for this same reason or because the partner has preferences for children of a specific sex. The mother's levels of stress or depression may in turn affect her interaction with her child and thereby the child's development. For example, there is evidence that maternal stress transmitted to the child post birth through breast milk can negatively impact observable behavior (Glynn et al. 2007).

Again the MES and NLSCY provide information on the health of mothers of Canadian children. The analysis of these data is in table 9. Post birth there is evidence that mothers of boys are more likely to experience post partum depression and post partum problems.[9] The differences are quite substantial—three percentage points for post partum depression and 10 percentage points for post partum problems.

The next variables provide information on the mother's current mental health. In both the NLSCY and the MES there is a depression score based on the respondent's answers to a number of questions. The measure in the MES is the Edinburgh Postnatal Depression Scale. The NLSCY also provides self reported depression. The variable is coded 0 if the respondent is depressed "rarely", and 1 if the respondent is depressed "sometimes /occasionally/most of the time".

In The NLSCY there is evidence that mothers of boys are marginally more likely to be depressed by both the self report and the score method in the means, although only the results for the score are statistically significant. In the MES the male female difference is negative but also statistically insignificant.

Finally both data sets provided a self reported health measure. In both the NLSCY and

[9] Post-partum problems include post-partum haemorrhage, post-partum infection, post-partum depression for more than 14 days and post-partum hypertension

the MES a higher score means worse health.[10] The sex differences in both data sets indicate that mothers of males are slightly more likely to report worse health but the difference is not statistically significant.

Do these differences in mothers' health have implications for mother and child interactions? The NLSCY also provides parenting scales based on the person most knowledgeable about the child's (PMK) responses to a series of questions about how they relate with their child. In the vast majority of cases the PMK is the child's mother. The scales cover a variety of dimensions of parenting including positivity, hostility, consistency and adversity. In each case a higher score means more of the indicated parenting dimension. The questions used for the scale are based on different questions by the age of the child.

The analysis is presented in table 10. Beginning with the scores for children aged 0-2 there is evidence in the unconditional means that the PMK is less likely to exhibit positive parenting and more likely to exhibit hostile parenting to a male child. We also report a variable from the behavioral questions in the NLSCY, which asks whether the PMK considers the child "difficult" for his or her age, a higher score indicating more difficult. Boys are more likely to be viewed as difficult by this measure. The regression results indicate that these sex differences are statistically significant, except in the case of positive parenting.

The results for the older children tell mostly the same story. The PMK is more likely to exhibit hostile or aversive parenting if the child is a boy. These differences are statistically significant in the regression results.

The last measure we investigate is of overall family functioning, again built up from a series of questions asked of the PMK. For this scale a higher score indicates greater family

[10] The self-reported health index ranges from 1 (excellent) to 5 (poor).

dysfunction. Here we observe that families where the first born is a male are marginally more dysfunctional although the difference is not statistically significant.

The message of this analysis is that the mothers of first born males are more likely to experience post partum difficulties and more likely to be depressed up to the time the child is age 5. Although we cannot establish a direct connection, first born males are also more likely to receive hostile and aversive parenting and to be considered difficult for their age.

Parental Time Inputs

For the final set of inputs we investigate how parents' time inputs differ by the sex of the child. As noted above there is previous evidence on this issue indicating that fathers provide a larger time input to male children, particularly play and companionship activities. We begin with an examination of the *American Time Use Survey* (ATUS), followed by further study of the Canadian NLSCY.

For the ATUS, we analyze samples of oldest children aged 0-2 and 0-5. We include all own-children in and out of the household. The control variables are similar to the other surveys used here, and reported in the appendix. We form dependent variables measuring the primary and secondary time (meaning children are present when another activity is undertaken) spent with the child during the diary day, measured in minutes. The results are presented in table 11, separately for mothers and fathers.

The first columns of the first row show the results for mothers' time in primary care of children age 0-2. Mothers spend 165 minutes a day for primary care of boys, and 159 minutes for girls. There is a slight advantage in primary care time for boys of about 6 minutes a day. The corresponding means for fathers' time shown in the second panel indicate they also spend more time in primary care with boys—roughly 5 minutes. The regression estimates for these differences are reported in the third panel. In each case the estimate is slightly larger than the mean difference, and for both mothers and fathers does not attain levels of statistical significance.

Mothers' time in secondary care again favors boys by almost 6 minutes in the mean difference, but is small and statistically insignificant in the regression estimates. In contrast fathers spend just over19 minutes more with daughters in secondary care. The regressions estimate is slightly smaller at 17 minutes, but also statistically insignificant.

