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Centre for Economic Policy Research
33 Great Sutton Street, London EC1V 0DX, UK
Tel: +44 (0)20 7183 8801
www.cepr.org

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JEL Classification: I20, I24, J16

Keywords: Australia, Parental education, Household Income, Numeracy, gender, Decomposition, role models, Stereotypes

Michelle Rendall - michelle.rendall@monash.edu
Monash University and CEPR

Jaai Parasnis - jaai.parasnis@monash.edu
Monash University

Molly Paterson - mipat2@student.monash.edu
Monash University

Gender, Income, and Numeracy Test Scores*†

Molly Paterson‡ Jaai Parasnis§ Michelle Rendall¶

January 12, 2022

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‡Monash University, Australia. Email: mipat2@student.monash.edu.

§Monash University, Australia. Email: jaai.parasnis@monash.edu.

¶Monash University, Australia and CEPR. E-mail: michelle.rendall@monash.edu.

1 Introduction

Gaps in educational achievement between children have significant and long-lasting consequences for several aspects of an individual's social and economic outcomes over their lifetime. Consequently, research into the importance of early interventions to address this disadvantage in educational achievement has demonstrated the importance of identifying where gaps between students occur and how they evolve (Heckman and Krueger, 2005). Two widely documented sources of achievement gaps between students over time are gender and socioeconomic status. This paper considers these factors in relationship with one another, analyzing the evolution of the gender test score gap for a particular cohort of students and how this interacts with the socioeconomic test score gap over time. Critically, this paper pays particular attention to the impact of early socioeconomic circumstances on students' later academic achievement and disentangles the role of (1) household income, (2) mother's education (relative to father's), and (3) mother's labor force participation. We focus on numeracy, a skill that is increasingly important in the labour market.[1] Numerous studies highlight that while progress has been made in narrowing gender gaps, they remain salient as demonstrated by the under-representation of women in STEM, particularly in math-intensive fields.[2]

We make three contributions to the literature on the evolution of gender gaps and socioeconomic gaps in educational achievement. First, we bring together the two strands of literature considering gender and socioeconomic status as separate sources of educational disadvantage. We examine the interaction between these two factors and how they may combine to create a double disadvantage for certain students. Socioeconomic status broadly captures the influence of household income, parental education and labor force status. Unlike previous research, we separately examine the role of these three dimensions of socioeconomic status. Secondly, we focus on early life circumstances, namely early household income, parental education, and cognitive ability before children enter school. From a policy perspective, these contributions provide insight into the "Who" and the "When" in designing interventions to address the educational disadvantage based on the interaction between gender and socioeconomic status. Lastly, our approach of separating household income from parental characteristics enables us to provide further evidence of the importance of reversing

[1] There is increasing evidence of a growing wage premium for occupations with high maths requirement. For example, see Paglin and Rufolo (1990), Murnane, Willett and Levy (1995), Weinberger (1999), Murnane et al. (2000), Altonji and Blank (1999), Grogger and Eide (1995), and Rendall and Rendall (2014).

[2] See Altonji, Blom and Meghir (2012), Bertrand (2020), and Kahn and Ginther (2017).

gendered beliefs and stereotypes and providing successful role models to girls early in life.

The gender gap in numeracy test scores is well documented in the literature and a myriad of complex socio-cultural factors have been explored. In a recent review of the gender gap, Bertrand (2020) points to the role of stereotypes in shaping skills and preferences. Lundberg (2020) points to the gender gap in educational aspirations linked to gender identity shaped by social and cultural forces. Further, there is a well documented intergenerational transmission of education which points to both, nature and nurture effects of household socio-economic status. We draw inspiration from these emerging patterns of the role that family plays in human capital formation. Firstly, a family's socioeconomic status affects the resources available for human capital investment. Secondly, family plays an important role in shaping gender attitudes through differential parenting and role models.[3] Within families, mothers have an influential role through time investments.[4] Recent evidence shows that while father's education matters through the genetic link with the child, mother's education matters net of the genetic links. A mother plays a strong "nurture" role in shaping a child's education and better educated mothers seem to be able to provide a prenatal and early childhood environment that is conducive for higher test scores.[5] Thus, income, parental education and gender, all play a part in educational achievement. These interrelationships of various socio-economic determinants and gender on test score gaps are the focus of the present paper.

We employ a uniquely rich dataset, the Longitudinal Study of Australian Children (LSAC), which provides an internationally relevant picture of children's development over time to trace the evolution of the numeracy gap over time. Due to the detailed nature of the LSAC data, this paper is able to examine how the gender gap in numeracy scores evolves from Grade 3, when students are generally 8-9 years old, until Grade 9, when students are 14-15 years old. Few papers have been able to examine the evolution of such gaps over such an extended period. We find that girls have lower numeracy scores than boys in Grade 3 and this gap increases over time. This gender gap is not explained by early childhood numeracy or literacy, contemporaneous household characteristics, or school types. However, household income in early childhood and parental education are significantly associated with numeracy scores. Belonging to a bottom income decile household leads to a penalty for girls, but not for boys. In our base estimations, approximately one-third

[3] For examples on family influences see Dahl, Rooth and Stenberg (2020), Dahl, Rooth and Stenberg (2021), and Brenøe (2021) and for role models, see Boneva et al. (2021), Fernández, Fogli and Olivetti (2004), and Fernández (2011).

[4] See, Fan, Fang and Markussen (2015); de San Román and de La Rica (2016).

[5] See, Lundborg, Plug and Rasmussen (2021).

of the gender gap in Grade 9 is explained by early household income. The effects of parental education vary depending on the interaction of income and gender in a non-monotonic way. A mother's education and labor force participation is an important contributor to increasing girls' test scores across the entire income distribution, with the effects increasing along the income distribution. At the top of the income distribution, a high level of mother's education almost results in gender parity. In contrast, for boys, test scores increase with stay-at-home mothers at the top of the income distribution with limited effect at the bottom and none in the middle.

The remainder of the paper is organized as follows. Section 2 discusses the related literature; Section 3 summarises the data; Section 4 presents the model and outlines the estimation strategy; Section 5 presents the results; Section 6 provides robustness exercises; and Section 7 provides some suggestive evidence on the potential origins of the widening gender gap in numeracy scores. Finally, Section 8 concludes.

2 Literature Review

Test score gaps based on gender have long been identified in the international literature, typically, male students perform better than female students in maths while female students outperform male students in literacy (Bedard and Cho, 2010; Fryer and Levitt, 2010; Husain and Millimet, 2009; Le and Nguyen, 2018). This phenomenon is not limited to any one cultural context. Using Program for International Student Assessment (PISA) data across 65 countries, Bharadwaj et al. (2016) find substantial gaps in mathematics test scores across both developed and developing countries. Similarly, Hermann and Kopasz (2018) use a cross-country analysis of gender test score gaps to suggest that the teaching practices and characteristics of education systems can have heterogeneous gender effects. Lastly, using an epidemiological approach Nollenberger, Rodríguez-Planas and Sevilla (2016) find that the transmission of cultural beliefs on the role of women in society accounts for over two-thirds of the math gender gap. Other studies have found that gender gaps in mathematics are not significantly related to indicators of gender equality across countries (Gevrek, Neumeier and Gevrek, 2018; Marks, 2008). Thus, while gender test score gaps are well established internationally, the analysis of such gaps benefits from close examination of detailed longitudinal data for a single country. Few papers in this area document the evolution of the gender test score gaps from childhood through adolescence due to data constraints (Sohn, 2012; Suryadarma, 2015). In a paper similar to ours using LSAC data, Le and Nguyen (2018) analyze the evolution of gender test score gaps through to Grade 7. They find evidence of a widening of the numeracy gender gap — in favor of boys — as children progress through school.

Studies have also documented how gender test score gaps manifest across the socioeconomic distribution (Trusty et al., 2000). Cobb-Clark and Moschion (2017) look at scores in third grade and find that the early gender gap in reading are largely observed for children at the bottom of the socioeconomic distribution while the gap in numeracy appears for children at the top of the socioeconomic distribution. Dahl and Lochner (2017) estimate the effect of family income on reading and numeracy scores and find that in the US context, a $1000 increase in household income raises scores by 6 percent of a standard deviation. They conclude that when income increases, the gains in academic achievement are largest for the children from disadvantaged families. Our focus on early household income in the evolution of test score gaps fits within a wider literature considering the impact of early life circumstances on the academic achievement of children. Pearce et al. (2016) consider the impact of early cognitive ability on socioeconomic gaps in academic achievement using LSAC data. They conclude that socioeconomic inequalities indeed emerge early in life, demonstrating the significant effect of early cognitive skills on academic achievement. Thus, we draw together these strands of literature regarding gender and socioeconomic gaps in our analysis.

The evidence on interaction of socioeconomic and gender gaps is limited. Brenøe (2021), using Danish data, find that boys benefit more (than girls) from an advantageous family environment in terms of overall GPA score and completion of Grade 9. Lei and Lundberg (2020) examine the effect of school and neighbourhood quality and the absence of the father on gender gaps in adolescent and adult outcomes using US data. In this paper, we focus particularly on the evolution of numeracy scores and parental characteristics.

Research investigating the sources of gender gaps in educational achievement points to a myriad of complex socio-cultural factors. Gender differences in parental time investment (Muller, 1998), stereotyping of certain fields being the domain of certain genders (Le and Nguyen, 2018; Marx and Roman, 2002) and differential responses to education environments (Hermann and Kopasz, 2018) are all potential explanations for the persistence of achievement gaps between boys and girls even as the awareness of gender inequalities rises. Gevrek, Neumeier and Gevrek (2018) decompose the gender gap in mathematics across a selection of countries and find that this gap cannot be reasonably explained by differences in observed characteristics by gender. Thus, research into the causal mechanism of gender inequality in school achievement is still ongoing.

In addition to income, we explore the contribution of another aspect of socioeconomic status, mother's education and labor force participation, to gender gaps in numeracy. Fan, Fang and Markussen (2015) find that, when considering the concurrent trends of the gender test score gap and increased labor force participation of women, boys appear adversely affected by decreases in mother's time input. There is also evidence that gender attitudes interact with social class; higher-income backgrounds and/or higher-educated parents are associated with more equitable gender attitudes among adolescents (Kågesten et al., 2016). While the causal mechanisms of gender gaps in numeracy are beyond the purview of this paper, we demonstrate where these gaps occur, how they evolve over time, and how income and a mother's role interact with the gender gap. This understanding is critically important to design and implement interventions and offers suggestive evidence for future research avenues.

3 Data

We use data from the Longitudinal Study of Australian Children (LSAC), a national study beginning in 2004. LSAC began with an initial cohort of about 10,000 children, forming a representative sample from across Australia. LSAC collects comprehensive information about children's academic test scores, socioeconomic, and demographic backgrounds, from parents, teachers, and children once every 2 years. The study consists of two cohorts; the birth or "B" cohort of 5107 children, aged 0-1 years in 2004, and the kindergarten or "K" cohort, of 4983 children, aged 4-5 years in 2004. As of the date of writing, LSAC survey data is available up to Wave 7, when the B cohort is aged 12-13 and the K cohort is aged 16-17.

The measure of academic achievement used in this paper is standardized results from the National Assessment Program Literacy and Numeracy (NAPLAN) which are obtained through data linkages with the LSAC study. The NAPLAN is a series of standardized tests designed to assess Australian students' reading, writing and numeracy abilities in grades 3, 5, 7, and 9 (ACARA, 2014). Students are generally aged 8-9 in Grade 3 and 14-15 by Grade 9. Test scores across these subjects range between 0 and 1000 and are designed to allow comparison between students over time. NAPLAN scores are measured against an assessment scale. Scales span all levels from Grade 3 to Grade 9, and are divided into 10 bands. The national minimum standard is defined as band 2 for Grade 3, band 4 for Grade 5, band 5 for Grade 7, and band 6 for Grade 9. These increments represent the increasingly challenging skills as children age. Thus, scores are monotonically increasing over time for all students. All NAPLAN scores presented in this paper have been standardized by grade with a mean 0 and standard deviation of 1 as is generally done in similar papers (Le and Nguyen, 2018).

The most recently available waves allow access up to Grade 9 NAPLAN test scores for the kindergarten or 'K' cohort and up to Grade 7 test scores for the birth or 'B' cohort. Given our focus on how the early socioeconomic environment affects the test score gap in later stages of human capital accumulation, we use the K cohort. This allows a unique picture of the evolution of the determinants of academic disadvantage across the school life of our sample, using a complete set of NAPLAN scores from Grades 3 through to Grade 9.

LSAC also provides data on two major tests administered to study children before they enter primary school, the 'Who am I?' (WAI) Test and the 'Peabody Picture Vocabulary Test' (PPVT-III). The WAI test is designed to assess general cognitive abilities before the beginning of formal schooling and focuses on reading and numeracy tasks (de Lemos, n.d.). The PPVT is designed to measure a child's receptive vocabulary ability in standard English by asking the child to indicate a picture that best represents the meaning of the word spoken by an interviewer (Dunn and Dunn, 1997). Girls outperform boys in these test, which could be due to higher school readiness at an earlier age.[6] We standardize and mean-adjust PPVT and WAI scores by gender, such that the average boy and girl both have scores of zero to avoid assigning girls' higher school-readiness, at age 4 to 5, as gender gaps at later schooling stages. The inclusion of these early ability tests is in line with our focus on early household circumstances influencing test scores into adolescence.

3.1 Descriptive Statistics

Table 1 provides summary statistics for variables used in this analysis. The numeracy test scores show that boys perform better than girls in Grade 3 and this gender gap increases through to Grade 9. Boys and girls are evenly distributed across household characteristics and types of schools. In summary, girls and boys do not differ in terms of household characteristics in Wave 1 or initial (normalized) cognitive test scores,

[6] Early cognitive ability, as measured by these tests, plays an important role in explaining numeracy test score gaps up to Grade 7 for Australia (Le and Nguyen, 2018).

however, marked gender differences are evident in numeracy test scores.

