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PIER Working Paper
21-026

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September 30, 2021

https://ssrn.com/abstract=3935995

Gender Gaps in Cognitive and Noncognitive Skills among Adolescents in India*

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September 2021

Abstract

Gender gaps in skills exist around the world but differ remarkably among countries. This paper uses a unique data set with more than 20,000 adolescents in rural India to explore gender gaps in cognitive and noncognitive skills. We find that boys have considerable advantages over girls on several indicators of cognitive and noncognitive skills that remains robust to a wide range of controls and specification choices. We also examine the correlates of cognitive and noncognitive outcomes, paying close attention to socioeconomic status (SES) and pro-female gender attitudes. We find a steep positive gradient in SES as well as for pro-female gender attitudes, with stronger associations between the SES gradient and skills. Further, high socioeconomic status and more pro-female gender attitudes are both strongly correlated with reducing the gender gap in cognitive and noncognitive outcomes.

Keywords: Cognitive skills, Noncognitive skills, Gender attitudes, Gender, India, Children

JEL Classification: I21, I25, J13, J16, J24

*We thank the two anonymous reviewers for their very helpful comments and suggestions. We also thank Anjali Chandra and Molly Sheets for excellent research assistance. This study acknowledges funding support from the International Initiative for Impact Evaluation (3ie) and the India Research Engagement Fund (IREF) at the University of Pennsylvania. The findings contained within are those of the authors and do not reflect policies of the funding organizations. The usual caveats apply.

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1 Introduction

Gender gaps in children's outcomes exist around the world but differ regionally and by income level. Countries of the Organisation for Economic Co-operation and Development (OECD) saw a steady reversal of the male-female gap in test scores, with girls recently doing much better than boys on reading scores of the Programme for International Student Assessment (PISA).[1] However, this reversal of the gender gap in test scores has not been observed in the poorest and most populated parts of the world—Asia and sub-Saharan Africa. Boys in India, for example, outperform girls in vocabulary and math (Dercon and Singh, 2013). Similarly, standardized test results from 19 African nations show the average mathematics score among girls is lower than for boys (Dickerson et al., 2015). Such gender gaps exist in noncognitive skills as well and vary across the high and low- and middle-income countries.[2] The empirical evidence showing the importance of noncognitive skills (such as self-esteem, self-efficacy, risk appetite, competitiveness, Big Five personality traits) in explaining both skill accumulation and success in the labor market in both high-income and low- and middle-income countries is growing (Heckman et al., 2006; Dasgupta et al., 2015; Kristoffersen et al., 2015).[3] It is therefore important to close gender gaps in both cognitive and noncognitive skills.[4]

Any effort to close the gender gaps in cognitive and noncognitive skills requires an understanding of the magnitude of these gaps in low- and middle-income countries, but a scarcity of data on skills constrains this research.[5] The primary objective of this paper is to examine gender gaps in cognitive and noncognitive skills and in doing so we extend the current literature in important ways. First, we use a unique data set with a large sample of more than 20,000 Indian children between the ages of 8 and 14 years to examine gender gaps in a range of indicators of skills: schooling attainment (e.g., enrollment and relative grade attainment), crystallized intelligence (e.g., performance on reading and math tests),

[1] In 2018, girls outperformed boys in reading by almost 30 points (OECD, 2020; Schleicher, 2019). Boys outperformed girls in math but only by 5 points.

[2] Bertrand and Pan (2013) show that male children in the United States are more likely than girls to have behavioral problems and display conduct problems in school. Dercon and Singh (2013) in fact show that girls fare worse than boys on agency and self-esteem in both India and Ethiopia. The pro-male bias in agency in India and Ethiopia among adolescents is striking.

[3] Gender gaps in noncognitive skills are also important in explaining gender gaps in mental health (Churchill et al., 2020).

[4] Goldammer (2012) finds that noncognitive skills may explain a significant share of the Asian advantage in adult economic outcomes in the United States relative to Whites, Blacks, and Hispanics.

[5] A recent study by Evans et al. (2020) examines gender gaps in enrollment and schooling attainment across many developing countries but does not have any measures on learning outcomes or noncognitive skills.

fluid intelligence (e.g., performance on Raven's tests), and self-esteem and self-efficacy.

Second, the paper provides the first evidence on the importance of pro-female gender attitudes in determining children's cognitive and noncognitive skills. Despite the vast literature examining the correlates of women's attitudes toward gender and well-being using data from the World Values Survey (Tausch, 2019; Sweeting et al., 2014), and the recent attention on improving children's gender attitudes (Dhar et al., 2018) and agency (Edmonds et al., 2021) using experimental methods, there is no work that directly links children's gender attitudes with their cognitive and noncognitive skills.

Third, we also examine the SES and attitude gradients in both cognitive and noncognitive skills. Schady et al. (2015) find a steep socioeconomic gradient in reading test scores across five countries in Latin America. The SES gradient in cognitive outcomes is also noted in all four countries of the Young Lives Study (Engle et al., 2011).[6] We add to this literature by examining not just socioeconomic gradients but also pro-female gender attitude gradients as well as the complementarities therein in both cognitive and noncognitive skills among children.

Our results indicate significant gender gaps in reading (in both native languages and English), math, Raven's tests, and relative grade attainment. We also note significant gender gaps in self-efficacy among adolescents but find no gender gaps in self-esteem. All observed scores in cognitive and noncognitive aspects of human capital are consistently larger for boys than for girls. Our preferred specifications show that the male-female gaps in reading in native languages and English are 0.08 and 0.13 standard deviations, respectively. The male-female gaps in math, relative grade attainment, and self-efficacy are 0.12, 0.09, and 0.08 standard deviations, respectively. The associations between gender and skills, both cognitive and noncognitive, are robust to the inclusion of a wide range of controls, including village and household fixed effects as well as pro-female gender attitudes.