We next examine time spent in specific activities: physical care, play, or reading. Note that for playing and reading, a substantial portion of the sample reports zero minutes. The mean differences indicate that both fathers and mothers report spending marginally more time in the physical care and playing with boys, and marginally less time reading to/with them. The regression estimates for these variables, however, are all equally small and not statistically significant.

Corresponding results for the age 0-5 sample are reported in the last three columns of the first two panels and the last two columns of the third panel. The mean differences are reasonably similar to those in the younger sample, although the sex difference favoring girls in the secondary care time of fathers is now much smaller and a sex difference in the play time of fathers favoring boys starts to emerge. This later result at just over 8 minutes is statistically significant in the regression estimates.

Overall, these time use data suggest that some of the differences documented in previous research for older children (e.g., Lundberg, Pabilonia, and Ward-Batts 2007) are not apparent at younger ages. In our own data we have confirmed in samples of school aged children that, for example, there is a sex difference in fathers' secondary care time that favors boys, consistent with the existing evidence. Our results suggest these sex differences evolve over time. Interestingly a similar age pattern is seen in tables 1 and 2 in the partners'/fathers' opinions of whether the conception of the first born was unwanted or at the right time.

We continue the analysis using NLSCY data on the parental time inputs for Canadian children. The NLSCY asks about specific activities a parent does with a child, rather than providing an overall accounting of time spent in competing domains. There is much more detail on reading and literacy than in the ATUS, so the Canadian data help to shine more light on possible sex differences in these inputs.

We begin the investigation with questions asked when the child is 4 or 5 years old, which best match the time inputs examined in previous research and in the ATUS. The PMK is asked how often s/he eats, plays, talks through things, does chores or goes on outings with his/her child. The categories of response are: 1) every day, 2) 5-6 days per week, 3) 3-4 days per week, 4) 1-2 days per week, 5) 1-2 days per month and 6) rarely or never. We reverse the scale so a higher a number means more frequent activity to be consistent with other activity questions examined below. We also select cases where the PMK is the mother, because the PMK is also separately asked how often his/her spouse or partner does these activities with the child. This way we can separately examine mothers' and fathers' time input.

The results for these variables are reported in table 12. For mothers the male female differences in the unconditional means are both positive and negative, and relatively large and positive for playing and large and negative for going on outings. In contrast the sex differences for fathers are almost all positive and relatively large for playing and talking with the child.

The regression results are reported in the second panel. Here we report the estimates from ordered logits rather than OLS regressions, although the pattern of statistical significance is similar between the two approaches. Because the proportional odds assumption may not be appropriate, multinomial logit models will be considered in future drafts of the paper. The results of the ordered logit indicate that only the male female differences for playing are statistically significant. Interestingly, both mothers and fathers report playing more frequently with a male child, in contrast with the results from the ATUS were there was only a significant sex difference favoring boys in the play time of the fathers.

The arbitrariness of the response scales renders the magnitudes hard to interpret and thus restrains their usefulness. We also cannot rule out the possibility that girls receive compensatory time inputs in an activity not covered by these questions. Finally, another weakness, shared by the ATUS results and some other previous studies of interactions with children, is the lack of a clear link between the activities canvassed here and the child's future development.

There are questions in the NLSCY, however, that potentially permit progress on this last point. In the literacy unit, the PMK is asked how often either s/he or his/her partner spends in activities teaching the child to read and use numbers or exposing them to stories and books. The categories for response to these questions are: 1) rarely or never, 2) a few times a month, 3) once a week, 4) a few times a week and 5) daily. The activities range from playing action games with very young children to teaching older children how to read new words.

The means by sex for these variables are reported in table 13.[11] Most of the questions are specific to the age of the child, which is indicated in the row headings.[12] Quite striking here is

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[11] We omit two variables from this unit—how often the child is taken to do errands and how the child is taken on walks. No sex differences in these variables are observed.

that almost all the male female differences are negative. The exceptions are activities that encourage the use of numbers and the age at which the child was exposed to books. Therefore, with the exception of the use of numbers male children receive less parental time in activities that promote literacy.

The conditional mean differences are reported in the first column of table 14. We again report estimates from an ordered logit model. There are statistically significant negative male female differences in many of the activities. Particularly strong are the differences in reading the child stories, and reading to or listening to the child read books.

Why would parents systematically provide boys less of these activities? One possibility is that these activities are more costly or less satisfying with boys because they are more resistant. One way of exploring this hypothesis is to examine the results for only children. If parents trade off quantity for quality in children, then parents of one child may be more perseverant in their investments in their offspring. The regression estimates for only children are presented in the second column of table 14. While many of the point estimates are negative for this sample, they are generally smaller and most are not statistically significant and some estimates change sign. There is less evidence here that these boys receive less of these activities from their parents.