Table 1: Summary Statistics

VARIABLES	Male	Female	Whole Sample	Total Observations
Male (=1)	1	0	0.52	3087
Numeracy Test Scores				
Grade 3	423.9	420.2	422.2	2265
Grade 5	506.3	499.6	503.0	2891
Grade 7	561.3	555.0	558.2	2717
Grade 9	611.6	602.8	607.3	2385
Household Characteristics				
Two parents in home (=1)	0.93	0.93	0.93	3087
Indigenous (=1)	0.02	0.02	0.02	3087
Ever breastfed (=1)	0.91	0.94	0.92	3087
Main language at Home is English (=1)	0.90	0.89	0.89	3087
Lives in Major Australian City (=1)	0.54	0.56	0.55	3087
Government School (=1)	0.65	0.65	0.65	3087
Catholic School (=1)	0.22	0.21	0.22	3087
Independent School (=1)	0.12	0.13	0.13	3087
WAI Score	62.1	67.6	64.8	3087
PPVT Score	64.0	65.0	64.5	3087
Household Income Indicators				
Mother University & Above (=1)	0.34	0.34	0.34	3087
Father University & Above (=1)	0.35	0.36	0.35	3087
Adjusted Weekly Average Household Income	1824.0	1814.7	1819.5	3087
Bottom Income Decile (=1)	0.08	0.07	0.08	3087
Top Income Decile (=1)	0.11	0.11	0.11	3087

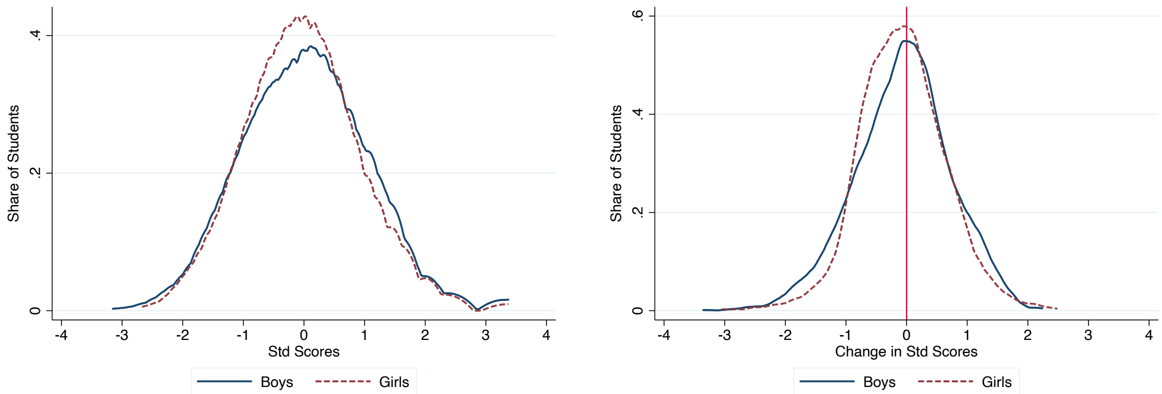
Notes: Summary Statistics are for observations used in regressions on Grade 3, 5, 7 or 9 numeracy scores. School types and two parents in the home are calculated at Wave 3. Grade scores are calculated at their respective waves. All other variables are calculated at Wave 1. Educational attainment of University & Above is defined as 16 plus years of schooling.

3.2 Test Score Distributions and Disadvantage

Comparing the distribution of numeracy test scores by gender in Figure 1, the distribution of boys' test scores has fatter tails and is positively skewed compared to girls in Grade 3 (see Figure 1 Panel (a)). Figure 1 Panel (b) shows the distribution of change from Grade 3 to Grade 9.[7] The distribution for boys again has fatter tails, but the distribution for girls is left skewed. It means that, while girls might not be moving into the extreme of the distribution compared to boys, as they move to Grade 9, they are falling behind boys on average.

[7] Formally computed as Grade 9 minus Grade 3 test scores.

Figure 1: *Numeracy Test Scores Distributions*



(a) Grade 3

(b) Change (Grade 9 - Grade 3)

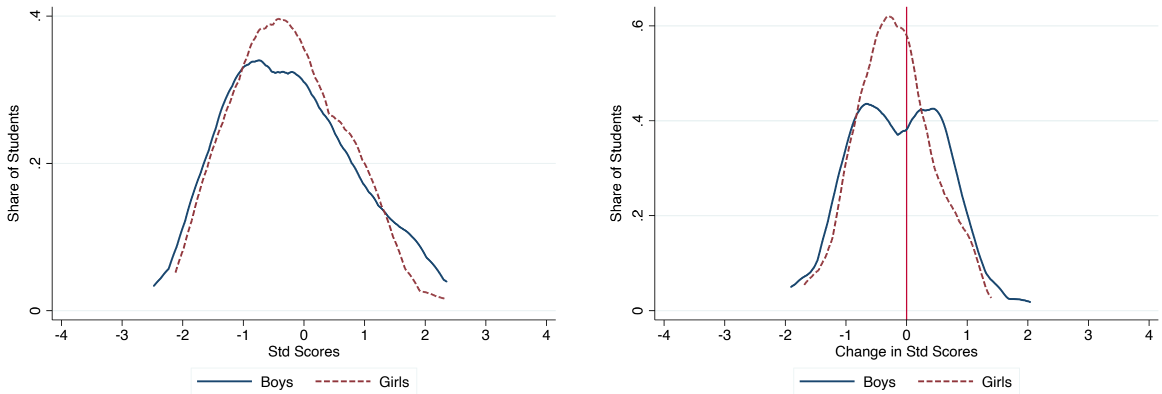
Notes: Kernel density distribution for standardized numeracy test scores for NAPLAN tests using the K cohort in LSAC sample, (1) Panel (a) shows the Grade 3 standardized numeracy NAPLAN test scores and (2) Panel (b) shows the change in test scores from Grade 3 to Grade 9 (Grade 9 standardized numeracy NAPLAN test scores minus Grade 3 standardized test scores).

Figure 2 plots distributions of test scores for low income students, defined here as households with income in the bottom decile in Wave 1 (aged 4-5). [8] Figure 2 Panel (a) still shows fatter tails for boys in Grade 3, but the distribution for boys is more negatively skewed compared to girls. Changes over time (Figure 2 Panel (b)) show that girls from these most disadvantaged households show much smaller increases in test scores from Grade 3 to Grade 9. The average change in test scores for these girls is negative (density mass lies left of zero). In contrast, there is a distinct double peak for boys, with roughly half of boys showing an improvement in test standardized scores. Thus, in these low income groups, the distribution for boys has a substantially larger right tail over time and a larger share of boys show improvements in their test scores overtime compared to girls. To conclude, Figure 2, Panel (b) is the key stylized fact for analysing gender and income gaps within the same study to explore possible interactions.

For comparison, Figure 3 Panel (a) shows the distribution of standardized reading scores by gender in Grade 3. The distribution of boys' test scores has a substantially fatter left tail, while girls on average do better than boys. Figure 3 Panel (b) shows the distribution of Grade 9 minus Grade 3 test scores, the distribution of change in reading scores over time, reinforces the original shape of the two distributions by

[8] We also plot the distributions of test scores by parental education. The results, available from authors, are similar to Figure 2.

Figure 2: *Numeracy Test Scores Distributions of Low Income Students*

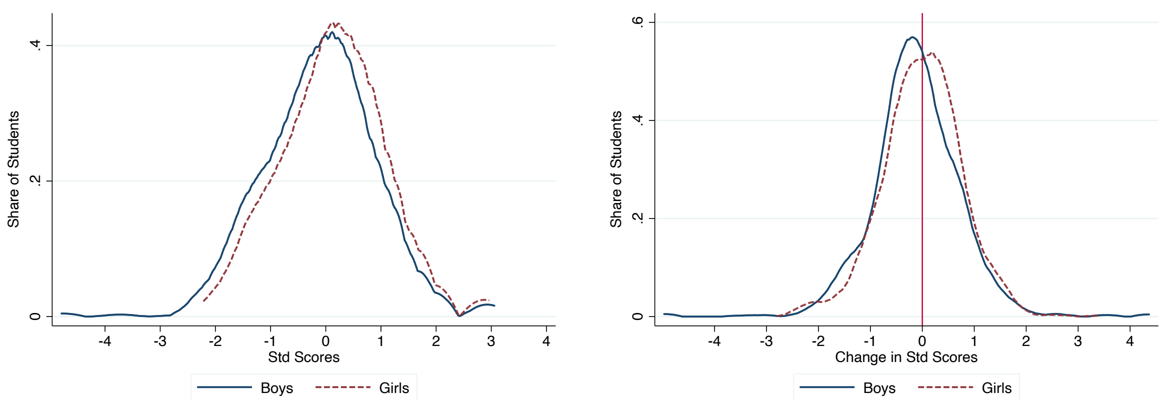


(a) Grade 3

(b) Change (Grade 9 - Grade 3)

Notes: Kernel density distribution for standardized numeracy test scores for NAPLAN tests using the K cohort in LSAC sample, sample restricted to children from the bottom income decile in LASAC Wave 1 (1) Panel (a) shows the Grade 3 standardized numeracy NAPLAN test scores and (2) Panel (b) shows the change in test scores from Grade 3 to Grade 9 (Grade 9 standardized numeracy NAPLAN test scores minus Grade 3 standardized test scores).

Figure 3: *Reading Test Scores Distributions*



(a) Grade 3

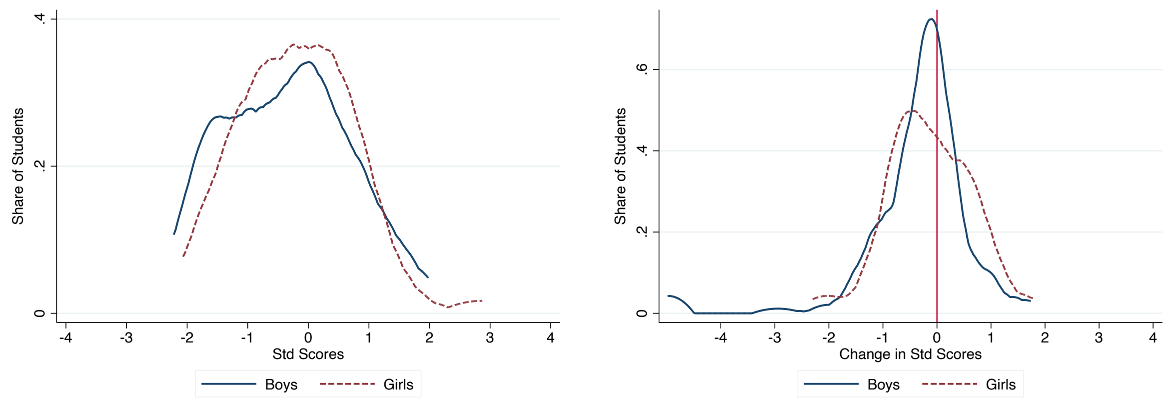
(b) Change (Grade 9 - Grade 3)

Notes: Kernel density distributions for standardized reading test scores for NAPLAN tests using the K cohort in LSAC sample,: Panel (a) Grade 3 standardized reading NAPLAN test scores and Panel (b) shows the change in test scores from Grade 3 to Grade 9 (Grade 9 standardized reading NAPLAN test scores minus Grade 3 standardized test scores).

gender.

Figure 4 plots the reading test scores from low-income students (from households with income in the bottom decile in Wave 1 (aged 4-5)). The distribution continues to have a fatter left tail for boys (see Panel

Figure 4: *Test Scores Distributions of Low Income Students*



(a) Grade 3 (b) Change (Grade 9 - Grade 3)

Notes: Kernel density distribution for standardized reading test scores for NAPLAN tests using the K cohort in LSAC sample, sample restricted to children from the bottom income decile in LASAC Wave 1 (1) Panel (a) shows the Grade 3 standardized reading NAPLAN test scores and (2) Panel (b) shows the change in test scores from Grade 3 to Grade 9 (Grade 9 standardized reading NAPLAN test scores minus Grade 3 standardized test scores).

(a)). However, in contrast to the total distribution, changes over time show that on average, girls scores decrease more than boys except at the extreme left tail (see Panel (b)). That is, girls do not improve in reading from Grade 3 to Grade 9. Thus, the widening gender gap, particularly for children from lower-income households, observed in Figure 2 cannot be explained by girls specialising in reading and boys specialising in mathematics.

3.3 Income Mobility

The above density distributions in test scores show substantial gender differences, especially for the most disadvantaged households as measured by Wave 1 household income (when the child is 4-5 years old). A natural question that arises is about the stability of household income over the time under consideration. Table 2 shows the transition from the bottom (first decile) to the middle (middle 80 percent) and the top (10th decile) from age 4/5 to age 8/9 and from age 4/5 to 14/15.[9,10]

Among the children who remain in the sample over time, more than half the children exit the bottom income group (57 percent by the time the child is 8-9 years and 59 percent by the time the child is 14-

[9] Transitions across quintiles are in Appendix A.

[10] Household income is adjusted by the size of the household in each wave following the OECD square root procedure.

Table 2: Income Transitions

	Percentages			
	Decile (Young)			
Decile	**Bottom**	**Middle**	**Top**	**Total**
Age 4/5 to Age 8/9 Transitions				
Bottom	8.2	6.1	0.7	14.9
Middle	10.4	46.5	5.9	62.8
Top	0.6	7.7	13.9	22.3
Total	19.2	60.3	20.5	100.0
N	654	2,052	699	3,405
Age 4/5 to Age 14/15 Transitions				
Bottom	6.6	7.7	0.9	15.2
Middle	9.3	44.5	8.6	62.4
Top	0.4	9.3	12.7	22.4
Total	16.4	61.5	22.1	100.0
N	415	1,558	561	2,534

Notes: For further details see Appendix A.

15 years old). The households at the top exhibit somewhat less income mobility, with roughly one-third dropping out of the top income decile compared to Wave 1.[11]

4 Methodology

The goal of this paper is to understand the interaction of gender and income on test scores. In this section, we present the intuitive framework for estimating these interactions. We start with the standard human capital accumulation framework.