We find both family SES and the child's own pro-female gender attitudes to be important correlates of cognitive and noncognitive skills. We find a steep positive gradient in SES as well as pro-female gender attitudes with stronger associations between the SES gradient and skills. We also find that the male advantages in cognitive outcomes almost disappears at higher levels of SES (there is a small male advantage in math scores that is significant only at the 10 percent level). By contrast, even though the male advantage falls with higher levels of pro-female gender attitudes, the gap does not completely disappear (especially the

[6]Fernald et al. (2011) estimate the SES gradient for multiple developmental domains including child health, receptive language, and executive functioning in Madagascar but do not examine noncognitive skills.

gender gap in reading scores in English remains significant at the 5 percent level). Even at high levels of pro-female gender attitudes, the gender gap in cognitive outcomes persists across some quintiles of the SES distribution, whereas at high levels of SES, the gender gap exists mostly at the lowest quintiles of the pro-female gender attitude distribution. More pro-female gender attitudes and higher SES are both correlated with lower gender gaps in cognitive and noncognitive skills. Lastly, we find significant complementarities in SES and pro-female gender attitudes in that having high socioeconomic status and high pro-female gender attitudes is correlated with eliminating male advantages in cognitive and noncognitive skills.

The rest of the paper is organized as follows. Section 2 describes the sampling strategy, our survey measures, and summary statistics. Section 3 presents the main results on the gender gaps in cognitive and noncognitive skills. Section 4 explores heterogeneity analysis and pathways are presented in Section 5. Robustness checks follow in Section 6, and lastly, concluding remarks are offered in Section 7.

2 Data

2.1 Sampling

We use unique data on more than 20,000 adolescent children between the ages of 8 and 14 years, randomly drawn from 158 rural villages across two Indian districts – Palghar and Kurnool. In Table 1 we show that our sample includes approximately equal numbers of children and households from both districts. These are pre-intervention data, collected as part of a large-scale cluster randomized control trial aimed at changing adolescent behaviors in health, education, and gender attitudes. We randomly sampled on average 135 age-eligible children from each village and implemented household surveys and child surveys during August–November 2015.[7] A detailed description of our sampling strategy is provided in Appendix B. Since we drop very small and very large villages and villages with very

[7]The baseline survey received ethics clearance from the Institutional Ethics Committee, at the Public Health Foundation of India under protocol ID: TRC-IEC-226/14. The enumerator first read the study details from the participant information sheet to an adult member in the household and obtained written consent (or oral consent when written consent was not feasible) from the adult respondent to administer the household questionnaire as well as received consent for interviewing children between the ages of 8 and 14 years in the household. After obtaining adult consent for interviewing the children, the children were directly read the study details from the participant information sheet and the enumerator obtained written consent (or oral consent when written consent was not feasible) from the target child as well before beginning the child questionnaire.

low and very high child-sex ratios (as described in Appendix B) our sample is likely to be representative of moderate-sized villages with relatively more equitable gender norms in both Kurnool and Palghar.

Kurnool is in the state of Andhra Pradesh and Palghar is in the state of Maharashtra. Both states are patriarchal where most of the heads of the households are males. In our sample, 93 percent of the heads of the households are male in the full sample (as well as in Maharashtra and in Andhra Pradesh). Kinship systems in both states are historically patrilineal (where lineage and inheritance can be traced through males in the family) and patrilocal (that is, where girls migrate to the husband's house after marriage) (see Ethnographic Atlas by Murdoch (1967)).

In terms of gender differences, historically, both states had similar and higher sex ratios (girls/boys) at birth than the northern states of India such as Punjab, Haryana, Uttar Pradesh and Rajasthan (Dyson and Moore, 1983). To assess how the socioeconomic characteristics in our data compare to the socioeconomic characteristics in rural Maharashtra and Andhra Pradesh together, and rural India more broadly, we proceed in two ways. We first recreate panel E of the summary statistics reported below in Table 3 in Appendix Table A1, using the 2015-2016 DHS-NFHS data for all children between the ages 8 and 14 years in rural Maharashtra (MH) and Andhra Pradesh (AP). This table captures gender gaps in demographic variables observed in rural AP and MH. Comparing the gender gaps in Table 3 panel E from our sample with that of Appendix Table A1, we note similar differences between boys and girls for the scheduled-tribe and household-size variables in both tables. Specifically, girls grow-up in larger households, and are more likely to belong to a scheduled tribe. Similarities across the two tables suggest that the gender gaps observed in our sample are mostly representative of the gender gaps observed among the average 8-to-14-year-old child in rural AP and MH.[8]

Next, we compare gender gaps in enrollment, relative grade attainment, and socioeconomic characteristics in our sample with the 2015-16 round of DHS-NFHS data for rural Maharashtra and Andhra Pradesh as well as rural and urban India. We present these results in Appendix Table A2. We find that gender gaps in enrollment and relative grade attainment are lower in our sample, compared to the state- and national-level gender gaps from the DHS (see Columns 1, 2 and 3). Not surprisingly, the gender gaps in enrollment and relative grade attainment are larger in the northern states (UP, Rajasthan, Delhi, Haryana and Punjab)

[8]We do not conduct this exercise for Kurnool and Palghar because there are only 300 observations in the DHS from Palghar and Kurnool.

compared to our sample (see Column 4). We find small gender differences in average wealth at the fifth SES quintile across datasets, however, the gender difference in average wealth (SES) in our sample does not seem to be significantly different from gender differences in wealth in AP and MH or even rural and urban India. Importantly, as shown by the absence of statistical significance in most rows in Appendix Table A2, the gender gaps in our sample are quite representative of the gender gaps prevalent in rural AP and MH, rural India more broadly, and urban India as well.