Interestingly, the pattern seen in the sample of first born is also apparent for the sample of all births. These results are reported in the third column of table 14. Therefore the lower input of parental time on these activities is observed for males at higher birth orders.

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[12] The information on how frequently the child goes to the library is available for older ages. We limit sample to ages 0-2 to better reflect the parent's decision to promote library use rather than the child's preference.

Literacy inputs and test scores

The motivation for the study of the inputs studied in this paper is their impact on subsequent development. In this section, we investigate how the sex differences in developmental inputs may matter, relating the sex differences in literacy time inputs in the NLSCY to subsequent test scores. This analysis provides some evidence that observed early-life sex differences in inputs may set children on different trajectories.

Ideally we would examine the impact of the literacy inputs on reading outcomes. Unfortunately the NLSCY dropped reading tests from the survey after the third wave. There are, however, the children's scores on the Peabody Picture Vocabulary Test (PPVT), which is administered at ages 4 and 5.

Our strategy is to first regress scaled PPVT scores on our standard control variables. We then add the measures of the parental time inputs the child received from his or her parents at younger ages. To do this for all children with PPVT scores in waves 6-8 of the NLSCY, we add data from waves 4 and 5 of the survey. This method of assessing the contribution of the parental time inputs relies on the assumption that they are in fact inputs and not alternative measures of some latent outcome that PPVT is also measuring. We explore some alternative specifications of our estimating equation to test the reasonableness of this assumption.

In the first row of column 1 of table 15 we report the male female difference in PPVT scores conditional on our controls. We start with the sample of children who have valid PPVT scores in waves 6-8, and have valid entries for all the parental time input variables in a wave previous to the wave in which they wrote the PPVT test. This limits the sample to the relatively older children in each wave who wrote the test, but insures that the measures of the parental time input are not concurrent with the test score. At 2.92 points the sex difference in PPVT indicates that boys score almost one fifth of a standard deviation below girls in this test.

In the next row the measures of the different parental time inputs listed in table 13 are added to the regression. They are added as a full set of dummy variables for each level of activity for each input. The impact on the sex difference in PPVT scores is substantial. It falls by over 40 percent. Alternatively, the male female difference is now just over 11 percent of a standard deviation.

The parental time input most likely to draw suspicion as an input is trips to the library. In the next two rows we examine what happens when this variable is dropped from the set of control variables. Because this changes the sample slightly, we first report the sex difference without the controls for the time inputs. At -2.943 it is very similar to the difference in the previous sample. The estimate conditional on the time inputs while bigger than in the previous sample is still 27 percent smaller than the estimate without the time inputs.

Finally in the last four rows we gauge the importance of the parental time inputs at younger and older ages. Here we only use the variables recorded in the wave when the child was aged 0-2. These inputs have a more modest impact in relative terms accounting for just under 20 percent of the "gross" difference. Note that measured at this younger age the impact of trips to the library is much smaller. In rows 1 and 2 the measure of library attendance is recorded when most of the children are 3 years old.

In the second column we repeat these investigations but now add observations for the children whose test scores and measures of the time inputs for older ages (i.e., at ages 3 and 4) come from the same wave of data. This effectively adds children who were 4 when they wrote the PPVT to the sample. The impact of adding the time inputs on the sex difference in PPVT scores is very similar to the impact in column 1, although their relative contribution is smaller in percentage terms. Note in this sample the impact of dropping the library variable is smaller.

The message of this analysis is that sex differences in the amount of time parents spend teaching and reinforcing literacy skills can account for a non trivial proportion of the sex difference in PPVT scores. This is also true in the sample of all births where the sex difference in PPVT scores is -2.290 (0.860), -1.696 (0.790) once the parental time inputs are added and -1.823 (0.798) if the variable capturing trips to the library is excluded.[13]

There are reasons to think these are lower bound estimates of the impact of the sex difference in the literacy time inputs. First our developmental outcome PPVT is not a reading test. Second the sex differences in the time inputs in the sample of children who we can link longitudinally across waves is not as strong as the full sample results reported in table 14.

Why parents spend different amount of times in these activities with boys and girls is not identified, but it does appear to be associated with the subsequent deficit males exhibit in verbal/reading skills.

Conclusions

We document a number of sex differences in the developmental inputs supplied to young first born children in the U.S. and Canada. These range from breastfeeding duration—males are breastfed a shorter period of time—to parenting—males are parented more aversely and with more hostility—to time inputs—males receive more play time from parents but less of activities that promote literacy.