Test score outcomes, Q_t, are simply a function of skills, $Q_t = g(\theta_t)$. Skills or human capital, θ_t is a function of investments, $\theta_t = f(I_t, I_{t-1}, \ldots, I_0)$. In turn, investment is a function of the stock of human capital, θ_{t-1}, gender norms, N_t^g, and parental resources, both in income, , y_t^p and parental human capital, θ^p:

$$I_t = h(\theta_{t-1}, N_t^g, y_t^p, \theta^p).$$

[11] More attrition is evident at the bottom than at the top in the sample, we will consider this pattern in the results section.

Following Cunha, Heckman and Schennach (2010), early and late investments are complementary; students with greater early abilities are more efficient in later learning of skills. The literature on early child development stresses the importance of early interventions and early cognitive ability for later academic and labor market outcomes (Heckman and Krueger, 2005; O'Connor et al., 2020). In empirical studies, this framework suggests that test scores are a function of past investments, or more precisely, they are functions of a child's innate ability (human capital), prevailing and past gender norms, and current and past parental resources:

$$Q_t = \underbrace{z(\underset{(+)}{\theta_0}, \underset{(-)}{\{N_s^g\}_{s=1}^t}, \underset{(+)}{\{y_s^p\}_{s=1}^t}, \underset{(+)}{\theta^p})}. \tag{1}$$

Literature on gender gaps shows that gender norms can either promote or hamper the acquisition of new skills. For example, positive reinforcement of "boys are good at math" can accelerate the acquisition of new math skills in boys. For exposition purposes, we focus on the potential negative impact only on girls. Investment in a child's human capital is impacted by the socioeconomic status (SES) of the household, through parents' skills, ability, and resources. Thus, investment is increasing in parental resources, parental skills, and ability, but decreasing in gender norms (as defined from the perspective of girls).

Studies so far have estimated the effects of SES and gender by treating them as two separable inputs.

$$Q_t = z_1(\theta_0) + z_2(\{N_s^g\}_{s=1}^t) + z_3(\{y_s^p\}_{s=1}^t, \theta^p). \tag{2}$$

However, whether SES and gender are two separable inputs or if they interact to produce a double (dis)advantage is an open question. While it is plausible that socioeconomic status affects boys and girls symmetrically, it is also possible that parental background interacts with gender norms. Gender norms themselves could vary based on socioeconomic status. Gender norms could be weaker amongst higher socioeconomic parents or parents with more resources can invest in countering the gender norms. Further, gender may interact differently with different determinants of SES, such as income versus parental education, which is the key focus of this paper. Thus, such interactions in human capital investments will be reflected in test scores as shown in Equation (3):

$$Q_t = z_1(\theta_0) + \underbrace{z_2(\{N_s^g\}_{s=1}^t)}_{(-)} + \underbrace{z_3(\{y_s^p\}_{s=1}^t, \theta^p)}_{(+)} + \underbrace{f_{23}(\{N_s^g\}_{s=1}^t, \{y_s^p\}_{s=1}^t}_{(-)/(+)} + \underbrace{h_{23}(\{N_s^g\}_{s=1}^t, \theta^p)}_{(-)/(+)}. \quad (3)$$

Whether the interaction of gender norms and parental resources is negative or positive and monotonic along socioeconomic status is unclear *a prior*. As well as the overall level of parental resources, the effect of parental resources on gender gap might depend on the role of the mother (or the father) in the family. Thus, in Sections 5 and 7 we empirically investigate whether low-income exacerbates gender differences (and high-income mitigates gender differences) and how this changes across households with a differing mother's role.

4.1 Regressions

The goal is to estimate Equations (2) and (3) from the data. To gain a better understanding of the importance of gender norms and parental characteristics of early-life household income and educational attainment, we proceed with the estimation in steps. We start by estimating a regression equation on the effect of gender on test scores:

$$Q_{it} = \alpha + \beta_1 Female_i + \varepsilon_{it}, \quad (4)$$

where, Q_{it} denotes the numeracy score for student i at time t (Grade 3 and Grade 9) and *Female* denotes a dummy variable for girls capturing any potential negative gender norm or stereotype. We then expand Regression (4) by adding time-varying controls, X_{it}, such as age at test, school type, and controls for household variables, H_i. Most important of these are household income in Wave 1 and mother's and father's education levels. To investigate potential non-linearities in household income, we allow for flexibility in the coefficient β_3^k with respect to different parts of the socioeconomic spectrum,

$$Q_{it} = \alpha + \beta_1 Female_i + \beta_2 X_{it} + \sum_k \beta_3^k H_i^k + \varepsilon_{it}. \quad (5)$$

Coefficients on gender, β_1, and household characteristics, β_3^k, provide the separable effect of gender and socioeconomic status estimated in the literature.

In order to investigate whether income and parental education have differential effects on girls and boys, we interact these variables with first, gender and second, with the mother's role in the household measured,

$$Q_{it} = \alpha + \beta_{1t} Female_i + \beta_{2t} X_{it} + \sum_k \beta_{3t}^k H_i^k + \sum_k \gamma_{3t}^k H_i^k \times Type_i + \varepsilon_{it}, \tag{6}$$

where $Type$ is an indicator for the household type of the student. For instance, whether the student is a girl or boy, and in the second step, whether his/her mother has a more traditional or modern role in the household as proxied by educational attainment and labor force participation. Thus, $\beta_{1t} < 0$ captures any negative gender norms towards girls in math, $\beta_{3t}^k < 0$ captures the disadvantage through lower household income in test scores, while $\beta_{3t}^j > 0$ captures the advantage from higher household income in test scores, assuming $k < j$ captures the relative income position of households accordingly. Lastly, the double disadvantage is captured in $\gamma_{3t}^k < 0$ if negative gender norms are reinforced through lower household income, while $\gamma_{3t}^j > 0$ captures if a higher household mitigates negative gender norms.

Lastly, in line with the theory on early cognitive ability for later academic success, in Equation (7), we study the evolution of test scores by replacing the dependent variable with the change in scores from Grade 3 to Grade 9,

$$Q_{i9} - Q_{i3} = \alpha + \beta_{19} Female_i + \beta_{29} X_{i9} + \sum_k \beta_{39}^k H_i^k + \sum_k \gamma_{39}^k H_i^k \times Type_i + \varepsilon_{i9}. \tag{7}$$

The resulting effects are now all functions of initial (Grade 3) scores and, thus a positive coefficient on our variables of interest would now suggest a narrowing or widening over time of these scores. For example, a positive coefficient of β_{3t}^k for low income students would suggest these students outperform higher income students conditional on Grade 3 test scores, while a negative coefficient would imply a further widening in the gap between low and high income students.

Taking Equations (4) - (7) to the data requires us to approximate gender norms, ability, and parental resources. Given data availability, gender norms or stereotypes are captured by a gender dummy for each outcome equation, ability, θ_0 at time zero is captured by early cognitive tests, while parental income and education interacted with gender can capture the interaction effect of parental resources and gender norms from Equation (3).

To further understand the contribution of gender, income and parental education and their interaction with gender norms to gender differences in numeracy scores, we employ Oaxaca-Blinder decomposition as follows,

$$(\overline{Q}_{it}^{F}) - (\overline{Q}_{it}^{M}) = \tag{8}$$
$$\sum_{j} \beta_{jt}^{F} \left(\overline{X}_{jt}^{F} - \overline{X}_{jt}^{M}\right) + (\beta_{jt}^{F} \times \gamma_{jt}^{F}) \left(\overline{H}_{jt}^{F} - \overline{H}_{jt}^{M}\right) + \overline{X}_{jt}^{M} \left(\beta_{jt}^{F} - \beta_{jt}^{M}\right) + \overline{H}_{jt}^{M} \left((\beta_{jt}^{F} \times \gamma_{jt}^{F}) - (\beta_{jt}^{M} \times \gamma_{jt}^{M})\right),$$

where the gap between female scores and males scores at the mean can be decomposed into the explained component due to observed group differences in the $\overline{X}$'s and $\overline{H}$'s (also known as endowment effect) and the unexplained component due to differences in the coefficients (the β's and γ's).

The empirical approach focuses on gender and socioeconomic characteristics (early-life household income and parental education) interacted with gender norms as the key explanatory variables. The theory suggests that higher income enables parents to invest in their child's human capital formation. Parental skills and inputs into children's numeracy skills are expected to increase with parents' education. However, gender stereotypes may decrease parental investment into girls and this might differ differential across the socioeconomic spectrum. In addition, early-life circumstances and investment may play a crucial role in late outcomes.

5 Results

Table 3 shows the gender gap in numeracy test scores in Grade 3 and Grade 9.[12] The gender gap in favor of boys is statistically insignificant in Grade 3 (column 1) but this advantage becomes highly significant and increases to 0.15 standard deviation by the time children reach Grade 9 (column 2). This widening of the gender gap in numeracy is in line with results from recent papers (Fryer and Levitt, 2010). The gender gap in numeracy cannot be explained by differences in household and school characteristics. In fact, controlling for these in columns (3) and (4) results in a bigger advantage for boys.

[12] This analysis focuses on numeracy scores; however, NAPLAN also tests for literacy. We also considered the gender gap in reading scores as discussed in Section 3 in the context of Figure 3 and Figure 4. Consistent with the evidence so far, the test scores show that girls do better than boys in reading. However, with a full set of controls, there is no evidence of a double disadvantage or significant changes over time. These results are available from the authors upon request.

Table 3: Basic Regression Specifications

VARIABLES	(1) Grade 3	(2) Grade 9	(3) Grade 3	(4) Grade 9	(5) Grade 3	(6) Grade 9	(7) Grade 3	(8) Grade 9	(9) Grade 3	(10) Grade 9
Female	-0.054	-0.149***	-0.074**	-0.166***	-0.079**	-0.165***	-0.081**	-0.165***	-0.074**	-0.156***
	(0.037)	(0.037)	(0.034)	(0.035)	(0.036)	(0.036)	(0.036)	(0.035)	(0.037)	(0.036)
Income (Bottom - Young)					-0.104	-0.211***	-0.073	-0.152**	-0.124*	-0.100
					(0.069)	(0.070)	(0.068)	(0.069)	(0.074)	(0.073)
Income (Top - Young)					0.288***	0.297***	0.189***	0.159***	0.143**	0.136**
					(0.060)	(0.060)	(0.061)	(0.060)	(0.070)	(0.066)
Income (Bottom)									0.058	-0.124
									(0.086)	(0.076)
Income (Top)									0.095	0.051
									(0.067)	(0.064)
University & Above (Mother)							0.155***	0.178***	0.142***	0.166***
							(0.041)	(0.040)	(0.042)	(0.042)
University & Above (Father)							0.203***	0.333***	0.203***	0.336***
							(0.042)	(0.041)	(0.043)	(0.043)
Observations	2,860	2,858	2,559	2,552	2,286	2,348	2,278	2,338	2,209	2,159
R-squared	0.001	0.006	0.247	0.238	0.241	0.249	0.257	0.283	0.258	0.288
CONTROLS			YES	YES	YES	YES	YES	YES	YES	YES

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Notes: Controls include, Age at test, Government School, Catholic School, Two Parents at Home at corresponding Wave, Indigenous, Breastfed, English as Main Language at Home, Lives in Major Australian City, and WAI and PPVT at Wave 1. Full regression can be found in Appendix B.

Adding early-life household income (columns 5 and 6) reveals the socioeconomic gaps in numeracy, but the magnitude or the significance of the gender gap (between 0.07 to 0.16 standard deviation) persists. Coming from a bottom income decile does not have a statistically significant effect in Grade 3 (though the effect is negative) but children from the top decile have a 0.3 standard deviation higher numeracy test score. By Grade 9, children from the bottom decile have 0.2 standard deviations lower scores and those from the top decile continue to have 0.3 standard deviations higher scores. We include a full set of controls in column (7) and (8). The gender effect is significant and largely unchanged in magnitude, the coefficients on income deciles are smaller but remain significant for the top decile. As expected, parents' education also has a significant effect. Both mother's and father's education have a positive effect on numeracy scores; father's tertiary education has the most notable effect. Numeracy scores are approximately 0.2 standard deviations higher in Grade 3 and 0.3 standard deviation higher in Grade 9 if the father have a tertiary qualification.

These results show that being male, having a higher early-life household income, and more parental education are positively associated with numeracy scores from Grade 3 to Grade 9. We now investigate how these interact. Does lower household income lead to a particular disadvantage for girls or boys?

The results in Table 4 highlight salient patterns in the interaction of income variables and gender. Being in the bottom income decile lowers Grade 3 test scores; however, the magnitude and significance of the coefficients suggest no socioeconomic or gender gap at this stage. In Grade 9, the effect is small and statistically insignificant for boys, that is, early-life disadvantage has no negative impact on test scores (column 2). In contrast, girls from the bottom income decile have an additional 0.3 standard deviation penalty (column 2), on top of the gender disadvantage in Grade 9. Looking at higher-income households, being in the top income decile increases numeracy score by about 0.2 standard deviations for boys, but this advantage does not extend to girls. Being in the top income decile does have a mitigating effect for girls; in contrast to the most disadvantaged girls, higher household income prevents the widening of the gender gap from Grade 3 to Grade 9. The numeracy scores for girls from the bottom income decile are 0.4 standard deviations lower in Grade 9, while they are 0.1 standard deviations lower for girls from the top income decile. These interactions between gender and household income in Grade 9 persist when we control for parents' education (Columns 3-6).