Lastly, we examine variables that capture women's empowerment using the sample of ever married women between the ages of 15 and 49, from the 2015-16 DHS-NFHS data for India. In Appendix Table A3, we summarize the socioeconomic and empowerment characteristics for women in Palghar and Kurnool, rural AP and MH, and rural India in Columns (1), (2), and (3) respectively. Only 25 to 36 percent of women work at the district and national levels, respectively. Consistently, women are economically highly dependent on their husbands at all levels: at the district level and national level, only 15 to 25 percent of women own assets (that is, own land or a house on their own). The extent of women's empowerment can also be measured by the rates of physical, emotional and sexual abuse present among couples: one out of three women have experienced intimate partner violence. Additionally, 41 to 61 percent of women interviewed agree with specific reasons for wife beating, at the national and district level, respectively. Women's position in Kurnool and Palghar, the districts in our study, seem to have more conservative gender norms compared to the nationwide average. Women in Kurnool and Palghar have lower labor-force-participation rates, lower rates of asset ownership, higher rates of acceptance of domestic violence, and face higher prevalence of controlling behaviors from husbands. However, as noted previously, the gender gaps prevalent in our sample of children appear to be largely representative or more pro-female than the gender gaps observed among adolescents in the rest of India.

2.2 Data collection

We administered the household surveys to parents of age-eligible children and the child surveys directly to the children of interest. The household survey collected data on standard household demographic characteristics (e.g., age, gender, enrollment status, completed grades of schooling, relationship to household head, and employment status for all household members), assets, expenditures on schooling, and participation in social protection programs such as the MGNREGA (Mahatma Gandhi National Rural Employment Guarantee Act). The child survey collected detailed data on enrollment, completed grades of schooling, and

several measures of learning outcomes. We used the Annual Status of Education Report (ASER, 2018) testing tools to measure children's proficiency in basic math and language. The math tests asked students to recognize numbers (1–9, 10–99), complete simple two-digit subtraction problems, and complete simple three-digit division problems.

We also administered two tests for capturing basic language proficiency: a reading test was administered in the children's native languages (e.g., Marathi, Telugu, or Urdu) and a similar one was administered in English. The two language-proficiency tests ask students to recognize letters, words, and read a brief paragraph (grade 1 level text) and a short story (grade 2 level text). The ASER reading tests are widely used to measure learning and cognitive skills among children in India (Shah and Steinberg, 2017). We also administered a 10-item version of the Raven's progression matrices to capture analytical reasoning, similar to Dasgupta et al. (2020). While reading tests capture crystallized intelligence, Raven's progressive matrices are relevant for measuring fluid intelligence.

To measure noncognitive skills and psychosocial competencies, we included a nine-item inventory on self-esteem and a five-item inventory on self-efficacy and agency (Dercon and Singh, 2013; Dercon and Sánchez, 2013). These measures were based on the Young Lives Survey, with some modifications. We also measured children's gender attitudes, similar to Dhar et al. (2019) and Edmonds et al. (2019). A unique aspect of our survey is that we collected data on children's performance on test scores and gender attitudes through household surveys and not school-based surveys. This is important because children's non-enrollment and absenteeism are considerable in low- and middle-income countries (Bernal et al., 2014; Tamiru et al., 2016), so scores on reading and writing tests and attitudes toward gender obtained from school-based surveys are likely to be skewed to be pro-female and probably indicate a smaller gender gap favoring boys among students than among all children because of differential school-attendance by gender.

2.3 Variable definitions

Cognitive and noncognitive skills

We use seven variables to capture children's competencies in cognitive and noncognitive domains of skill accumulation. The cognitive skills are assessed based on reading score in native language, reading score in English, math score, relative grade attainment, and Raven's test score. The noncognitive skills and psychosocial competencies are assessed based on self-efficacy score and self-esteem score. The reading scores take values between 0 and 4, where

0 = the child cannot read even letters, 1 = the child can read letters, 2 = the child can read words, 3 = the child can read sentences (at the grade 1 level), and 4 = the child can read a paragraph (at the grade 2 level). The math scores take values between 0 and 4, where 0 = the child is unable to read numbers, 1 = the child can recognize one-digit numbers, 2 = the child can recognize two-digit numbers, 3 = the child can perform a simple subtraction, and 4 = the child can perform a simple division. Children between 8 and 14 years should be able to read atleast a grade-2 text and complete a simple subtraction problem. We define relative grade attainment as the ratio of a child's completed grades of schooling to the child's potential completed grade (based on age). It is a relative measure of a child's academic progression and accounts for grade repetition and initial enrollment when older (Mani et al., 2012). The Raven's score is the total number of correct answers obtained on the 10-item Raven's test that was constructed for this sample.

We closely follow Dercon and Singh (2013) and Dercon and Sánchez (2013) for constructing our scores on self-esteem and self-efficacy. The self-esteem measure is constructed based on children's agreement or disagreement with the following nine statements: (1) The job I do makes me feel proud; (2) I feel proud of the job my father (or mother) does; (3) I feel proud of my achievements at school; (4) I feel proud to show my friends or other visitors where I live; (5) I am happy with my shoes; (6) I am happy with my clothes; (7) I am happy about the work I do; (8) I am not worried that I don't have the correct school uniform; and (9) I am not worried that I do not have the right books, pencils, and other equipment. Each statement is recoded as a positive outcome and takes a value 1 if the child agrees with a positive outcome, 0 otherwise. The resulting self-esteem index is an average of these nine binary indicators and is the proportion of positive outcomes declared by a child: it measures a child's sense of self-worth, akin to confidence in experimental economics (Dasgupta et al., 2015).

The self-efficacy index has a similar construction. We use dummy variables to record children's agreement or disagreement with the following five statements: (1) I like to make plans for my future studies and work; (2) if I try hard, I can improve my situation in life; (3) if I study hard at school, I will be rewarded by a better job in the future; (4) I have no choice about the work I do—I must work; and (5) other people in my family make all the decisions about how I spend my time. Each statement is recoded as a positive dummy variable. Self-efficacy is the average of these five binary variables. All cognitive and noncognitive outcomes are defined in Panels A and B of Table 2, respectively.