[13] These results are based on the sampling strategy of row 1 in table 14.

We also document sex differences in the health of first born males and females and their mothers. The mothers of first born males are more likely to experience post partum problems and depression, to report higher rates of depression as their child grows and to report marginally worse overall health. First born males are more likely to be admitted to special care units after birth, and their mothers report them in marginally worse health at older ages.

Ultimately the importance of these findings lies in their ability to account for sex differences in developmental outcomes at older ages. We show that the boy/girl difference in parental time inputs promoting literacy can account for up to 40 percent of the boy/girl difference in PPVT scores at ages 4 and 5.

Our results also suggest that fathers' stated preference[14] for boys and the extra time input they supply boys evolves over time. In samples of younger first born children there is little difference by sex in whether the father views the pregnancy as wanted or in the amount of time they spend with their children.

[14] Preference measured by the partners' view of whether the pregnancy was unwanted.

Data Appendix

NSFG: The NSFG is a nationally representative survey of the household population of men and women between the ages of 15 and 44. The information on children is built up from the pregnancy histories of the surveyed women. The analysis makes use of recoded variables provided in the NSFG but omits observations with imputed values of these variables. The control variables for the NSFG regressions include dummies for mothers' age at conception, child's age, child's month and year of birth, mothers' education, ethnicity (black, Hispanic), religion (catholic, protestant, none), foreign birth and rural location.

MES: The target population of the MES is biological mothers who were 15 years of age or older at the time of their singleton live birth, and who were living with their infant. The survey excludes mothers living on Indian Reserves or collective dwellings. There is no imputation of variables in the MES. Information is collected on a single birth for each mother. The control variables in the MES regression are child' age (single year), mother's age (single year), and dummy variables for mother's education (4 categories), aboriginals, province and rural residence.

NIS: We use data from the 2004 through 2008 waves if the National Immunization Survey. The target population is children 19-35 months of age. The survey of breastfeeding is completed by the person most knowledgeable about the child. We select responses where the mother is the respondent. Control variables for the NIS regressions include dummies for year, the child's sex, age (19-23, 24-29 and 30-35 months) mother's education, race (black, Hispanic) and age (<=19, 20-19, >=30) and state. The standard errors are clustered on the survey supplied stratum identifiers.

NHANES: The National Health and Nutrition Examination Survey is a representative survey of about 5000 persons per year. We draw a sample children aged 1-2 to match the NIS sample. The NHANES regressions include dummies for the child's sex, age, race (black and Hispanic), the mother's age at birth, and the survey year.

NLSCY: National Longitudinal Survey of Children and Youth is a nationally representative survey of Canadian children conducted biennially between 1994/95 and 2008/09. We use waves 6-8, which were conducted in 2004/05, 2006/07 and 2008/09. The NLSCY provides a great variety on the development of children as well as the households in which they live. The control variables for the NLSCY regressions are child's age (single year), mother's age (five year age groups), mother's education (4 categories), mother's foreign birth, dummy variables for province, urban size (5 categories) and year of birth.

ATUS: The American Time Use Survey version we use pools together responses from the 2003 to 2009 waves of the survey. The target of the survey is a representative sample of the American population. Each household has one respondent who answers the time-use questions, so we have either a mother or a father from each household, but never both in the sample. We draw a sample of oldest children aged zero to five. We include own children in and outside the household. For the regressions, we include controls for age (single year), mother's / father's age (five year groups), mother's / father's education (four categories), mother's / father's foreign birth, region, race (black and Hispanic), survey year, survey month, and diary day.

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Table 1: **Means by Sex in Selected Pre Birth Characteristics of a First Born Child's Birth**

	NSFG						MES		
	Age 5 and Younger			Age 2 and Younger			Age 5-14 Months		
	Males	Females	Difference	Males	Females	Difference	Males	Females	Difference
Mother didn't want pregnancy	0.089	0.089	0.000	0.096	0.060	0.036	0.039	0.032	0.007
Mother thinks pregnancy at right time	0.509	0.510	-0.001	0.503	0.537	-0.034	0.473	0.464	0.009
Partner didn't want pregnancy	0.094	0.124	-0.030	0.106	0.106	0.000	0.039	0.041	-0.002
Partner thinks pregnancy at right time	0.579	0.519	0.060	0.529	0.527	0.002			
Mother got married between conception and birth	0.171	0.164	0.007	0.131	0.178	-0.047			
Stress Index while pregnant							1.324	1.313	0.011

Notes: Authors' calculations from NSFG and MES data.