The results so far suggest that while the double disadvantage is a function of the early childhood envi-

Table 4: Full Regression Specifications

VARIABLES	(1) Grade 3	(2) Grade 9	(3) Grade 3	(4) Grade 9	(5) Grade 3	(6) Grade 9
Female	-0.057	-0.118***	-0.055	-0.119***	-0.072	-0.131**
	(0.040)	(0.039)	(0.042)	(0.042)	(0.053)	(0.054)
Income (Bottom - Young)	-0.086	0.002	-0.191*	0.028	-0.194*	0.025
	(0.093)	(0.096)	(0.104)	(0.100)	(0.105)	(0.100)
Female x Income (Bottom - Young)	0.029	-0.312**	0.134	-0.275*	0.138	-0.272*
	(0.134)	(0.136)	(0.146)	(0.146)	(0.146)	(0.147)
Income (Top - Young)	0.301***	0.266***	0.248**	0.206**	0.254***	0.212**
	(0.081)	(0.081)	(0.097)	(0.094)	(0.098)	(0.095)
Female x Income (Top - Young)	-0.248**	-0.227**	-0.227	-0.148	-0.240*	-0.159
	(0.117)	(0.114)	(0.138)	(0.128)	(0.140)	(0.132)
Income (Bottom)			0.049	-0.165	0.048	-0.167
			(0.117)	(0.103)	(0.117)	(0.103)
Female x Income (Bottom)			0.023	0.101	0.027	0.104
			(0.164)	(0.143)	(0.164)	(0.144)
Income (Top)			0.115	0.086	0.121	0.089
			(0.095)	(0.090)	(0.096)	(0.090)
Female x Income (Top)			-0.046	-0.079	-0.058	-0.085
			(0.130)	(0.125)	(0.133)	(0.127)
University & Above (Mother)	0.154***	0.178***	0.140***	0.168***	0.122**	0.151***
	(0.041)	(0.040)	(0.042)	(0.042)	(0.058)	(0.058)
University & Above (Father)	0.205***	0.338***	0.205***	0.338***	0.198***	0.338***
	(0.042)	(0.041)	(0.043)	(0.043)	(0.059)	(0.060)
Female x University & Above (Mother)					0.036	0.034
					(0.084)	(0.083)
Female x University & Above (Father)					0.014	-0.001
					(0.085)	(0.085)
Observations	2,278	2,338	2,209	2,159	2,209	2,159
R-squared	0.258	0.286	0.260	0.290	0.260	0.290

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Notes: Controls include, Age at test, Government School, Catholic School, Two Parents at Home at corresponding Wave, Indigenous, Breastfed, English as Main Language at Home, Lives in Major Australian City, and WAI and PPVT at Wave 1. Full regression can be found in Appendix B.

ronment, it only manifests itself strongly by Grade 9. We focus on the change in test scores from Grade 3 to Grade 9 by estimating Equation (7) with the change in test scores as the dependent variable. The results of these estimations are reported in Table 5.

The double disadvantage for girls from the lowest income households becomes more evident in these results. The raw gender gap disappears when "controlling" for Grade 3 test scores. Girls from the bottom income households have test scores 0.4 standard deviation lower than the average. In contrast, boys are able to close some of the early life disadvantage in terms of test scores, scoring 0.19 standard deviations higher (albeit this effect is not significant). The results in columns (2) and (4) suggest that current household income also generates a double disadvantage, although the coefficients are not statistically significant and are roughly one-quarter of those for early household income in magnitude. At the top of the early childhood income distribution, the evolution of scores for boys and girls are mostly unaffected by early childhood characteristics. Lastly, for boys having a father with a tertiary education leads to an increase in test scores (0.18 standard deviations), but the same is not true for girls (0.18 standard deviation advantage from father's education is offset by the interaction effect for female and father's education of -0.14). Note that, this specification using the change in test scores as a dependent variable also addresses the possible non-random attrition, with usually the worst performing students dropping out of the samples. However, this is not the case for girls in this sample.[13]

The results so far suggest that girls face more disadvantages and boys experience positive effects from parental income and education resulting in higher test scores. How do these results contribute to the observed numeracy test score differences between boys and girls? Oaxaca-Blinder decomposition of the above base regressions, allow us to summarize the main drivers in gender numeracy gaps. The decomposition is based on the regressions reported in Table 4. Each column in Table 6 reports the percent explained of the Oaxaca-Blinder decomposition Equation (8) for every Grade 3 and 9 regression of Table 4 (columns (1) - (3) and columns (4) - (6), respectively). Rows labeled with '(Q)' refer to only the endowment effect of Equation (8), while all the other variables refer to total effect (endowment plus coefficients, where coefficients come from to each of the regressions above). The table summarizes the main characteristics of interest, (1) gender norms

[13] Regression results from Table 4 are also robust to further sample restrictions and available upon request.

Table 5: Changes over Time Regression Specifications

VARIABLES	(1)	(2)	(3)	(4)
Female	0.017	0.030	0.050	0.061
	(0.042)	(0.045)	(0.055)	(0.058)
Income (Bottom - Young)	0.189	0.186	0.192	0.186
	(0.116)	(0.118)	(0.116)	(0.119)
Female x Income (Bottom - Young)	-0.443***	-0.430**	-0.455***	-0.438***
	(0.166)	(0.169)	(0.167)	(0.169)
Income (Top - Young)	0.032	0.026	0.015	0.016
	(0.088)	(0.096)	(0.090)	(0.097)
Female x Income (Top - Young)	-0.014	0.004	0.022	0.030
	(0.122)	(0.132)	(0.128)	(0.135)
Income (Bottom)		0.021		0.029
		(0.103)		(0.104)
Female x Income (Bottom)		-0.102		-0.117
		(0.148)		(0.149)
Income (Top)		0.015		0.003
		(0.094)		(0.094)
Female x Income (Top)		-0.068		-0.041
		(0.129)		(0.131)
University & Above (Mother)	0.003	0.003	-0.018	-0.017
	(0.043)	(0.043)	(0.060)	(0.061)
University & Above (Father)	0.108**	0.108**	0.179***	0.180***
	(0.044)	(0.045)	(0.061)	(0.062)
Female x University & Above (Mother)			0.048	0.048
			(0.086)	(0.086)
Female x University & Above (Father)			-0.143*	-0.144
			(0.087)	(0.088)
Observations	1,539	1,539	1,539	1,539
R-squared	0.058	0.059	0.060	0.061

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Notes: Controls include, Age at test, Government School, Catholic School, Two Parents at Home at corresponding Wave, Indigenous, Breastfed, English as Main Language at Home, Lives in Major Australian City, and WAI and PPVT at Wave 1. Full regression can be found in Appendix B.

(*Gender*); (2) socio-economic status (*Early SES*), which includes both household income before entering school and parental education levels; (3) current income effects (*Current Income*); and (4) the aggregate effects of the remaining controls (*General Controls*). The table also provides a breakdown of early SES by income and education. We further separately report the contribution of early income that comes from the interaction of gender and income both at the bottom 10 percent and top 10 percent of the income distribution (*Girl's Disadvantage*). Lastly, the endowment effects for early household income, parent's education and current income are also shown.

Table 6 shows the widening gap from Grade 3 to 9 from 4.3 percentage points to 14.9. The results also show that gender gaps are not explained by early childhood numeracy or literacy, general household characteristics or school types (general controls). If anything girls in Grade 3 outperform boys based on these general controls. Current income has a small positive effect in Grade 3 and a small negative effect in Grade 9. The variable with the largest explanatory power for Table 4 regressions is the unexplained gender difference, while endowment effects are mostly negligible, consistent with the results of Fryer and Levitt (2010) for the US.

Two striking patterns emerge when considering early SES. Firstly, girls' double disadvantage for low-income households does not contribute to the average gender gap in Grade 3, but has a large effect for high-income households. By Grade 9, the contribution both at the top and bottom of girls' double disadvantage is roughly equal explaining around 16 percent of the average gender gap. Secondly, more generally, the results for early SES vary substantially in Grade 3 and to a much smaller degree in Grade 9, but this is mostly due to parental education. Early household income explains over 40 percent of gender differences in Grade 3 and one third of the gender gap by Grade 9. Recall that parental education only has gender interactions for columns (3) and (6). In conclusion, the decomposition suggest some potentially diverging interaction effects of parental education and income by gender at the extremes of the income distribution, which we investigate further in Section 7.

6 Robustness

The results from Section 5 establish a persistent gender gap in numeracy scores, especially for girls from the poorest households. The following section provides further evidence by analyzing different socioeconomic

Table 6: Decomposition of Gaps in Scores (Percent Explained)

Regression VARIABLES	(1) Grade 3	(2) Grade 3	(3) Grade 3	(4) Grade 9	(5) Grade 9	(6) Grade 9
Raw Gender Gap	0.043	0.043	0.043	0.149	0.149	0.149
Gender	101	92	128	76	78	88
Early SES	61	37	-3	35	31	23
Income (Young)	65	41	42	36	32	33
Girl's Disadvantage (Bottom - Young)	-3	-9	-9	18	16	16
Girl's Disadvantage (Top - Young)	73	54	56	18	15	16
Income (Young) (Q)	-5	-5	-5	0	0	0
Parent's Education	-4	-4	-45	-1	0	-10
Parent's Education (Q)	-4	-4	-3	-1	0	0
Current Income	0	4	8	0	-8	-8
Current Income (Q)	0	-2	-2	0	-3	-3
General Controls	-18	-18	-18	2	2	2

Notes: Each column reports the percent explained of the Oaxaca-Blinder decomposition Equation (8) for every Grade 3 and 9 regression of Table 4. Variables denoted by '(Q)' refer to the endowment effect of Equation (8) all other variables refer to the total effect. "Early SES" captures early childhood household income and parental education, while 'Girl's Disadvantage" captures the interaction of gender with income at the bottom and top of the income distribution.

measures and the gender differences across different subgroups of the sample.

6.1 Alternative Samples

Table 7 provides results with alternative measures for income thresholds and sample restrictions. We replicate *Regression (1)* and *Regression (2)* for Grade 3 and 9 from Table 4 respectively, and *Regression (1)* for change in scores (Grade 9 minus Grade 3 numeracy scores) from Table 5 using different samples. The first two columns report results for Grade 3 and Grade 9, respectively, and the third column provides the results for the evolution over time. We report three sets of robustness analyses in this table: Columns (1) through (3) report results for income quintiles, columns (4) - (6) for income terciles, and columns (7) - (9) restricts the sample to (only) the first born children.

Focusing on alternative cut-offs for the low- and high-income households in columns (1) to (6), the gender gap and income disadvantage weakens as we broaden the definition of disadvantaged households. Similarly, the disadvantage for poor girls is smaller at income quintiles and reverses significantly for some of the tercile specifications. In contrast, the advantage of boys at the top income level remains even with a broader definition of income. These findings suggest that the double disadvantage is especially acute for the poorest girls.

Birth order can dictate the norms and resource allocations within families (Black, Devereux and Salvanes, 2005; Gary-Bobo, Picard and Prieto, 2006). Hence, we restrict the sample to first-born children. The results in columns (7) to (9) show that household income remains the prime explanation for the observed test score gaps in our context. The disadvantage for first-born girls in low-income households roughly doubles in Grade 9. Note that we use household income adjusted for household size in all estimations.

Table 7: Alternative income measures and first-born sample

VARIABLES	(1) Grade 3	(2) Grade 9	(3) Δ_{9-3}	(4) Grade 3	(5) Grade 9	(6) Δ_{9-3}	(7) Grade 3	(8) Grade 9	(9) Δ_{9-3}
	Income quintiles			*Income terciles*			*Only first-born children*		
Female	0.020	-0.068	0.012	-0.097	-0.091	0.149**	-0.066	-0.099	0.086
	(0.047)	(0.046)	(0.048)	(0.062)	(0.062)	(0.064)	(0.063)	(0.063)	(0.065)
Income (Bottom - Young)	-0.188***	-0.078	-0.011	-0.169***	-0.042	0.081	-0.126	0.285*	0.084
	(0.073)	(0.074)	(0.083)	(0.064)	(0.066)	(0.070)	(0.164)	(0.167)	(0.186)
Female x Income (Bottom - Young)	0.019	-0.166	-0.184	0.214**	-0.012	-0.275***	-0.168	-0.867***	-0.359
	(0.100)	(0.103)	(0.113)	(0.092)	(0.093)	(0.098)	(0.241)	(0.244)	(0.269)
Income (Top - Young)	0.302***	0.210***	-0.043	0.155**	0.074	0.003	0.325***	0.267**	0.019
	(0.064)	(0.066)	(0.069)	(0.061)	(0.061)	(0.063)	(0.118)	(0.124)	(0.122)
Female x Income (Top - Young)	-0.410***	-0.266***	0.031	-0.103	-0.161*	-0.215**	-0.337*	-0.232	0.056
	(0.090)	(0.090)	(0.093)	(0.087)	(0.086)	(0.089)	(0.176)	(0.173)	(0.177)
University & Above (Mother)	0.136***	0.166***	-0.000	0.143***	0.182***	0.002	0.052	0.124**	0.023
	(0.042)	(0.042)	(0.043)	(0.042)	(0.042)	(0.043)	(0.063)	(0.063)	(0.065)
University & Above (Father)	0.203***	0.340***	0.116***	0.202***	0.356***	0.128***	0.243***	0.267***	0.090
	(0.042)	(0.043)	(0.044)	(0.043)	(0.043)	(0.044)	(0.065)	(0.064)	(0.065)
Observations	2,209	2,159	1,539	2,209	2,159	1,539	910	950	692
R-squared	0.267	0.291	0.058	0.261	0.285	0.062	0.247	0.294	0.086
CONTROLS	YES	YES	YES	YES	YES	YES	YES	YES	YES

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Notes: Controls include, Age at test, Government School, Catholic School, Two parents at home at corresponding Wave, Indigenous, Breastfed, English as Main Language at Home, Lives in Major Australian City, and WAI and PPVT at Wave 1. Full regression can be found in Appendix B.

6.2 Socioeconomic Status or Income

Thus far, we have focused on the role of household income and parental education. The literature has used other measures of socioeconomic status variables to capture household living conditions and parental resources (Fryer and Levitt, 2010). LSAC provides a variable measuring the socioeconomic position of households, which is a composite measure of both resource and social status based factors in line with the literature. More specifically, it is based on combined annual income, parents' educational attainment, and occupational status (Blakemore, Gibbings and Strazdins, 2006).