Gender attitudes

We measure adolescents' gender attitudes in four domains: gender roles, freedom, education, and leadership. We also construct a composite gender attitude index that is based on the gender roles index, freedom index, education index and leadership index. First, we compute the gender role index as an average of five binary variables (based on responses to five questions and statements) that each receive a value 1 if the child's view is pro-female, and 0 otherwise. The five questions and statements on gender roles are (1) between a brother and a sister, who should help their parents more with household chores? (2) when relatives give gifts, between a brother and a sister, who should receive the most gifts? (3) a father's job is to earn money for the family, and a mother's job is to look after the children; (4) between a brother and a sister, on whose medical care should the family spend more money? and (5) parents should give dowry for their girl's marriage.[9]

We follow the same method to construct three additional indices pertaining to gender attitudes: the freedom index, education index, and leadership index. The freedom index is based on children's responses (agree-disagree or yes-no) to the following three statements and questions that solicit children's opinions on female empowerment and independence: (1) a wife needs permission from her husband if she wants to go to the market; (2) a wife needs permission from her husband if she needs to visit the doctor; and (3) should girls play outdoor sports such as Football, Cricket, Kabaddi, Gilli-danda, Kho kho, Hopscotch, Satoliya (Pitthu)?

The education index is similarly based on responses to two questions and one statement, intended to capture children's acceptance of differential investment in education within a household. The two questions include: (1) between a brother and a sister, on whose education should the family spend more money? and (2) should a husband and his wife have the same level of education? The responses to these questions can be - same for both, more for boys or husbands, or more for girls or wives. (3) is a statement to which the respondent agrees or disagrees - "teachers should encourage boys to take more classes in science and mathematics as compared to girls".

The leadership index uses three binary statements that reflect children's opinions (agree-disagree) on gender roles in leadership: (1) having a male headmaster or principal at school is better than a female; (2) religious leaders (e.g., priest, pastor, maulvi) should always be men; and (3) community leaders (e.g., sarpanch) should always be men. Lastly, the gender attitude index is computed as the average of the gender roles index, freedom index, education

[9]Responses to statements (3) and (5) are agree or disagree only; responses to questions (1), (2), and (4) can be same for both, more for boys, or more for girls.

index and the leadership index. Overall, a higher score on the gender attitude index as well as the four sub-indices reveals higher (lower) pro-female (pro-male) attitudes in the overall index as well as in the specific sub-domains. All gender attitudes are defined in Panel C of Table 2.

Familial characteristics and investments

We also measure parental investments and child inputs (such as school enrollment, days absent from school, chores, and parental expenditure on schooling), defined in Panel D of Table 2. Lastly, family background characteristics that capture demographics, parental characteristics, and household resources are given in Panel E of Table 2. The key proxy for household socioeconomic status in our sample is household wealth. We use the principal component analysis method by Pollitt et al. (1993) and Filmer and Pritchett (2001) to construct the asset index, our measure of household SES. We also control for birth order and family size in our regressions, as parental investments (and child outcomes) are likely to be influenced by the child's birth order as well as family size (see Jayachandran and Pande (2017) and Spears et al. (2019)).

2.4 Summary statistics

We present sample averages on cognitive outcomes, noncognitive outcomes, pro-female gender attitudes, and family background characteristics for boys and girls separately in Table 3. We also present gender differences in outcomes and background characteristics. For ease of interpretation, the table reports raw mean differences for all variables. In Panel A of Table 3 we show that boys fare systematically better than girls on all five cognitive-outcome variables. Unlike the gender gaps favoring girls observed in OECD countries, boys' performance on reading in their native language is 0.06 points (5 percent of a standard deviation) higher than girls'. Boys' performance on reading in English is even higher, averaging 0.14 points (11 percent of a standard deviation) higher than girls'. Girls lag behind in math skills as well: boys score 0.09 points (9 percent of a standard deviation) higher than girls. The male-female gaps in learning are also evident in our measure of grade progression: the average boy is 0.03 relative grades ahead of the average girl. We also find that boys' competency on Raven's test scores is higher, 0.06 points ahead of girls'. The gender gaps in cognitive skills are mostly significant at the 1 percent level except for Raven's test score.

Turning to gender differences in noncognitive outcomes reported in Panel B of Table 3, we observe no gender gaps in self-esteem but significant and sizable differences in self-

efficacy: the average boy is 0.012 points ahead of the average girl, reflecting a greater sense of control and mastery over his life.

We also examine gender gaps in chores and parental investments (pathways into skill accumulation) in Panel C of Table 3. The chores index captures the proportion of chores that a child has to do, of the eight chores used to construct this index. Girls have a higher burden than boys: they do on average 41 percent of all eight types of chores, while boys on average only do 18 percent of all chores. Additionally, a higher proportion of boys are enrolled in school (92 vs 87 percent for girls) though they are more absent from school than girls, and parents spend about 19 percent more money per child on boys' schooling than on girls' education annually.

Male-female differences in gender attitudes are summarized in Panel D of Table 3. Gender attitudes are coded to reflect pro-female views. They are systematically higher among girls, and differences are significant at the 1 percent level for both the overall gender attitude index as well as the four subindices. Girls' attitudes on gender roles are 25 percent of a standard deviation higher than boys' attitudes, girls' attitudes on freedom are 10 percent of a standard deviation higher, girls' attitudes on education are 29 percent of a standard deviation higher, and girls' attitudes on leadership are 28 percent of a standard deviation higher. The overall gender attitude index shows that girls' overall gender attitudes are 32 percent of a standard deviation higher than boys' attitudes.

Lastly, in Panel E of Table 3, we report male-female differences in socioeconomic characteristics that we control in the regression analysis. We examine gender differences across 20+ variables in Panel E; significant differences exist among only three variables – scheduled tribe, salaried, and household size – suggesting that girls do not seem to be growing-up in particularly more socioeconomically disadvantaged households than boys. Though we do find evidence of son preference in that girls are in larger households on average than are boys (Clark, 2000). We find that on average both boys and girls in our sample are second-born children and the difference is not significant.

We also examine gender gaps in the full distribution of cognitive, noncognitive and pro-female gender attitudes. We present the kernel density plots for all cognitive outcomes, noncognitive outcomes and pro-female gender attitudes in Figures 1, 2 and 3 respectively. The Kolmogorov-Smirnov (K-S) test shows significant male-female differences in the distributions of all outcomes. For all outcomes the differences are significant at the 1 percent level ($p<0.01$), except reading score in native languages ($p=0.015$) and Raven's test score ($p=0.03$) for which the male-female differences are significant at the 5 percent level.