Table 2: **Sex Differences in Selected Characteristics of a First Born Child's Birth**

	NSFG		MES
	Age 5 and Younger	Age 2 and Younger	Age 5-14 Months
Mother didn't want pregnancy	0.000	0.033*	-0.004
	(0.015)	(0.020)	(0.007)
Mother thinks pregnancy at right time	-0.005	-0.036	0.003
	(0.023)	(0.032)	(0.021)
Partner didn't want pregnancy	-0.031**	-0.001	-0.002
	(0.015)	(0.021)	(0.007)
Partner thinks pregnancy at right time	0.057**	0.007	
	(0.026)	(0.035)	
Mother got married between conception and birth	-0.003	-0.040	
	(0.026)	(0.032)	
Stress Index while pregnant			0.014
			(0.059)

Notes: Authors' calculations from NSFG and MES data. The reported statistics are the estimated parameter on a 0/1 indicator that the child is male. Robust standard errors in parentheses.

Table 3: **Sex Differences in Selected Birth Characteristics of a First Born Child's Birth**

	NSFG						MES		
	Age 5 and Younger			Age 2 and Younger			Age 5-14 Months		
	Males	Females	Difference	Males	Females	Difference	Males	Females	Difference
Means									
Low Birth Weight	0.081	0.094	-0.013	0.077	0.094	-0.017	0.060	0.062	-0.002
Gestational Age							39.10	39.14	-0.04
NICU							0.178	0.139	0.039
Child's health							1.350	1.289	0.061
Time to Hold							1.688	1.666	0.022
"Right" time to hold							0.653	0.706	-0.053
Skin to skin contact							0.220	0.253	-0.033
In bed in first hour							0.339	0.357	-0.018
Regression estimates									
Low Birth Weight		-0.013			-0.015			-0.001	
		(0.016)			(0.020)			(0.010)	
Gestational Age								-0.051	
								(0.079)	
NICU								0.041***	
								(0.015)	
Child's Health								0.057***	
								(0.025)	
Time to Hold								0.020	
								(0.053)	
"Right" time to hold								-0.053***	
								(0.019)	
Skin to skin contact								-0.036**	
								(0.017)	
In bed in first hour								-0.026	
								(0.020)	

Notes: Authors' calculations from NSFG and MES data. The reported regression statistics are the estimated parameter on a 0/1 indicator that the child is male. Robust standard errors in parentheses.

Table 4: Means by Sex in Selected Breastfeeding Milestones for First Born Children in the U.S.

	NIS 2004-05			NIS 2006-08			NSFG		
	19-35 months			19-35 months			1-2 years^		
	Males	Females	Difference	Males	Females	Difference	Males	Females	Difference
Breastfeeding incidence	0.720	0.721	-0.001	0.749	0.742	0.007	0.730	0.698	0.032
Duration of breastfeeding in first year	193.24	202.27	-9.03	208.50	209.80	-1.3	22.02	24.32	-2.3
Child still Breastfeeding							0.102	0.145	-0.043
Duration of exclusive breastfeeding in first year	99.82	102.59	-2.77						
Age (months) when other food introduced (in the first year)							2.33	2.95	-0.62

Notes: Authors' calculations from NIS and NSFG. Age of sample children as indicated except ^. ^ sample includes children younger than 1 for analysis of breastfeeding incidence and whether still breastfeeding. Duration of breastfeeding in first year is measured in weeks in the NSFG and in days in the NIS. The age when other food in introduced is measured in months in the NSFG.

Table 5: Sex Differences in Selected Breastfeeding Milestones for First Born Children in the U.S.

	NIS 2004-05	NIS 2006-08	NSFG
Age of Child at Interview	19-35 months	19-35 months	1-2 years^
Breastfeeding incidence	-0.000	0.006	0.023
	(0.007)	(0.010)	(0.030)
Duration of breastfeeding in first year	-8.730***	-0.661	-0.811
	(3.022)	(3.205)	(1.948)
Breastfeeding at 3 months	-0.020**	0.002	-0.089
	(0.009)	(0.008)	(0.056)
Breastfeeding at 6 months	-0.019**	0.009	-0.042
	(0.009)	(0.007)	(0.052)
Breastfeeding at 9 months	-0.023**	0.001	-0.008
	(0.012)	(0.009)	(0.048)
Breastfeeding at 12 months	-0.026***	-0.005	0.051
	(0.008)	(0.005)	(0.041)
Child is still breastfeeding			-0.034
			(0.023)
Duration of exclusive breastfeeding in first year	-2.535		
	(1.824)		
Exclusive breastfeeding at 3 months	-0.016***		
	(0.005)		
Exclusive breastfeeding at 6 months	-0.012*		
	(0.006)		
Exclusive breastfeeding at 9 months	-0.003		
	(0.003)		
Age (months) when other food introduced (in the first year)			-0.491*
			(0.289)