Table 8 replicates the base results by replacing educational attainment and early household income with the socioeconomic position variable (SES) from LSAC. Columns (1) through (3) analyze the effect of SES at the extreme deciles, while columns (4) through (5) measure it at the bottom and top quintiles. Using SES, instead of income and parental education separately, suggests a more persistent and widening gender gap from Grade 3 to 9. The SES gap at the bottom and top remains in the base specifications; however, the double disadvantage for girls from low SES becomes insignificant and a reversed effect is now statistically significant in Grade 3. One possible explanation for this result is that the SES variable is a broader measure. It not only captures the economic factors based on resources but also includes social status and possibly, gender norms in a family through the mother's education and occupation. These results offer suggestive evidence that the main driver of the double disadvantage manifests itself most strongly through parents' early income, but other components of SES can potentially mitigate some of the gender disadvantages. We return to this question in Section 7.

6.3 Gender Gaps across Household Types

We also explore if the gender and socioeconomic gaps differ along the observable dimensions in the population (location, school type, and mother's education and labor force participation). As a baseline comparison for the US data sample Fryer and Levitt (2010) find no discernible differences across any of their subsamples. In line with Fryer and Levitt (2010), without gender interactions (i.e., estimation of Equation (5)) the results on the evolution of the gender gap for most subgroups are in line with the results for the total population (see Table 9). That is, the gender gap widens from Grade 3 to 9 in a similar magnitude with three

Table 8: Alternative SES Measure

SES VARIABLES	(1) Deciles Grade 3	(2) Deciles Grade 9	(3) Deciles Grade 9	(4) Quintile Grade 3	(5) Quintile Grade 9	(6) Quintile Grade 9
Female	-0.098**	-0.170***	0.022	-0.070	-0.128***	0.006
	(0.039)	(0.038)	(0.040)	(0.045)	(0.044)	(0.046)
SES (Bottom - Young)	-0.337***	-0.156	0.074	-0.285***	-0.192**	-0.076
	(0.127)	(0.128)	(0.134)	(0.080)	(0.082)	(0.085)
Female x SES (Bottom - Young)	0.351*	-0.297	-0.356	0.213*	-0.181	-0.076
	(0.183)	(0.211)	(0.228)	(0.113)	(0.117)	(0.123)
SES (Top - Young)	0.212**	0.262***	0.046	0.341***	0.290***	0.051
	(0.088)	(0.087)	(0.088)	(0.072)	(0.071)	(0.072)
Female x SES (Top - Young)	-0.030	0.003	-0.016	-0.160*	-0.101	0.047
	(0.111)	(0.108)	(0.109)	(0.085)	(0.082)	(0.084)
University & Above (Mother)	0.131***	0.137***	-0.010	0.065	0.085*	-0.038
	(0.043)	(0.042)	(0.043)	(0.046)	(0.045)	(0.045)
University & Above (Father)	0.174***	0.288***	0.094**	0.101**	0.234***	0.064
	(0.044)	(0.043)	(0.044)	(0.048)	(0.047)	(0.048)
Observations	2,279	2,338	1,703	2,279	2,338	1,703
R-squared	0.258	0.287	0.047	0.265	0.292	0.048
CONTROLS	YES	YES	YES	YES	YES	YES

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Notes: Controls include, Age at test, Government School, Catholic School, Two parents at home at corresponding Wave, Indigenous, Breastfed, English as Main Language at Home, Lives in Major Australian City, and WAI and PPVT at Wave 1. Full regression can be found in Appendix B.

notable exceptions.

Firstly, there is a large difference between public and private schools. Students in a public school system start with no initial gap, but the gender gap widens by Grade 9. In contrast, there is already a substantial gender gap in Grade 3 in private schools but it does not widen by Grade 9. This could be due to the school environments and/or parents making conscious decisions about school choice to address the numeracy gaps. In Australia, most students start in a public system and switch to private schools in high school. Given the sample sizes, there is clearly some selection of students into private schools from Grade 3 to 9. The analysis of private schools is outside the scope of this study and could be the focus of further research. Second, households in which the mother has the same or more years of education than the father, show a flat gender gap over time. Inversely, where the mother has strictly fewer years of education than the father, the gap grows substantially more than in the total population. Third, when the mother works in Wave 1 (when the child is 4-5 years old), the gender gap is high and significant in Grade 3, but the evolution of the gender gap is flatter over time (half of the magnitude of the increase in the gap observed for the total population). In households where the mother does not work in Wave 1, the gap only grows with age (doubles compared to the increase in the gap for the total population). These results provide some evidence towards factors and circumstances that could reverse the detrimental gender gaps in numeracy. The second and third points suggest a role for mother's education and labor force participation and are further explored below in the context of stereotypes and role models. We discuss some of these potential avenues and their relevance for policy interventions in the following section.

7 Discussion on Gender Stereotypes and Role Models in Numeracy

In this section, we explore why lower income is more detrimental for girls' performance in numeracy. The literature suggests role models, a conscious effort (particularly) by mothers to reverse gender stereotypes or the availability of resources (both monetary and non-monetary resources such as information and knowledge) can improve scores (Boneva et al., 2021; Corno and Carlana, 2021). While the exact causes and mechanisms are outside the scope of this study, we provide suggestive evidence for income and mother's role in the family which offer ways forward towards addressing these gaps.

We focus on mother's relative education and labor force status as proxies for gender stereotypes/role

Table 9: Gender Gap across Different Households

Household Type (No Obs.)	(1) Grade 3	(2) Grade 9	(3) Change
All			
(# 2,278; 2,338)	-0.081**	-0.165***	-0.084
	(0.036)	(0.035)	
Urban			
(# 1,284; 1,265)	-0.085*	-0.181***	-0.096
	(0.048)	(0.050)	
Rural			
(# 994; 1,073)	-0.066	-0.148***	-0.082
	(0.054)	(0.049)	
Public Schools			
(# 1,437; 1,068)	0.015	-0.152***	-0.167
	(0.044)	(0.054)	
Private Schools			
(# 841; 1,270)	-0.258***	-0.184***	0.074
	(0.061)	(0.046)	
Mother same or higher Ed			
(# 1,462; 1,524)	-0.084*	-0.090**	-0.006
	(0.045)	(0.043)	
Mother lower Ed			
(# 816; 814)	-0.079	-0.304***	-0.225
	(0.061)	(0.061)	
Mother University & Above			
(# 1,003; 1,078)	-0.081	-0.168***	-0.087
	(0.054)	(0.055)	
Mother less than University			
(# 1,275; 1,260)	-0.069	-0.169***	-0.1
	(0.048)	(0.046)	
Mother not in Labour Force (Young)			
(# 815; 795)	0.001	-0.153**	-0.154
	(0.060)	(0.062)	
Mother in Labour Force (Young)			
(# 1,461; 1,541)	-0.132***	-0.172***	-0.04
	(0.045)	(0.043)	

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Notes: Controls include, Income at Wave 1, Mother's and Father's University & Above dummy, Age at test, Government School, Catholic School , Two parents at home at corresponding Wave, Indigenous, Breastfed, English as Main Language at Home, Lives in Major Australian City, and WAI and PPVT at Wave 1.

models, Table 10 provides the results of *Regression (1)* and *Regression (2)* for Grade 3 and 9 from Table 4 for each subgroup. Subgroups are defined as "traditional" or "modern" households, where a mother's educational attainment or labor force participation defines the household type. Traditional households are those where a mother does not participate in the labour market or where the mother has a lower education level than the father (the reverse applies to modern households). All regressions show that, on average, higher-income and University education of both parents has a positive effect on test scores for boys, while lower-income has a weakly negative (insignificant) effect. Contrasting columns (1) and (2), children whose mother has a higher education level (in years) than the father, with columns (3) and (4) where the mother has less education than the father, a mother's education has three differential gender effects: (1) lower mother's education levels lead to a substantial widening of the gender gap over time; (2) the disadvantage for girls from low income households is more than twice as large in more traditional households; and (3) only (higher) mother's education can compensate fully for any gender gap at the bottom and top of the income distribution. It means that in households with more traditional gender norms, girls at both ends (bottom and top) of the income distribution perform considerably worse than in households where the mother has a higher education level. Moreover, the magnitudes are similar for both extremes of the income distribution by Grade 9, while the effects are only statistically significant and large for girls from high-income households in Grade 3. The results in columns (5) and (6) follow previous findings in the literature, that, boys usually benefit from a stay-at-home mother (Fan, Fang and Markussen, 2015). Contrasting results from columns (5) through (8) systematically show that girls in households with a stay-at-home mother, do significantly worse than their peers, both at the bottom and top of the income distribution. The magnitudes and effects are similar to the regressions results on mother's relative education levels. In summary, the results highlight how traditional gender norms at home have a negative effect on girls' numeracy test gap scores.

Table 10: Gender Interactions in Subgroups

VARIABLES	(1) Grade 3 *Mother same or higher Ed*	(2) Grade 9	(3) Grade 3 *Mother lower Ed*	(4) Grade 9	(5) Grade 3 *Mother not in LF (Young)*	(6) Grade 9	(7) Grade 3 *Mother in LF (Young)*	(8) Grade 9
Female	-0.083*	-0.075	-0.017	-0.209***	0.046	-0.057	-0.121**	-0.156***
	(0.050)	(0.047)	(0.067)	(0.067)	(0.066)	(0.068)	(0.050)	(0.047)
Income (Bottom - Young)	-0.128	-0.076	-0.029	0.140	0.021	0.077	-0.214	-0.058
	(0.117)	(0.117)	(0.158)	(0.166)	(0.123)	(0.140)	(0.152)	(0.138)
Female x Income (Bottom - Young)	0.035	-0.220	0.041	-0.493**	-0.069	-0.450**	0.146	-0.147
	(0.164)	(0.164)	(0.233)	(0.242)	(0.176)	(0.193)	(0.218)	(0.203)
Income (Top - Young)	0.306***	0.116	0.265*	0.453***	0.385**	0.503***	0.267***	0.196**
	(0.102)	(0.101)	(0.136)	(0.138)	(0.161)	(0.173)	(0.094)	(0.091)
Female x Income (Top - Young)	-0.039	0.019	-0.606***	-0.561***	-0.640**	-0.705***	-0.127	-0.072
	(0.146)	(0.140)	(0.197)	(0.196)	(0.258)	(0.251)	(0.133)	(0.126)
University & Above (Mother)	0.200***	0.136**	0.188**	0.297***	0.203***	0.328***	0.113**	0.100**
	(0.057)	(0.055)	(0.096)	(0.096)	(0.074)	(0.073)	(0.051)	(0.048)
University & Above (Father)	0.134**	0.326***	0.227***	0.349***	0.206***	0.280***	0.220***	0.366***
	(0.063)	(0.061)	(0.068)	(0.069)	(0.070)	(0.073)	(0.053)	(0.050)
Observations	1,462	1,524	816	814	815	795	1,461	1,541
R-squared	0.261	0.278	0.278	0.327	0.279	0.338	0.250	0.267

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Notes: Controls include, Mother's and Father's University & Above dummy, Age at test, Government School, Catholic School, Two parents at home at corresponding Wave, Indigenous, Breastfed, English as Main Language at Home, Lives in Major Australian City, and WAI and PPVT at Wave 1.

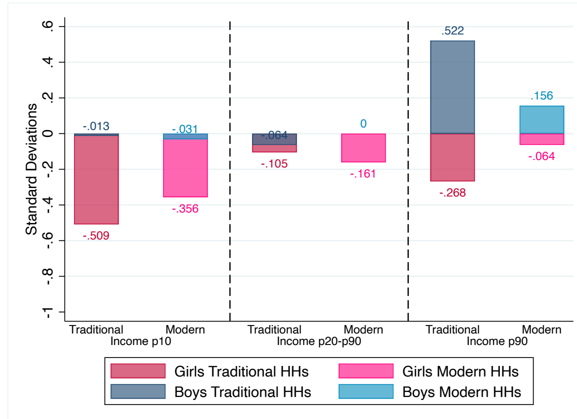
Lastly, Figure 5 provides a snapshot of different types of students and their test score outcomes, enabling a comparison of numeracy scores across gender, household income, and mother's role in the family. More precisely, the effects shown in Figure 5 follow from replicating *Regression (2)* for Grade 9 from Table 4, with the additional controls of (1) a dummy indicating if the mother has the same or more years of education as the father, (2) a dummy for whether the mother is out of the labor force or not in a given year and their gender interactions. Comparing vertically in Figure 5 shows the differences between girls and boys (the gender gap within similar households) while moving horizontally across enables comparison across household types (gender gap across household types by household income and mother's role). [14]

Our earlier results highlighted the interaction between gender and income. The results here add the importance of gender norms (as suggested by Bertrand (2020)) through mother's role. Consistent with Brenøe (2021) boys benefit most from advantageous family environments, captured here by high-income (90th percentile) households. In contrast, for girls the results are more heterogeneous along the income distribution and depend crucial on a mother's role in the household. That is, girls from families where the mother is in a traditional household role, either as a stay-at-home mother (in Wave 1 or the current Wave) or has a lower education level (in years) than the father, have lower numeracy scores. This is especially large at the extremes of the income distribution. For example, at the top of the income distribution, girls with a mother who has a higher education level than the father score 0.03 standard deviations higher than average, while boys score 0.10 standard deviations higher (albeit none of the coefficients are statistically significant at 10 percent). In contrast, in households where the mother has a lower education level, girls score 0.25 standard deviations lower than average, while boys score 0.55 standard deviations higher than the average. In this latter case, the coefficients on gender, income, and traditional gender norms/roles are statistically significant. Similarly, for girls from poor households, the corresponding values are negative 0.37 for girls from modern households, and negative 0.055 for boys from modern households, negative 0.521 for girls from traditional households and 0.122 for boys from traditional households. However, for poor students, none of the coefficients are significant at 10 percent within this specification. In contrast, for students in the

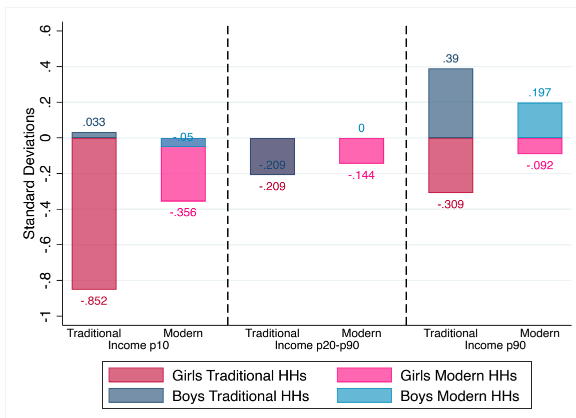
[14] The effects shown are the sum of the coefficients on Female, Income, Female x Income, Mother's Role, Female x Mother's Role, Income x Mother's Role, Female x Income x Mother's Role when applicable. Mother's Traditional Roles refers to either (1) a mother with fewer years of education than the father; (2) a mother that did not work in Wave 1; and (3) a mother that does not work in the current Wave (Grade 9). Coefficient results for *Regression (1)* and *Regression (2)* from Tables 4 and 5 can be found in Appendix B.