3 Results

3.1 Gender gaps in cognitive and noncognitive skills

We estimate the following regression model to capture gender gaps in skills:

$$Outcome_{i,hh} = \alpha + \beta Male_{i,hh} + \gamma^{'} X_{i,hh} + \eta_v + \epsilon_{i,hh} \quad (1)$$

where $Outcome_{i,hh}$ in equation (1) includes the full set of cognitive and noncognitive skills defined in Panels A and B of Table 2 for individual i in household hh. Male is a dummy that takes a value 1 if male, 0 if female. X includes the full vector of controls described in Panel E of Table 2. We also account for village-level resources, such as access and type of schooling and aggregate shocks like rainfall and temperature variations, by including village fixed effects in the specifications.[10] The coefficient estimate on the male dummy, β, captures average gaps between boys and girls conditional on all child and family observed characteristics as well as fixed village observed and unobserved characteristics. To account for unobserved correlations among children living in a village, we cluster our standard errors at the village level. To facilitate comparison in gender gaps across different outcomes, we standardize all outcome variables—cognitive and noncognitive skills –with respect to the mean and standard deviation of the girls in our sample.

In Column 1 of Table 4, we present the unconditional gender gaps for each cognitive and noncognitive outcome. In Column 2, we present the gender gap conditional on family background characteristics, and in Column 3, our preferred specification, we present the gender gap conditional on both family background characteristics as well as village fixed

[10]Using the names of the villages under study, we have merged our data with village-level data from the most recently available census of India (2011). This provides us with set of covariates that we incorporate in our specification: namely child-sex ratio, the percentage of individuals belonging to a scheduled tribe, the percentage of individuals belonging to a scheduled caste, female literacy rate, and female labor force participation rate. We show in Appendix Table A4 that our results are robust to replacing the village fixed effects with the aforementioned observed village level variables. These results are presented in Column 1 of Appendix Table A4. We use a specification similar to that used in Table 6 column 1, but we replace the village fixed effects with village-level covariates. We also examine heterogeneity in gender gaps by stratifying our sample into four subgroups - villages with above-median child-sex ratios, below-median child-sex ratios, above-median female literacy rates, and below-median female literacy rates. We find that the gender gaps are greater in villages with below-median child-sex ratios (Column 2) compared to above-median child-sex ratios (Column 3) consistent with son-preference and high sex-selective abortion. The gender gaps are also more prevalent in villages with below-median female literacy (Column 4) compared to villages with above-median female literacy (Column 5) reflecting cultural norms that disfavor women.

effects (as specified above in equation (1)). We find that the male-female gap in reading in the native languages is 0.047 standard deviations and remains unchanged across columns. Next, the male-female gap in reading English is almost double the gap in reading in the native languages, at 0.12 standard deviations, and once again remains unchanged with the addition of family background controls as well as village-level fixed effects. The male-female gaps in math and relative grade attainment are 0.09 and 0.08 standard deviations, respectively, and remain stable cross columns. We find that boys are 0.03 standard deviations ahead of girls in the Raven's test score (in Column 1 of Table 4), but this gap is fully accounted for by the controls in Column 3 of Table 4. We next compare unconditional and conditional male-female gaps in noncognitive skills, reported in Panel B of Table 4. We find no gender gaps in self-esteem. However, we report notable gender gaps in self-efficacy. Boys have 0.066 standard deviations higher agency than girls, and the gap persists even after controlling for the full set of family and village controls in Column 3.

Adding controls including fixed effects controls for omitted variables and improves the precision by reducing the standard errors in the model (Cinelli et al., 2020). It is not surprising that adding the family background characteristics and other controls, including village fixed effects, does not change the gender gaps noted across Columns 1–3 of Table 4 because there are no gender differences in most family background factors, shown in Table 3. That is, gender is orthogonal to most family background characteristics, and hence omitting them in Column 1 does not bias the coefficient estimates on the male dummy. However, the R-squared increases from 0.001 in Column 1 of Table 4 for the reading score in the native language to 0.25 in Column 3. The substantial improvement in R-squared between Columns 1 and 3 of Table 4 is noted across all variables, which suggests that the additional controls are important predictors of the cognitive and noncognitive outcomes and, as a result, also increase the precision of our estimates in Column 3.[11]

3.2 Male-female gaps in gender attitudes

Next, we estimate male-female gaps in gender attitudes using equation (1), where for the outcome variables we use the pro-female gender attitudes presented in Panel D of Table 3. Similar to Table 4, we present both unconditional and conditional male-female gaps in the overall gender attitude (index) as well the four sub-indices (gender roles, education, leadership and freedom) in Table 5. We find that boys' pro-female gender attitudes are 0.23

[11]We further perform a joint F-test on all the control variables included in Columns 2 and 3 of Table 4. The p-values are below the critical threshold of 0.01 across all columns, which further suggests that these additional controls are important predictors of the cognitive and noncognitive outcomes.

standard deviations less than girls' attitudes and this difference remains unchanged across columns. Turning to the specific sub-indices, we find large male-female differences in gender attitudes toward gender roles, education, leadership and freedom as well, with girls exhibiting consistently more pro-female attitudes than boys in all domains. We find that the male-female gap in attitudes toward gender roles reported in Table 5 is –0.26 standard deviations and similarly remains unchanged across columns, which shows that girls have significantly greater pro-female attitudes. Next, the male-female gaps in attitudes toward education, leadership, and freedom are –0.31, –0.28, and -0.09 standard deviations, respectively, and once again remain unchanged with the addition of family- and child-level controls as well as village-level fixed effects. Girls consistently exhibit more pro-female attitudes than boys. These gender gaps in attitudes could possibly be associated with some of the male-female gaps in cognitive and noncognitive outcomes previously reported in Table 4, which we explore next.