Notes: Authors' calculations from NIS and NSFG. Age of sample children as indicated except ^. ^ sample includes children younger than 1 for analysis of breastfeeding incidence and whether still breastfeeding. Duration of breastfeeding in first year is measured in weeks in the NSFG and in days in the NIS. The age when other food in introduced is measured in months in the NSFG. The reported statistics are the estimated parameter on a 0/1 indicator that the child is male. Robust standard errors in parentheses. The standard errors for the NIS are clustered at the survey strata level.

Table 6: Sex Differences in Selected Breastfeeding Milestones for First Born Children in Canada

	Males	Females	Difference
Means			
Breastfeeding Incidence	0.923	0.932	-0.009
Age at first other liquid^ (weeks)	13.62	14.19	-0.57
Age at first food^ (weeks)	20.63	21.33	-0.70
Still Breastfeeding	0.430	0.474	-0.44
Duration of breastfeeding in first 6 months^	18.26	19.30	-1.04
Regression estimates			
Breastfeeding Incidence		-0.011	
		(0.010)	
Age at first other liquid^		-0.550	
(weeks)		(0.461)	
Age at first food^ (weeks)		-0.729***	
		(0.201)	
Still Breastfeeding		-0.048***	
		(0.019)	
Duration of breastfeeding in		-1.085***	
first 6 months^		(0.420)	

Notes: Authors' calculations from MES data. Age of children at survey is 5-14 months. ^ indicates sample is children 6 months and older. The reported regression statistics are the estimated parameter on a 0/1 indicator that the child is male. Robust standard errors in parentheses.

Table 7: Sex Differences in Vaccination Rates for First Born Children in the U.S.

	Males	Females	Difference
Means			
Diphtheria/Tetanus	0.837	0.827	0.010
Polio	0.914	0.912	0.002
Measles, Mumps and Rubella	0.923	0.921	0.002
Haemophilus Influenzae type B	0.922	0.917	0.005
Hepatitis B	0.922	0.920	0.002
Pneumococcal infections	0.613	0.612	0.001
Regression results			
Diphtheria/Tetanus		0.012**	
		(0.006)	
Polio		0.003	
		(0.004)	
Measles, Mumps and Rubella		0.002	
		(0.003)	
Haemophilus Influenzae type B		0.005	
		(0.004)	
Hepatitis B		0.002	
		(0.003)	
Pneumococcal infections		0.002	
		(0.004)	

Notes: Authors' calculations from NIS. Age of children at survey is 19-35 months. In the regression results the reported statistics are the estimated parameter on a 0/1 indicator that the child is male. The standard errors are clustered at the survey strata level.

Table 8: **Sex Differences in Mother's Return to Work for First Born Children in Canada.**

	NLSCY			MES		
	Males	Females	Difference	Males	Females	Difference
Means						
Returned to work	0.625	0.625	0.000	0.122	0.131	-0.009
Time at home first six months	5.750	5.750	0.000			
Time at home first year	10.506	10.371	0.135			
Weeks since birth at return				18.845	19.457	-0.612
Regression results						
Returned to work		-0.004			-0.005	
		(0.022)			(0.013)	
Time at home first six months		0.049 0.095)				
Time at home first year		-0.160 (0.314)				
Weeks since birth at return					-2.029** (1.021)	

Notes: Authors' calculations from NLSCY and MES data. The NLSCY samples are children aged 0-5 for "Returned to work", children aged 6-23 months for "Time at home in first six months" and children aged 12-23 months for "Time at home in first year". The sample for the MES is children aged 6-14 months. In the regression results the reported statistics are the estimated parameter on a 0/1 indicator that the child is male. Robust standard errors in parentheses.