Figure 5: *Fictional Student Performance Gaps*

(a) Mother's Education



(b) Mother's Labour Force Young



(c) Mother's Labour Force (Current)

Notes: The effects shown are the sum of the coefficients on Female, Income, Female x Income, Mother's Role, Female x Mother's Role, Income x Mother's Role, Female x Income x Mother's Role when applicable. Mother's Traditional Roles refers to either (1) a mother with fewer years of education than the father; (2) a mother that did not work in Wave 1; and (3) a mother that does not work in the current Wave (Grade 9). Coefficient results for *Regression (1)* and *Regression (2)* from Tables 4 and 5 can be found in Appendix B.

remaining income bins, the results are much smaller irrespective of household type. The results in Figure 5 panel b, uses mother's labor force status in place of education either in Wave 1 when kids are in preschool and for each current year in panel c, and the results are comparable to panel a.

In summary, coefficients on the gender-income interactions are highly suggestive of stereotypes regarding women's role in the labor market. These have a strong effect on gender test scores gaps especially at the extremes of the income distribution. That is, for very high-income and very low-income students, who typically tend to be the high and low achieving students, respectively. Importantly, the results also show that the gender gap at the top of the income distribution is driven by boys having significant advantage in traditional households. A higher income helps cushion the numeracy scores for girls, but gender norms in traditional families result in a bigger advantage for boys, resulting in a gender gap even within high income households.The important role of mother, demonstrated by our results, is in line with recent evidence showing that mother plays a strong "nurture" role in shaping a child's education, and better-educated mothers lead to higher test scores for their children (Lundborg, Plug and Rasmussen, 2021).

These results also demonstrate the particular challenges faced by girls, recognising these challenges is the first step towards addressing them. The results provide suggestive evidence for the policy initiatives that can close these gaps. Gender gaps are exacerbated by low household income. Thus, girls from low-income household should be the main focus of any interventions. The effects mother's education and labor force participation show that irrespective of income, having a positive female role model is important for girls. In communities with low women's education and labor force participation, there is a need to recognize that these might perpetuate the low numeracy achievements for girls. Furthermore, a positive correlation between low income and traditional mother's role further exacerbates the double disadvantage for girls from low-income households. Thus, policies aimed at providing girls with female role models from STEM fields, especially in disadvantaged circumstances, may potentially help in reducing some of the observed gender gaps in mathematics in line with the results by Olivetti, Patacchini and Zenou (2020) who look at the effects of role models on labor force participation.

8 Conclusion

Gender gaps in numeracy open up early (by Grade 3) and rather than closing over the school years, increase to Grade 9. Household income has an independent effect on numeracy scores, but more worryingly, it interacts with gender, leading to a double disadvantage for girls from lower-income households. Our results are consistent with conclusions drawn from the literature investigating early interventions to address childhood disadvantage (Heckman and Cunha, 2007). These results help identify both the optimal timing of intervention and the optimal student to target, should policy makers wish to design interventions to address both gender and socioeconomic test score gaps between students. It appears that early interventions are likely to have the greatest impact, as by Grade 3 inequalities are already manifesting between students. Similarly, it appears that poorer female students suffer an acute double disadvantage by the time they reach Grade 9.

Significant gender and socioeconomic effects contribute to academic inequalities between children and may potentially influence the trajectory of students' lives after schooling. This paper contributes to the literature on the determinants of numeracy test score gaps by including a detailed examination of the interplay between socioeconomic disadvantage and gender in influencing academic achievement. This draws together two strands of literature in this area and demonstrates that income and gender disadvantage compound to doubly disadvantage poorer female students in their numeracy results. By measuring gender gaps in numeracy across a 7-year period between Grades 3 and 9, we are able to illustrate the evolution of gender heterogeneous effects over time. We detail the differing impacts of mother's and father's education on student's achievement, with father's higher education more strongly influencing students results overall, but girls being more impacted by mother's higher education than boys. By focusing our analysis on early household income and parental education, before children enter school, we further demonstrate the importance of early life circumstances on the evolution of socioeconomic and gender gaps throughout schooling. This has important policy implications when designing interventions to address educational inequalities. Our analysis highlights both who and when to target when designing such interventions; namely poorer female students, as early as possible, potentially by providing role models working to reverse gendered stereotypes.

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A Appendix: Data

Table A.1 shows the transition matrix of households across quintile income bins over time. The resulting transitions are similar to the decile transitions.

Table A.1: Income Transitions

	Percentages			
	Quintiles (Young)			
Quintiles	**Bottom**	**Middle**	**Top**	**Total**
Age 4/5 to Age 8/9 Transitions				
Bottom	8.2	6.1	0.7	14.9
Middle	10.4	46.5	5.9	62.8
Top	0.6	7.7	13.9	22.3
Total	19.2	60.3	20.5	100.0
N	654	2,052	699	3,405
Age 4/5 to Age 14/15 Transitions				
Bottom	6.6	7.7	0.9	15.2
Middle	9.3	44.5	8.6	62.4
Top	0.4	9.3	12.7	22.4
Total	16.4	61.5	22.1	100.0
N	415	1,558	561	2,534

B Appendix: Results

B.1 Mother's Traditional Gender Roles

This section provides the underlying regressions results to construct Figure 5. For completeness we provide both Grade 3 (Table B.1) and Grade 9 (Table B.2) results, although Figure 5 only shows Grade 9 results.

Table B.1: Various Regressions for Mother’s Traditional Gender Roles (Grade 3)

	(1)	(2)	(3)	(4)	(5)	(6)
Mother’s Role	*Mother lower Education*		*Mother not in LF (Young)*		*Mother not in LF*	
VARIABLES						
Female	-0.064	-0.086*	-0.103**	-0.124**	-0.053	-0.064
	(0.049)	(0.051)	(0.049)	(0.051)	(0.045)	(0.046)
Income (Bottom - Young)	-0.085	-0.115	-0.068	-0.185	-0.095	-0.153
	(0.093)	(0.118)	(0.094)	(0.153)	(0.096)	(0.133)
Female x Income (Bottom - Young)	0.031	0.037	0.000	0.128	0.038	0.177
	(0.134)	(0.167)	(0.135)	(0.220)	(0.137)	(0.185)
Income (Top - Young)	0.297***	0.287***	0.290***	0.248***	0.302***	0.317***
	(0.081)	(0.103)	(0.081)	(0.094)	(0.081)	(0.090)
Female x Income (Top - Young)	-0.245**	-0.038	-0.226*	-0.112	-0.246**	-0.222*
	(0.117)	(0.149)	(0.118)	(0.135)	(0.118)	(0.127)
Mother’s Traditional Role	0.036	0.025	-0.077	-0.106*	0.051	0.045
	(0.057)	(0.062)	(0.052)	(0.057)	(0.060)	(0.067)
Female x Mother’s Traditional Role	0.020	0.076	0.117	0.172**	-0.011	0.034
	(0.074)	(0.082)	(0.075)	(0.082)	(0.086)	(0.095)
Income x Mother’s Traditional Role (Bottom - Young)		0.077		0.193		0.113
		(0.192)		(0.193)		(0.190)
Female x Income x Mother’s Traditional Role (Bottom - Young)		-0.003		-0.219		-0.316
		(0.279)		(0.279)		(0.276)
Income x Mother’s Traditional Role (Top - Young)		0.031		0.152		-0.072
		(0.161)		(0.180)		(0.199)
Female x Income x Mother’s Traditional Role (Top - Young)		-0.565**		-0.520*		-0.334
		(0.242)		(0.285)		(0.371)
University & Above (Mother)	0.179***	0.176***	0.149***	0.146***	0.159***	0.156***
	(0.048)	(0.048)	(0.042)	(0.042)	(0.042)	(0.042)
University & Above (Father)	0.185***	0.186***	0.210***	0.214***	0.204***	0.204***
	(0.046)	(0.046)	(0.042)	(0.042)	(0.042)	(0.042)
Observations	2,278	2,278	2,276	2,276	2,265	2,265
R-squared	0.258	0.262	0.259	0.260	0.258	0.259
CONTROLS	YES	YES	YES	YES	YES	YES

Standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Table B.2: Mother's Traditional Gender Roles (Grade 9)

	(1)	(2)	(3)	(4)	(5)	(6)
Mother's Role	*Mother lower Education*		*Mother not in LF (Young)*		*Mother not in LF*	
VARIABLES						
Female	-0.047	-0.078	-0.132***	-0.161***	-0.125***	-0.144***
	(0.047)	(0.049)	(0.047)	(0.049)	(0.042)	(0.042)
Income (Bottom - Young)	0.002	-0.055	0.007	-0.031	0.023	-0.050
	(0.096)	(0.120)	(0.097)	(0.143)	(0.098)	(0.115)
Female x Income (Bottom - Young)	-0.318**	-0.237	-0.323**	-0.164	-0.320**	-0.162
	(0.136)	(0.168)	(0.137)	(0.211)	(0.138)	(0.158)
Income (Top - Young)	0.265***	0.096	0.264***	0.157*	0.265***	0.197**
	(0.081)	(0.103)	(0.081)	(0.093)	(0.081)	(0.089)
Female x Income (Top - Young)	-0.227**	0.016	-0.228**	-0.060	-0.234**	-0.145
	(0.114)	(0.144)	(0.115)	(0.131)	(0.114)	(0.123)
Mother's Role	0.086	0.024	-0.021	-0.065	-0.122*	-0.209***
	(0.057)	(0.062)	(0.052)	(0.056)	(0.069)	(0.080)
Female x Mother's Role	-0.191***	-0.106	0.041	0.120	0.006	0.143
	(0.073)	(0.080)	(0.074)	(0.080)	(0.098)	(0.110)
Income x Mother's Role (Bottom - Young)		0.153		0.082		0.293
		(0.198)		(0.193)		(0.220)
Female x Income x Mother's Role (Bottom - Young)		-0.222		-0.291		-0.723**
		(0.285)		(0.278)		(0.327)
Income x Mother's Role (Top - Young)		0.431***		0.430**		0.402*
		(0.160)		(0.184)		(0.206)
Female x Income x Mother's Role (Top - Young)		-0.637***		-0.690**		-0.554
		(0.235)		(0.269)		(0.339)
University & Above (Mother)	0.171***	0.168***	0.178***	0.176***	0.168***	0.166***
	(0.047)	(0.047)	(0.041)	(0.041)	(0.041)	(0.041)
University & Above (Father)	0.336***	0.337***	0.338***	0.338***	0.352***	0.349***
	(0.045)	(0.045)	(0.041)	(0.041)	(0.041)	(0.041)
Observations	2,338	2,338	2,336	2,336	2,306	2,306
R-squared	0.288	0.291	0.287	0.289	0.287	0.290

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Notes: Controls include, Mother's and Father's University & Above dummy, Age at test, Government School, Catholic School and two parents at home at corresponding Wave, Indigenous, Breastfed, English as Main Language at Home, Lives in Major Australian City, WAI and PPVT at Wave 1.

B.2 Detailed Regression Results

This section provides detailed regression results, showing all coefficients, for all tables provided in the main text.