3.3 Role of gender attitudes in skills

Even for boys and girls with similar family backgrounds, it is possible that the boys' attitudes toward gender are such that they do not participate in many household chores, and that the consequent additional burden on girls makes it difficult for them to spend time on homework or concentrate in school. To explore this issue, in Table 6 we assess the effects of adding the four pro-female gender attitude sub-indices on the right-hand side of equation (1) on the associated size and significance of the male-female differences in cognitive and noncognitive outcomes.

In Column 1 of Table 6, compared with the gender gaps in skills reported in Column 3 of Table 4, we find a significant increase in the gender gaps across all cognitive outcomes. The gender gap in the reading score in the native languages is 0.07 standard deviations in Column 1, Table 6, in the reading score in English is 0.13 standard deviations,in the math score is 0.11 standard deviations, and in relative grade attainment is 0.08 standard deviations, Raven's test score is 0.03 standard deviations, and self-efficacy is 0.07 standard deviations. All reported gaps are significant at the 1 percent level. The R-squared improvement in Column 1 of Table 6 (compared with Column 3 of Table 4) suggests that pro-female gender attitudes play an important role in determining cognitive and noncognitive outcomes, and that omitting them biases the gender gap downward in Table 4. Two things determine the sign of this bias – (a) correlations between pro-female gender attitudes (omitted variable) and the male dummy: on average girls have significantly greater pro-female gender attitudes

than boys (as shown in Table 5), and therefore pro-female gender attitudes are negatively correlated with the male dummy, and (b) correlations between pro-female gender attitudes and the outcome variables: we find that pro-female gender attitudes are positively correlated with cognitive skills and self-efficacy (as shown in Appendix Table A5).[12] Hence, omitting the pro-female gender attitudes from the RHS in Table 4 biases the coefficient estimates on the male dummies downwards.

Next, in Column 2 of Table 6, we replace the pro-female gender attitude sub-indices with the overall gender attitude fixed effects to examine male-female gaps within a given level of attitude, and we find that the male-female gaps remain consistently large and significant across all cognitive outcomes as well as for self-efficacy.

Lastly, a preference for sons might be a concern in our sample which biases the estimated gender gaps in cognitive and noncognitive skills (Jayachandran and Pande, 2017). Households preferring to have sons might treat boys and girls differently. We reestimate equation (1) with gender attitudes as additional controls as well as household fixed effects to control for household-specific unobserved fixed variables, such as son preference. Doing this allows us to exploit within-household differences in the treatment of boys and girls to purge our estimates of the gender gap in outcomes from differences in son preference across households. These findings are reported in Column 3 of Table 6. The male-female gaps in cognitive outcomes and self-efficacy remain sizable and significant even after we account for possible son preference in our sample.[13]

3.4 Gender attitude gradient in skills

Next, to investigate the attitude gradient in cognitive and noncognitive scores, in Panel A of Table 7 we present the coefficients on the wealth and attitude quintiles obtained with the specification used in Column 2 of Table 6, where the coefficients on the attitude quintiles capture the magnitude of the pro-female attitude gradient in quintile k relative to the bottom quintile (omitted category). We document steep pro-female attitude gradients across several cognitive outcomes. In Columns 1 and 2 of Panel A, we find that the gaps in native and

[12]Specifically, a boy's pro-female gender attitude is also positively correlated with cognitive skills and self-efficacy (as shown in Appendix Table A6). Boys' pro-female gender attitudes probably reflect the attitudes of their parents and the general norms of their household. In a household where parents hold more progressive attitudes towards gender roles, we can expect that more investment, care and encouragement would be given to both boys and girls' education.

[13]In Appendix Table A7 we also replicate the regression presented in Column 2, Table 6 using the same sample as in Column 3 of Table 6 and find that the gender gaps in cognitive and noncognitive skills remain similar in both size and statistical significance to those reported in Column 2, Table 6.

English language reading scores between children in Q2 vs Q1 are 0.04 and 0.05 standard deviations (though this difference is not significant even at the 10 percent level for native-language reading scores) respectively, but the gap between children in Q5 vs Q1 almost triples to 0.19 and 0.14 standard deviations (and is significant at the 1 percent level). Similarly, in Columns 3 and 4, children from households in Q5 score, on average, 0.19 and 0.25 standard deviations higher on math and Raven's test, respectively, than children in Q1. Turning to noncognitive skills, there is some evidence that higher pro-female gender attitudes (being in Q5 vs Q1) are correlated with greater self-efficacy. Interestingly, the gender attitude gradient is negatively correlated with self-esteem—that is, more pro-female attitudes are correlated with lower degrees of self-esteem, and the effects are steep across the attitude gradients.

3.5 SES gradient in skills

In Panel B of Table 7 we present the SES gradient in skills for our preferred specification reported in Column 2 of Table 6, where the coefficients on the SES quintiles capture the magnitude of the SES gradient in quintile k relative to the bottom quintile (omitted category). These coefficient estimates are large and statistically significant across almost all measures of cognitive and noncognitive skills except self-esteem, and only larger levels of wealth seem to matter for Raven's test score, as reported in Column 5 of Table 7. We find a steep SES gradient in reading scores (both native languages and English), math scores, and self-efficacy. The gap in native languages reading scores between children in Q2 and Q1 is 0.19 standard deviations, and the gap almost doubles to 0.32 standard deviations for children in Q5 vs Q1. Similarly, the gap in math scores jumps from 0.13 standard deviations in Q2 (vs Q1) to 0.30 standard deviations in Q5 (vs Q1). By contrast, the SES gradient in relative grade attainment is largely flat through Q2-Q5 (vs Q1) with no significant differences in the SES gradient between the second and fifth quintile (p-value = 0.21). For the Raven's test score, we find no differences among children in Q2 (vs Q1) and Q3 (vs Q1), but learning advantages appear at Q4 and Q5 (vs Q1). Finally, we find a steep SES gradient in noncognitive skills as well, though the gradient is less stronger than for cognitive skills. These results are consistent with previous findings by Schady et al. (2015) and Galasso et al. (2019), who identify steep socioeconomic gradients in receptive vocabulary, attention, working memory, and receptive language ability for children from several Latin American countries and Madagascar in Africa.