Table 9: **Sex Differences in Mother's Health Post Birth for First Born Children in Canada**

	NLSCY						MES		
	Age 5 and Younger			Age 2 and Younger			Age 5-14 Months		
	Males	Females	Difference	Males	Females	Difference	Males	Females	Difference
Means									
Post partum depression	0.144	0.112	0.032	0.141	0.108	0.033			
Post partum problems	0.306	0.214	0.092	0.310	0.207	0.103			
Mother's self reported depression	0.185	0.160	0.025	0.180	0.157	0.023			
Depression Score	4.136	4.073	0.063	4.130	4.022	0.108	5.035	5.184	-0.149
Mother's Health	1.916	1.897	0.019	1.919	1.874	0.045	1.967	1.928	0.039
Regression results									
Post partum depression		0.035*** (0.012)			0.036*** (0.014)				
Post partum problems		0.094*** (0.024)			0.103*** (0.026)				
Mother's self reported depression		0.027** (0.012)			0.027* (0.014)				
Depression Score		0.106 (0.156)			0.166 (0.187)			-0.128 (0.177)	
Mother's Health		0.021 (0.027)			0.058* (0.032)			0.041 (0.037)	

Notes: Authors' calculations from NLSCY and MES data. In the regression results the reported statistics are the estimated parameter on a 0/1 indicator that the child is male. Robust standard errors in parentheses.

Table 10: **Sex Differences in the Parenting of First Born Children in Canada**

	Males	Females	Difference
Means			
Positive: Age 0-2	18.072	18.122	-0.050
Hostile: Age 0-2	2.177	2.011	0.166
Child is Difficult for age: Age 0-2	2.231	2.082	0.149
Positive: Age 3-5	16.123	15.985	0.138
Hostile: Age 3-5	8.729	8.343	0.386
Consistent: Age 3-5	15.354	15.410	-0.056
Averse Age: 3-5	4.260	3.929	0.336
Family Functioning: Age 0-5	8.146	8.061	0.055
Regression results			
Positive: Age 0-2		-0.062	
		(0.085)	
Hostile: Age 0-2		0.183***	
		(0.059)	
Child is Difficult for age: Age 0-2		0.140***	
		(0.046)	
Positive: Age 3-5		0.153	
		(0.111)	
Hostile: Age 3-5		0.379**	
		(0.175)	
Consistent: Age 3-5		-0.017	
		(0.147)	
Averse Age: 3-5		0.322***	
		(0.096)	
Family Functioning: Age 0-5		0.192	
		(0.159)	

Notes: Authors' calculations from NLSCY data. In the regression results the reported statistics are the estimated parameter on a 0/1 indicator that the child is male. Robust standard errors in parentheses.

Table 11: Sex Differences in Parent's Time Inputs for First Born Children in the United States

	Age 2 and younger			Age 5 and younger		
	Males	Females	Difference	Males	Females	Difference
Means						
Mother						
Primary care time	165.137	159.170	5.967	142.447	140.041	2.406
Secondary care	251.336	245.641	5.696	241.639	238.878	2.762
Physical care	89.154	88.598	0.556	71.401	72.447	-1.047
Play	57.565	53.351	4.215	48.378	44.542	3.836
Reading	3.907	4.512	-0.606	5.349	5.582	-0.233
Father						
Primary care time	93.928	88.597	5.331	88.024	81.017	7.007
Secondary care	169.677	188.911	-19.234	165.904	169.649	-3.745
Physical care	44.162	39.959	4.203	35.677	33.329	2.348
Play	40.714	37.264	3.450	40.791	33.962	6.829
Reading	2.127	2.916	-0.788	3.045	3.635	-0.590

Regression results	Age 2 and younger: Mothers	Age 2 and younger: Fathers	Age 5 and younger: Mothers	Age 5 and younger: Fathers
Primary care time	8.980	9.128	3.177	7.345
	(6.319)	(8.082)	(3.975)	(4.967)
Secondary care	0.907	-16.924	0.486	-4.856
	(10.917)	(10.370)	(6.916)	(6.837)
Physical care	3.250	3.891	-0.808	1.277
	(4.703)	(6.190)	(2.748)	(3.421)
Play	4.284	6.938	3.620	8.151**
	(3.980)	(4.920)	(2.486)	(3.277)
Reading	-0.321	-0.373	0.025	-0.440
	(0.561)	(0.616)	(0.447)	(0.491)

Notes: Authors' calculations from ATUS data. In the regression results the reported statistics are the estimated parameter on a 0/1 indicator that the child is male. Robust standard errors in parentheses.