Table B.3: Basic Regression Specifications

ARIABLES	(1) Grade 3	(2) Grade 9	(3) Grade 3	(4) Grade 9	(5) Grade 3	(6) Grade 9	(7) Grade 3	(8) Grade 9	(9) Grade 3	(10) Grade 9
Female	-0.046	-0.117***	-0.077**	-0.150***	-0.073**	-0.150***	-0.073**	-0.155***	-0.074**	-0.156***
	(0.042)	(0.043)	(0.037)	(0.038)	(0.037)	(0.037)	(0.037)	(0.036)	(0.037)	(0.036)
Income (Bottom - Young)					-0.144**	-0.183**	-0.112	-0.127*	-0.124*	-0.100
					(0.072)	(0.074)	(0.071)	(0.072)	(0.074)	(0.073)
Income (Top - Young)					0.297***	0.308***	0.188***	0.157**	0.143**	0.136**
					(0.061)	(0.063)	(0.062)	(0.063)	(0.070)	(0.066)
Income (Bottom)									0.058	-0.124
									(0.086)	(0.076)
Income (Top)									0.095	0.051
									(0.067)	(0.064)
Two Parents			0.045	0.177***	0.040	0.177***	0.022	0.149***	0.028	0.112*
			(0.073)	(0.059)	(0.072)	(0.058)	(0.072)	(0.057)	(0.075)	(0.061)
Indigenous			-0.493***	-0.460***	-0.473***	-0.436***	-0.432***	-0.414***	-0.430***	-0.422***
			(0.129)	(0.124)	(0.129)	(0.123)	(0.127)	(0.120)	(0.127)	(0.120)
Age<5 (Young)			0.152**	0.374***	0.147**	0.371***	0.139**	0.351***	0.139**	0.353***
			(0.064)	(0.073)	(0.063)	(0.072)	(0.063)	(0.071)	(0.063)	(0.071)
Breastfed			0.230***	0.201***	0.210***	0.188**	0.166**	0.139*	0.166**	0.137*
			(0.069)	(0.078)	(0.069)	(0.077)	(0.069)	(0.076)	(0.069)	(0.076)
English at Home			-0.094	-0.373***	-0.118*	-0.381***	-0.090	-0.341***	-0.092	-0.346***
			(0.061)	(0.064)	(0.061)	(0.063)	(0.061)	(0.062)	(0.061)	(0.062)
Urban (Young)			0.179***	0.246***	0.152***	0.219***	0.107***	0.155***	0.104***	0.155***
			(0.039)	(0.039)	(0.039)	(0.039)	(0.039)	(0.039)	(0.039)	(0.039)
Govn't School			-0.061	-0.329***	-0.019	-0.275***	0.014	-0.181***	0.019	-0.176***
			(0.056)	(0.047)	(0.056)	(0.048)	(0.056)	(0.047)	(0.056)	(0.048)
Catholic School			-0.152**	-0.305***	-0.117*	-0.266***	-0.088	-0.215***	-0.082	-0.215***
			(0.064)	(0.053)	(0.064)	(0.053)	(0.064)	(0.052)	(0.064)	(0.052)
WAI (Young)			0.344***	0.327***	0.343***	0.324***	0.330***	0.307***	0.328***	0.305***
			(0.023)	(0.022)	(0.023)	(0.021)	(0.023)	(0.021)	(0.023)	(0.021)
PPVT (Young)			0.281***	0.179***	0.269***	0.169***	0.251***	0.148***	0.251***	0.147***
			(0.021)	(0.022)	(0.021)	(0.022)	(0.021)	(0.021)	(0.021)	(0.021)
University & Above (Mother)							0.146***	0.170***	0.142***	0.166***
							(0.042)	(0.042)	(0.042)	(0.042)
University & Above (Father)							0.211***	0.343***	0.203***	0.336***
							(0.042)	(0.043)	(0.043)	(0.043)
Constant	0.128***	0.106***	-0.072	0.134	-0.068	0.112	-0.161	-0.051	-0.173	-0.007
	(0.029)	(0.030)	(0.127)	(0.122)	(0.128)	(0.122)	(0.127)	(0.120)	(0.130)	(0.123)
Observations	2,209	2,159	2,209	2,159	2,209	2,159	2,209	2,159	2,209	2,159
R-squared	0.001	0.003	0.229	0.238	0.239	0.249	0.257	0.286	0.258	0.288

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table B.4: Full Regression Specifications

VARIABLES	(1) Grade 3	(2) Grade 9	(3) Grade 3	(4) Grade 9	(5) Grade 3	(6) Grade 9
Female	-0.055	-0.116***	-0.055	-0.119***	-0.072	-0.131**
	(0.040)	(0.040)	(0.042)	(0.042)	(0.053)	(0.054)
Income (Bottom - Young)	-0.180*	-0.005	-0.191*	0.028	-0.194*	0.025
	(0.099)	(0.098)	(0.104)	(0.100)	(0.105)	(0.100)
Female x Income (Bottom - Young)	0.137	-0.258*	0.134	-0.275*	0.138	-0.272*
	(0.139)	(0.143)	(0.146)	(0.146)	(0.146)	(0.147)
Income (Top - Young)	0.308***	0.251***	0.248**	0.206**	0.254***	0.212**
	(0.083)	(0.086)	(0.097)	(0.094)	(0.098)	(0.095)
Female x Income (Top - Young)	-0.259**	-0.193	-0.227	-0.148	-0.240*	-0.159
	(0.118)	(0.118)	(0.138)	(0.128)	(0.140)	(0.132)
Income (Bottom)			0.049	-0.165	0.048	-0.167
			(0.117)	(0.103)	(0.117)	(0.103)
Female x Income (Bottom)			0.023	0.101	0.027	0.104
			(0.164)	(0.143)	(0.164)	(0.144)
Income (Top)			0.115	0.086	0.121	0.089
			(0.095)	(0.090)	(0.096)	(0.090)
Female x Income (Top)			-0.046	-0.079	-0.058	-0.085
			(0.130)	(0.125)	(0.133)	(0.127)
University & Above (Mother)	0.143***	0.170***	0.140***	0.168***	0.122**	0.151***
	(0.042)	(0.042)	(0.042)	(0.042)	(0.058)	(0.058)
University & Above (Father)	0.212***	0.345***	0.205***	0.338***	0.198***	0.338***
	(0.042)	(0.043)	(0.043)	(0.043)	(0.059)	(0.060)
Female x University & Above (Mother)					0.036	0.034
					(0.084)	(0.083)
Female x University & Above (Father)					0.014	-0.001
					(0.085)	(0.085)
Two Parents	0.023	0.151***	0.030	0.115*	0.031	0.114*
	(0.072)	(0.057)	(0.075)	(0.061)	(0.075)	(0.061)
Indigenous	-0.430***	-0.411***	-0.430***	-0.420***	-0.433***	-0.423***
	(0.127)	(0.120)	(0.127)	(0.120)	(0.128)	(0.120)
Age<5 (Young)	0.144**	0.350***	0.144**	0.351***	0.145**	0.352***
	(0.063)	(0.071)	(0.063)	(0.071)	(0.063)	(0.071)
Breastfed	0.164**	0.142*	0.164**	0.139*	0.164**	0.140*
	(0.069)	(0.076)	(0.069)	(0.076)	(0.069)	(0.076)
English at Home	-0.085	-0.345***	-0.086	-0.350***	-0.086	-0.348***
	(0.061)	(0.062)	(0.061)	(0.062)	(0.061)	(0.062)
Urban (Young)	0.103***	0.154***	0.101***	0.155***	0.101***	0.155***
	(0.039)	(0.039)	(0.039)	(0.039)	(0.039)	(0.039)
Govn't School	0.009	-0.181***	0.014	-0.176***	0.013	-0.177***
	(0.056)	(0.047)	(0.056)	(0.048)	(0.056)	(0.048)
Catholic School	-0.096	-0.216***	-0.088	-0.215***	-0.088	-0.216***
	(0.064)	(0.052)	(0.064)	(0.052)	(0.064)	(0.052)
WAI (Young)	0.330***	0.305***	0.329***	0.303***	0.329***	0.303***
	(0.023)	(0.021)	(0.023)	(0.021)	(0.023)	(0.021)
PPVT (Young)	0.251***	0.148***	0.251***	0.148***	0.251***	0.148***
	(0.021)	(0.021)	(0.021)	(0.021)	(0.021)	(0.021)
Constant	-0.166	-0.071	-0.180	-0.027	-0.172	-0.021
	(0.128)	(0.121)	(0.131)	(0.124)	(0.132)	(0.125)
Observations	2,209	2,159	2,209	2,159	2,209	2,159
R-squared	0.259	0.288	0.260	0.290	0.260	0.290

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table B.5: Changes over Time Regression Specifications

VARIABLES	(1)	(2)	(3)	(4)
Female	0.017	0.030	0.050	0.061
	(0.042)	(0.045)	(0.055)	(0.058)
Income (Bottom - Young)	0.189	0.186	0.192	0.186
	(0.116)	(0.118)	(0.116)	(0.119)
Female x Income (Bottom - Young)	-0.443***	-0.430**	-0.455***	-0.438***
	(0.166)	(0.169)	(0.167)	(0.169)
Income (Top - Young)	0.032	0.026	0.015	0.016
	(0.088)	(0.096)	(0.090)	(0.097)
Female x Income (Top - Young)	-0.014	0.004	0.022	0.030
	(0.122)	(0.132)	(0.128)	(0.135)
Income (Bottom)		0.021		0.029
		(0.103)		(0.104)
Female x Income (Bottom)		-0.102		-0.117
		(0.148)		(0.149)
Income (Top)		0.015		0.003
		(0.094)		(0.094)
Female x Income (Top)		-0.068		-0.041
		(0.129)		(0.131)
University & Above (Mother)	0.003	0.003	-0.018	-0.017
	(0.043)	(0.043)	(0.060)	(0.061)
University & Above (Father)	0.108**	0.108**	0.179***	0.180***
	(0.044)	(0.045)	(0.061)	(0.062)
Female x University & Above (Mother)			0.048	0.048
			(0.086)	(0.086)
Female x University & Above (Father)			-0.143*	-0.144
			(0.087)	(0.088)
Two Parents	0.207***	0.204***	0.206***	0.203***
	(0.060)	(0.064)	(0.060)	(0.064)
Indigenous	0.133	0.134	0.141	0.143
	(0.124)	(0.125)	(0.124)	(0.125)
Age<5 (Young)	0.149**	0.152**	0.148**	0.151**
	(0.066)	(0.066)	(0.066)	(0.066)
Breastfed	-0.056	-0.055	-0.064	-0.062
	(0.079)	(0.079)	(0.079)	(0.080)
English at Home	-0.264***	-0.264***	-0.268***	-0.267***
	(0.063)	(0.063)	(0.063)	(0.063)
Urban (Young)	-0.033	-0.033	-0.035	-0.035
	(0.041)	(0.041)	(0.041)	(0.041)
Govn't School	-0.104**	-0.106**	-0.100**	-0.102**
	(0.049)	(0.049)	(0.049)	(0.050)
Catholic School	-0.148***	-0.149***	-0.147***	-0.148***
	(0.053)	(0.054)	(0.053)	(0.054)
WAI (Young)	0.004	0.004	0.004	0.004
	(0.024)	(0.024)	(0.024)	(0.024)
PPVT (Young)	-0.102***	-0.102***	-0.102***	-0.102***
	(0.023)	(0.023)	(0.023)	(0.023)
Constant	0.106	0.105	0.099	0.098
	(0.123)	(0.128)	(0.125)	(0.129)
Observations	1,539	1,539	1,539	1,539
R-squared	0.058	0.059	0.060	0.061

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table B.6: Alternative Income Measures

VARIABLES	(1) Grade 3	(2) Grade 9	(3) Grade 9	(4) Grade 3	(5) Grade 9	(6) Grade 9	(7) Grade 3	(8) Grade 9	(9) Grade 9
Female	0.020	-0.068	0.012	-0.097	-0.091	0.149**	-0.066	-0.099	0.086
	(0.047)	(0.046)	(0.048)	(0.062)	(0.062)	(0.064)	(0.063)	(0.063)	(0.065)
Income (Bottom - Young)	-0.188***	-0.078	-0.011	-0.169***	-0.042	0.081	-0.126	0.285*	0.084
	(0.073)	(0.074)	(0.083)	(0.064)	(0.066)	(0.070)	(0.164)	(0.167)	(0.186)
Female x Income (Bottom - Young)	0.019	-0.166	-0.184	0.214**	-0.012	-0.275***	-0.168	-0.867***	-0.359
	(0.100)	(0.103)	(0.113)	(0.092)	(0.093)	(0.098)	(0.241)	(0.244)	(0.269)
Income (Top - Young)	0.302***	0.210***	-0.043	0.155**	0.074	0.003	0.325***	0.267**	0.019
	(0.064)	(0.066)	(0.069)	(0.061)	(0.061)	(0.063)	(0.118)	(0.124)	(0.122)
Female x Income (Top - Young)	-0.410***	-0.266***	0.031	-0.103	-0.161*	-0.215**	-0.337*	-0.232	0.056
	(0.090)	(0.090)	(0.093)	(0.087)	(0.086)	(0.089)	(0.176)	(0.173)	(0.177)
University & Above (Mother)	0.136***	0.166***	-0.000	0.143***	0.182***	0.002	0.052	0.124**	0.023
	(0.042)	(0.042)	(0.043)	(0.042)	(0.042)	(0.043)	(0.063)	(0.063)	(0.065)
University & Above (Father)	0.203***	0.340***	0.116***	0.202***	0.356***	0.128***	0.243***	0.267***	0.090
	(0.042)	(0.043)	(0.044)	(0.043)	(0.043)	(0.044)	(0.065)	(0.064)	(0.065)
Two Parents	0.013	0.132**	0.197***	0.017	0.142**	0.205***	0.053	0.137	0.310***
	(0.071)	(0.057)	(0.060)	(0.071)	(0.057)	(0.060)	(0.113)	(0.088)	(0.087)
Indigenous	-0.411***	-0.398***	0.147	-0.426***	-0.423***	0.134	-0.133	-0.140	0.082
	(0.127)	(0.120)	(0.125)	(0.127)	(0.120)	(0.124)	(0.208)	(0.207)	(0.192)
Age<5 (Young)	0.147**	0.362***	0.160**	0.151**	0.356***	0.149**	0.135	0.368***	0.172*
	(0.062)	(0.071)	(0.066)	(0.062)	(0.071)	(0.066)	(0.098)	(0.105)	(0.099)
Breastfed	0.144**	0.133*	-0.068	0.162**	0.137*	-0.065	0.112	0.161	-0.023
	(0.068)	(0.075)	(0.079)	(0.068)	(0.076)	(0.079)	(0.136)	(0.148)	(0.162)
English at Home	-0.101*	-0.355***	-0.268***	-0.086	-0.337***	-0.253***	-0.195**	-0.480***	-0.294***
	(0.061)	(0.062)	(0.063)	(0.061)	(0.062)	(0.063)	(0.092)	(0.092)	(0.092)
Urban (Young)	0.093**	0.149***	-0.039	0.093**	0.159***	-0.026	0.126**	0.252***	0.074
	(0.039)	(0.039)	(0.041)	(0.039)	(0.039)	(0.041)	(0.062)	(0.061)	(0.064)
Govn't School	-0.012	-0.188***	-0.108**	0.002	-0.202***	-0.121**	0.110	-0.148**	-0.108
	(0.056)	(0.047)	(0.049)	(0.056)	(0.047)	(0.049)	(0.086)	(0.071)	(0.073)
Catholic School	-0.120*	-0.226***	-0.156***	-0.110*	-0.231***	-0.164***	-0.051	-0.245***	-0.182**
	(0.063)	(0.052)	(0.053)	(0.063)	(0.052)	(0.053)	(0.098)	(0.077)	(0.078)
WAI (Young)	0.329***	0.307***	0.007	0.328***	0.309***	0.008	0.349***	0.343***	0.008
	(0.023)	(0.021)	(0.024)	(0.023)	(0.021)	(0.024)	(0.035)	(0.032)	(0.035)
PPVT (Young)	0.249***	0.147***	-0.100***	0.250***	0.149***	-0.098***	0.211***	0.121***	-0.098***
	(0.021)	(0.021)	(0.023)	(0.021)	(0.021)	(0.023)	(0.032)	(0.032)	(0.033)
Constant	-0.112	-0.033	0.159	-0.130	-0.053	0.100	-0.060	0.036	-0.076
	(0.129)	(0.123)	(0.126)	(0.132)	(0.126)	(0.128)	(0.214)	(0.207)	(0.218)