4 Heterogeneity analysis

4.1 Gender gaps by SES and gender attitudes

Even similar home environments for boys and girls might conceal important socioeconomic influences on the gender gaps in cognitive and noncognitive skills. For example, girls raised in richer households might have less disadvantage in terms of being able to achieve cognitive and noncognitive outcomes than girls raised in poorer households. This could happen, for instance, because richer households discriminate less between boys and girls, or because greater resources mitigate the effect of discrimination for children in households with higher SES. In another aspect of human capital, namely health, Behrman and Deolalikar (1986), Behrman (1988a) and Behrman (1988b) show that intrahousehold allocation of nutrients in rural India tend to favor boys, and that this phenomenon is reinforced in periods of nutrient scarcity and increased poverty. Similarly, we might expect larger gender gaps in outcomes in samples of children with more male-biased attitudes. Such a finding would support the idea that attitudes matter for the formation of cognitive and noncognitive skills. In fact, the literature notes that girls' underperformance in mathematics relative to boys disappears in more gender-equal cultures: girls perform, on average, 22.6 points lower than boys in Turkey but 14.5 points higher than boys in Iceland (Guiso et al., 2008). Hence, although we may not find differences in household socioeconomic environments for boys and girls on average, this does not imply that the home environments are not contributing factors in the gender gap in cognitive and noncognitive skills. To investigate this possibility, we next look at the variation in gender gaps in cognitive and noncognitive outcomes by SES and gender attitude levels. To do this, we reestimate equation (1) across different quintiles of the SES index and different quintiles of the pro-female gender-attitude index controlling for a full set of family- and child-level characteristics and village fixed effects.

In Figure 4 we present the gender gaps in cognitive and noncognitive skills across the different attitude quintiles—that is, we reestimate the gender gaps across the attitude distribution, dividing our sample of children into five attitude quintiles – the full regression table is available in Panel A of Appendix Table A8. The sizes of the gender gaps in native and English language reading scores, math scores, and relative grade attainment consistently decrease as we move to higher pro-female attitude quintiles. Specifically, the gender gaps in reading scores in native languages, English scores, math scores, and relative grade attainment decline from 0.12, 0.17, 0.146, and 0.10 standard deviations, respectively, in Q1 (where the gender gaps are all significant at the 1 percent level) to 0.02, 0.09, 0.005, and 0.05 standard

deviations, respectively, in Q5 (where the gender gaps are only significant for reading scores in English and relative grade attainment). For the native languages reading score and math score, the gender gaps seem to disappear once we reach Q5. Interestingly, the sign of the gap in the Raven's test score is reversed once we move to higher quintiles. Qualitatively, children in Q1 agree with pro-female statements 33 percent of the time, whereas children in the Q5 agree with pro-female statements 85 percent of the time. Moving from Q1 to Q5 therefore is associated with a significant increase in pro-female gender attitudes. Overall, these results provide evidence that pro-female gender attitudes are associated with lower gender gaps in cognitive outcomes, which suggests that, if this reflects in part causal effects, interventions focused on making gender attitudes more pro-female can be very effective.

Next, we look at gender gaps in noncognitive outcomes across attitude quintiles. Consistent with our findings thus far, we do not find significant gender gaps in self-esteem across attitude quintiles. We do, however, document significant gender gaps in self-efficacy at Q1, Q3 and Q4. The gap disappears at Q5, where the coefficient on the male dummy decreases to 0.03 and appears statistically insignificant, suggesting that boys and girls with strongly pro-female attitudes do not differ in terms of levels of self-efficacy. From these results we conclude that attitudes are not as strongly associated with noncognitive skills as they are with cognitive skills.

In Figure 5 we examine the gender gaps in cognitive and noncognitive skills across SES quintiles. The corresponding table is in Panel B of Appendix Table A8. We first examine the gender gaps in cognitive outcomes. Across the SES quintiles in Columns 1–5, the sizes of the gender gap in native and English language reading scores, math scores, and relative grade attainment consistently decrease as we move to higher SES quintiles. We find that in the highest SES quintile (Q5), the gender gap even disappears for all cognitive outcomes. For instance, the gender gap in the native languages reading score goes from 0.12 (where it is significant at 1 percent level) standard deviations in the poorest SES quintile (Q1) to 0.005 in the richest SES quintile (Q5) where the gap is no longer significant at even the 10 percent level. Similarly, the gender gaps in math scores and relative grade attainment go from 0.17 and 0.20 standard deviations, respectively, in Q1 to 0.05 and –0.02 standard deviations in Q5 (where they are not significant at the 5 and 10 percent levels respectively). This is strong evidence that the gender gaps in cognitive skills are smallest or even nonexistent in richer households, and that poorer socioeconomic status might be particularly detrimental to girls' cognitive development. Additionally, most of our households come from rural villages in India where SES varies widely across families. In our sample, the standardized SES gap

between the Q1 and Q5 is considerable: the poorest quintile (Q1) is 1.3 standard deviations below the sample mean, while the richest quintile (Q5) is 1.5 standard deviations above the sample mean. Qualitatively, of the 24 items (e.g., chair, bed, table, TV) used to construct the asset index (used as a proxy for SES), households in Q1 own only four of these items, whereas households in Q5 own 12 items. Our results suggest that if these associations reflect causality, only a sizable increase in SES can eradicate the gender gaps in cognitive development. In contrast, the gender gaps in Raven's test scores appear relatively similar across poorer and richer families and are insignificant in three of the five quintile groups. This result is to be expected, since many researchers[14] find that fluid intelligence is not determined by socioeconomic characteristics and also not inherently higher or lower in one sex.

Turning to noncognitive outcomes, a more nuanced picture emerges. Although there are no gender gaps in self-esteem across the different SES quintiles, a gender gap in self-efficacy persists across all SES quintiles, and its size does not significantly vary across Q2 through Q4. We do find that the gender gap in self-efficacy seems to disappear at Q5. Overall, SES does not seem to matter as much for the gender gaps in noncognitive outcomes as it does for cognitive outcomes.