Table 12: Sex Differences in Parent's Time Inputs for First Born Children in Canada

	Males	Females	Difference
Means			
Mother			
Frequency of eating with child	5.816	5.823	-0.007
Frequency of playing with child	4.852	4.699	0.123
Frequency of talking with child	5.919	5.936	-0.017
Frequency of doing chores with child	4.813	4.801	0.012
Frequency of outings with child	3.964	4.113	-0.149
Father			
Frequency of eating with child	5.365	5.319	0.046
Frequency of playing with child	4.348	4.168	0.180
Frequency of talking with child	5.618	5.461	0.157
Frequency of doing chores with child	3.665	3.695	-0.030
Frequency of outings with child	3.475	3.412	0.063
Regression results			
	Mothers	Fathers	
Frequency of eating with child	0.390	-0.100	
	(0.257)	(0.173)	
Frequency of playing with child	0.328**	0.318**	
	(0.140)	(0.152)	
Frequency of talking with child	-0.309	0.255	
	(0.363)	(0.197)	
Frequency of doing chores with child	0.118	0.073	
	(0.147)	(0.149)	
Frequency of outings with child	0.191	0.166	
	(0.137)	(0.150)	

Notes: Authors' calculations from NLSCY data. In the regression results the reported statistics are the estimated parameter (ordered logit model) on a 0/1 indicator that the child is male. Robust standard errors in parentheses.

Table 13: Means by Sex for Parents' Time Input to Literacy Activities for First Born Children in Canada

	Males	Females	Difference
Play action games: Age 0-2	4.794	4.850	-0.056
Read stories: Age 0-2	4.512	4.637	-0.125
Read books: Age 3-4	4.414	4.517	-0.103
Tell Stories: Age 0-4	4.267	4.318	-0.051
Sing Songs: Age 0-4	4.587	4.657	-0.070
Teach new words: Age 0-2	4.627	4.718	-0.091
Teach to read new words: Age 3-4	3.429	3.426	0.003
Teach letters and numbers: Age 3-4	3.937	4.064	-0.127
Encourage use of numbers: Age 3-4	4.510	4.547	-0.037
Age exposed to books: Age 0-2	3.956	3.843	0.113
How often goes to library: Age 1-2	1.471	1.508	-0.037

Notes: Authors' calculations from NLSCY data.

Table 14: Sex Differences in Parents' Time Input to Literacy Activities for First Born Children in Canada

	First Births	Only Child	All Births
Play action games: Age 0-2	-0.301**	0.324*	-0.218***
	(0.122)	(0.172)	(0.074)
Read stories: Age 0-2	-0.312***	-0.091	-0.229***
	(0.098)	(0.131)	(0.060)
Read books: Age 3-4	-0.273***	-1.931	0.238***
	(0.103)	(1.544)	(0.066)
Tell Stories: Age 0-4	-0.157**	-0.046	-0.102**
	(0.072)	(0.111)	(0.046)
Sing Songs: Age 0-4	-0.189**	-0.052	-0.245***
	(0.079)	(0.130)	(0.051)
Teach new words: Age 0-2	-0.154	-0.245	-0.116
	(0.113)	(0.154)	(0.073)
Teach to read new words: Age 3-4	-0.040	0.087	-0.157***
	(0.085)	(0.508)	(0.055)
Teach letters and numbers: Age 3-4	-0.213**	-0.112	-0.223***
	(0.083)	(0.431)	(0.055)
Encourage use of numbers: Age 3-4	-0.040	1.535**	-0.005
	(0.099)	(0.675)	(0.063)
Age exposed to books: Age 0-2	0.061	0.262*	0.045
	(0.068)	(0.140)	(0.045)
How often goes to library: Age 1-2	-0.116	0.124	-0.039
	(0.106)	(0.163)	(0.067)

Notes: Authors' calculations from NLSCY data. The reported statistics are the estimated parameter (ordered logit model) on a 0/1 indicator that the child is male. Robust standard errors in parentheses.

Table 15: Sex Differences in PPVT Scores—the role of parental time inputs for literacy

	Time inputs from previous waves	**Time inputs from previous and concurrent waves**
Sex Difference	-2.920**	-2.511***
	(1.359)	(0.824)
Sex Difference conditional on parental time inputs	-1.720 (1.189)	-1.740** (0.787)
Sex Difference	-2.943**	-2.507***
	(1.353)	(0.824)
Sex Difference conditional on parental time inputs excluding tips to library	-2.146* (1.271)	-1.880** (0.799)
Sex Difference	-2.501***	-2.501***
	(0.828)	(0.828)
Sex Difference conditional on "young" parental time inputs	-2.022** (0.808)	-2.022** (0.808)
Sex Difference	-2.504***	-2.501***
	(0.828)	(0.828)
Sex Difference conditional on "young" parental time inputs excluding tips to library	-2.085** (0.815)	-2.022** (0.808)

Notes: Authors' calculations from NLSCY data. The reported statistics are the estimated parameter on a 0/1 indicator that the child is male. Robust standard errors in parentheses. "young" parental inputs refer to inputs measured when the child is ages 0-2. Time inputs from previous waves denote that the measures of time inputs come from waves of the data before the wave in which the child takes the PPVT test.