Observations	2,209	2,159	1,539	2,209	2,159	1,539	910	950	692
R-squared	0.267	0.291	0.058	0.261	0.285	0.062	0.247	0.294	0.086

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table B.7: Alternative SES Measure

	(1)	(2)	(3)	(4)	(5)	(6)
SES	Deciles	Deciles	Deciles	Quintile	Quintile	Quintile
VARIABLES	Grade 3	Grade 9	Grade 9	Grade 3	Grade 9	Grade 9
Female	-0.098**	-0.170***	0.022	-0.070	-0.128***	0.006
	(0.039)	(0.038)	(0.040)	(0.045)	(0.044)	(0.046)
SES (Bottom - Young)	-0.337***	-0.156	0.074	-0.285***	-0.192**	-0.076
	(0.127)	(0.128)	(0.134)	(0.080)	(0.082)	(0.085)
Female x SES (Bottom - Young)	0.351*	-0.297	-0.356	0.213*	-0.181	-0.076
	(0.183)	(0.211)	(0.228)	(0.113)	(0.117)	(0.123)
SES (Top - Young)	0.212**	0.262***	0.046	0.341***	0.290***	0.051
	(0.088)	(0.087)	(0.088)	(0.072)	(0.071)	(0.072)
Female x SES (Top - Young)	-0.030	0.003	-0.016	-0.160*	-0.101	0.047
	(0.111)	(0.108)	(0.109)	(0.085)	(0.082)	(0.084)
University & Above (Mother)	0.131***	0.137***	-0.010	0.065	0.085*	-0.038
	(0.043)	(0.042)	(0.043)	(0.046)	(0.045)	(0.045)
University & Above (Father)	0.174***	0.288***	0.094**	0.101**	0.234***	0.064
	(0.044)	(0.043)	(0.044)	(0.048)	(0.047)	(0.048)
Two Parents	-0.007	0.114**	0.162***	-0.005	0.108**	0.157***
	(0.068)	(0.053)	(0.056)	(0.067)	(0.053)	(0.056)
Indigenous	-0.434***	-0.364***	0.169	-0.415***	-0.365***	0.159
	(0.125)	(0.120)	(0.121)	(0.125)	(0.119)	(0.120)
Age<5 (Young)	0.128**	0.355***	0.170***	0.130**	0.346***	0.168***
	(0.061)	(0.069)	(0.063)	(0.061)	(0.068)	(0.063)
Breastfed	0.166**	0.148**	-0.074	0.144**	0.132*	-0.083
	(0.067)	(0.073)	(0.075)	(0.066)	(0.073)	(0.075)
English at Home	-0.094	-0.374***	-0.250***	-0.114*	-0.385***	-0.255***
	(0.059)	(0.059)	(0.060)	(0.059)	(0.059)	(0.060)
Urban (Young)	0.092**	0.150***	-0.023	0.077**	0.140***	-0.028
	(0.038)	(0.037)	(0.039)	(0.038)	(0.037)	(0.039)
Govn't School	0.006	-0.179***	-0.102**	0.015	-0.168***	-0.092**
	(0.055)	(0.045)	(0.046)	(0.055)	(0.045)	(0.046)
Catholic School	-0.083	-0.200***	-0.146***	-0.081	-0.199***	-0.143***
	(0.063)	(0.050)	(0.051)	(0.062)	(0.049)	(0.051)
WAI (Young)	0.330***	0.305***	-0.000	0.332***	0.298***	-0.004
	(0.022)	(0.020)	(0.023)	(0.022)	(0.020)	(0.023)
PPVT (Young)	0.251***	0.152***	-0.088***	0.246***	0.151***	-0.089***
	(0.021)	(0.021)	(0.022)	(0.021)	(0.021)	(0.022)
Constant	-0.089	0.018	0.135	-0.040	0.062	0.177
	(0.122)	(0.114)	(0.115)	(0.123)	(0.116)	(0.118)

Observations	2,279	2,338	1,703	2,279	2,338	1,703
R-squared	0.258	0.287	0.047	0.265	0.292	0.048

Standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Table B.8: Gender Interactions in Subgroups

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Grade 3	Grade 9	Grade 3	Grade 9	Grade 3	Grade 9	Grade 3	Grade 9
VARIABLES	*Mother same or higher Ed*		*Mother lower Ed*		*Mother not in LF (Young)*		*Mother in LF (Young)*	
Female	-0.083*	-0.075	-0.017	-0.209***	0.046	-0.057	-0.121**	-0.156***
	(0.050)	(0.047)	(0.067)	(0.067)	(0.066)	(0.068)	(0.050)	(0.047)
Income (Bottom - Young)	-0.128	-0.076	-0.029	0.140	0.021	0.077	-0.214	-0.058
	(0.117)	(0.117)	(0.158)	(0.166)	(0.123)	(0.140)	(0.152)	(0.138)
Female x Income (Bottom - Young)	0.035	-0.220	0.041	-0.493**	-0.069	-0.450**	0.146	-0.147
	(0.164)	(0.164)	(0.233)	(0.242)	(0.176)	(0.193)	(0.218)	(0.203)
Income (Top - Young)	0.306***	0.116	0.265*	0.453***	0.385**	0.503***	0.267***	0.196**
	(0.102)	(0.101)	(0.136)	(0.138)	(0.161)	(0.173)	(0.094)	(0.091)
Female x Income (Top - Young)	-0.039	0.019	-0.606***	-0.561***	-0.640**	-0.705***	-0.127	-0.072
	(0.146)	(0.140)	(0.197)	(0.196)	(0.258)	(0.251)	(0.133)	(0.126)
University & Above (Mother)	0.200***	0.136**	0.188**	0.297***	0.203***	0.328***	0.113**	0.100**
	(0.057)	(0.055)	(0.096)	(0.096)	(0.074)	(0.073)	(0.051)	(0.048)
University & Above (Father)	0.134**	0.326***	0.227***	0.349***	0.206***	0.280***	0.220***	0.366***
	(0.063)	(0.061)	(0.068)	(0.069)	(0.070)	(0.073)	(0.053)	(0.050)
Two Parents	-0.013	0.120*	-0.045	0.089	-0.072	0.111	0.057	0.130**
	(0.084)	(0.066)	(0.117)	(0.091)	(0.103)	(0.097)	(0.091)	(0.063)
Indigenous	-0.253*	-0.405***	-1.063***	-0.433	-0.347*	-0.466**	-0.498***	-0.332**
	(0.140)	(0.128)	(0.273)	(0.307)	(0.181)	(0.200)	(0.176)	(0.150)
Age<5 (Young)	0.182**	0.309***	0.046	0.361***	0.043	0.338***	0.207***	0.340***
	(0.080)	(0.088)	(0.097)	(0.109)	(0.097)	(0.119)	(0.080)	(0.084)
Breastfed	0.160*	-0.060	0.159	0.436***	0.210**	0.297**	0.140	0.046
	(0.088)	(0.094)	(0.105)	(0.117)	(0.096)	(0.118)	(0.094)	(0.095)
English at Home	-0.037	-0.285***	-0.196*	-0.538***	-0.105	-0.389***	-0.104	-0.358***
	(0.073)	(0.071)	(0.104)	(0.107)	(0.090)	(0.094)	(0.082)	(0.078)
Urban (Young)	0.111**	0.182***	0.045	0.080	0.066	0.172***	0.092*	0.138***
	(0.048)	(0.045)	(0.064)	(0.065)	(0.064)	(0.066)	(0.048)	(0.045)
Govn't School	0.056	-0.179***	-0.115	-0.177**	-0.015	-0.171**	0.015	-0.184***
	(0.067)	(0.055)	(0.095)	(0.079)	(0.095)	(0.080)	(0.068)	(0.055)
Catholic School	-0.021	-0.201***	-0.237**	-0.208**	-0.108	-0.200**	-0.099	-0.231***
	(0.077)	(0.060)	(0.107)	(0.088)	(0.109)	(0.091)	(0.077)	(0.059)
WAI (Young)	0.355***	0.310***	0.301***	0.288***	0.271***	0.318***	0.375***	0.296***
	(0.028)	(0.025)	(0.037)	(0.034)	(0.036)	(0.035)	(0.029)	(0.025)
PPVT (Young)	0.215***	0.132***	0.305***	0.198***	0.302***	0.225***	0.210***	0.104***
	(0.026)	(0.025)	(0.036)	(0.036)	(0.034)	(0.034)	(0.027)	(0.026)
Observations	1,462	1,524	816	814	815	795	1,461	1,541
R-squared	0.261	0.278	0.278	0.327	0.279	0.338	0.250	0.267

Standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Table B.9: Mother's Traditional Gender Roles (Grade 9)

Mother's Role	*Mother lower Education*		*Mother not in LF (Young)*		*Mother not in LF*	
	(1)	(2)	(3)	(4)	(5)	(6)
VARIABLES						
Female	-0.047	-0.078	-0.132***	-0.161***	-0.125***	-0.144***
	(0.047)	(0.049)	(0.047)	(0.049)	(0.042)	(0.042)
Income (Bottom - Young)	0.002	-0.055	0.007	-0.031	0.023	-0.050
	(0.096)	(0.120)	(0.097)	(0.143)	(0.098)	(0.115)
Female x Income (Bottom - Young)	-0.318**	-0.237	-0.323**	-0.164	-0.320**	-0.162
	(0.136)	(0.168)	(0.137)	(0.211)	(0.138)	(0.158)
Income (Top - Young)	0.265***	0.096	0.264***	0.157*	0.265***	0.197**
	(0.081)	(0.103)	(0.081)	(0.093)	(0.081)	(0.089)
Female x Income (Top - Young)	-0.227**	0.016	-0.228**	-0.060	-0.234**	-0.145
	(0.114)	(0.144)	(0.115)	(0.131)	(0.114)	(0.123)
Mother's Traditional Role	0.086	0.024	-0.021	-0.065	-0.122*	-0.209***
	(0.057)	(0.062)	(0.052)	(0.056)	(0.069)	(0.080)
Female x Mother's Traditional Role	-0.191***	-0.106	0.041	0.120	0.006	0.143
	(0.073)	(0.080)	(0.074)	(0.080)	(0.098)	(0.110)
Income x Mother's Traditional Role (Bottom - Young)		0.153		0.082		0.293
		(0.198)		(0.193)		(0.220)
Female x Income x Mother's Traditional Role (Bottom - Young)		-0.222		-0.291		-0.723**
		(0.285)		(0.278)		(0.327)
Income x Mother's Traditional Role (Top - Young)		0.431***		0.430**		0.402*
		(0.160)		(0.184)		(0.206)
Female x Income x Mother's Traditional Role (Top - Young)		-0.637***		-0.690**		-0.554
		(0.235)		(0.269)		(0.339)
University & Above (Mother)	0.171***	0.168***	0.178***	0.176***	0.168***	0.166***
	(0.047)	(0.047)	(0.041)	(0.041)	(0.041)	(0.041)
University & Above (Father)	0.336***	0.337***	0.338***	0.338***	0.352***	0.349***
	(0.045)	(0.045)	(0.041)	(0.041)	(0.041)	(0.041)
Two Parents	0.114**	0.113**	0.125**	0.123**	0.093*	0.096*
	(0.053)	(0.053)	(0.053)	(0.053)	(0.056)	(0.056)
Indigenous	-0.388***	-0.393***	-0.378***	-0.381***	-0.375***	-0.383***
	(0.120)	(0.120)	(0.119)	(0.120)	(0.120)	(0.120)
Age<5 (Young)	0.341***	0.343***	0.343***	0.335***	0.336***	0.333***
	(0.069)	(0.068)	(0.069)	(0.069)	(0.069)	(0.069)
Breastfed	0.162**	0.156**	0.154**	0.151**	0.148**	0.145*
	(0.073)	(0.073)	(0.073)	(0.073)	(0.074)	(0.074)

English at Home	-0.377***	-0.376***	-0.367***	-0.368***	-0.376***	-0.378***
	(0.059)	(0.059)	(0.059)	(0.060)	(0.059)	(0.059)
Urban (Young)	0.149***	0.149***	0.152***	0.155***	0.152***	0.156***
	(0.037)	(0.037)	(0.037)	(0.037)	(0.038)	(0.038)
Govn't School	-0.172***	-0.171***	-0.170***	-0.174***	-0.168***	-0.164***
	(0.045)	(0.045)	(0.045)	(0.045)	(0.046)	(0.046)
Catholic School	-0.203***	-0.201***	-0.204***	-0.209***	-0.207***	-0.206***
	(0.050)	(0.050)	(0.050)	(0.050)	(0.050)	(0.050)
WAI (Young)	0.305***	0.303***	0.305***	0.305***	0.302***	0.300***
	(0.020)	(0.020)	(0.020)	(0.020)	(0.020)	(0.020)
PPVT (Young)	0.154***	0.155***	0.152***	0.151***	0.152***	0.152***
	(0.021)	(0.021)	(0.021)	(0.021)	(0.021)	(0.021)
Constant	-0.064	-0.037	-0.042	-0.016	0.016	0.028
	(0.115)	(0.116)	(0.116)	(0.116)	(0.117)	(0.117)
Observations	2,338	2,338	2,336	2,336	2,306	2,306
R-squared	0.288	0.291	0.287	0.289	0.287	0.290

Standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1