4.2 Complementarity between attitudes and SES

So far we have examined SES and pro-female gender attitudes as two independent correlates of the gender gaps in outcomes and the male advantages in cognitive and noncognitive outcomes are substantially less if either is at high levels (Q5). In this section we explore whether SES and attitudes are complementary in their associations with cognitive and noncognitive skills.

In Figure 6 (full estimates shown in Panel A of Appendix Table A9), we show the gender gaps in outcomes by attitude quintiles, where we hold SES constant at high levels (Q4 and Q5). Except for attitudes at Q1 where we still find significant gender gaps in outcomes, in Q2–Q5, once we hold SES at high values, the gender gap in several cognitive outcomes disappears, suggesting that if girls belong to high SES families then only very low pro-female gender attitudes predict limited girls' progress at this age. We find a similar pattern in Figure 7 (full estimates shown in Panel B of Table A9), where we examine gender gaps by SES quintiles, this time holding pro-female gender attitudes constant at high values (Q4 and Q5) across all SES quintiles. At high levels of attitudes, only SES predicts gender gaps

[14] An exception is Maluccio et al. (2009).

in outcomes at lower quintiles (except for reading in English where it persists at Q2 and Q3 as well) and the gender gaps completely disappear at Q4 and Q5. This shows that with high pro-female gender attitudes, the gender gap in several cognitive outcomes exists only at lower levels of SES but disappears with higher SES. Interestingly, Figures 4-7 suggest that for SES and pro-female gender attitudes, having high values (Q5) of either one or the other may be sufficient to predict substantially reduced gender gaps in several cognitive outcomes but high levels of SES and pro-female gender attitudes combined together predict no male advantages in the rural Indian villages studied here.

5 Pathways

We now explore different pathways through which SES and attitudes might differentially be associated with girls' and boys' cognitive skills. For instance, it could be the case that poorer families may require more help with chores and that this burden weighs more heavily on girls than on boys. Similarly, households with less pro-female attitudes might find it reasonable to ask girls to perform household chores more than boys; that would reduce the time girls can dedicate to their studies. To investigate these possible mechanisms, we assess gender gaps in school enrollment, absenteeism, chores, and educational expenses. In Table 8 we reestimate equation (1) separately for the different quintiles of the attitude index and the SES index in Panels A and B, respectively. We find that less pro-female attitudes are correlated with larger gender gaps in enrollment and educational expenditures but that with more pro-female attitudes, the gaps are lower. However, we find no gender gaps in the number of days absent from school. We do find that across all attitude quintiles, girls consistently must perform more chores than boys. This is consistent with our finding in Figure 4, where we show that gender gaps in English reading and relative grade attainment persist, even as they decrease with higher pro-female gender attitudes, across the attitude quintiles. Even in pro-female households, girls have more chores than boys, which could explain why the gaps in some cognitive skills persist. In Panel B of Table 8 we find that less wealth is associated with higher gender gaps in enrollments. The gender gaps in chores also go from 1.04 standard deviations in Q1 to 0.77 standard deviations in Q5 but don't disappear. Gender gaps in chores remain high across the different points in the attitude and SES distribution. Lastly, we examine gender gaps in parental expenditures on child schooling and find significant gender gaps in expenditures across the entire distributions of attitudes and SES. The gender gaps in schooling expenditures decline with pro-female attitudes but increase with high SES where households apparently can afford to make the gaps larger.

While the gender gaps in schooling expenditures open up at high SES levels, the gender gaps in learning disappear at high (specifically Q5) SES level (see Figure 5) perhaps due to the poor quality of education in rural India. Chaudhury et al. (2006) note that 25 percent of teachers are absent from public schools. They also note that while teacher absenteeism is lower in private schools relative to public schools in rural villages, it is only 4 percentage points less. Given that teacher presence can substantially improve student learning (Duflo et al., 2012) and among all factors (individual, household, school and teacher) that influence student learning – teachers matters the most (Chetty et al., 2014), gender differences in schooling expenditures (or parental inputs) can only account for gender differences in learning up to a point in the SES distribution but do not translate to gender differences in learning for children in the highest (Q5) SES group.

6 Robustness

Since Type I error increases in the number of outcomes tested, to account for overrejection of the null, we report sharpened two-stage q-values in Column 3 of Table 6, following the procedure proposed by Benjamini et al. (2006) and implemented by Anderson (2008). We find that our results are robust to Type I error.

So far our specifications control for the child's birth order but, in addition, we also examine the birth-order gradient in children's cognitive and noncognitive outcomes. These results are reported in Panel C of Appendix Table A10. Across specifications, we find largely insignificant relationships between birth-order dummies and children's cognitive and noncognitive outcomes. Also note that the pro-female gender attitude and SES gradients in cognitive and noncognitive outcomes reported here remain unchanged.

Lastly, we also show that our results are robust to variable definitions. We reconstruct the pro-female gender attitude index using the principal component analysis method (like the one used to construct the SES index) and re-examine the attitude gradient in skills in Appendix Table A11 and do not find substantial changes in the implications of our estimates.

7 Conclusions

Our analysis of gender gaps in cognitive and noncognitive skills points to a number of important findings. First, children in our Indian sample display large gender gaps in

cognitive and noncognitive outcomes, virtually all favoring boys. Second, the gradient in children's gender attitudes is steep, but third, while the household socioeconomic status gradient is also steep, it has stronger associations with children's skills. Fourth, gender gaps in skills somewhat persist even at the highest quintile of the attitude distribution but almost disappears at the highest quintile of the socioeconomic status distribution.

Our results suggest that, if they reflect underlying causal relations, significant increases in pro-female gender attitudes and household socioeconomic status would yield important gains for girls. Specifically, we find significant complementarities in SES and pro-female gender attitudes in that having high socioeconomic status and high pro-female gender attitudes is correlated with eliminating male advantages in cognitive and noncognitive skills. Overall, the household socioeconomic and cultural environment are both significantly associated with the gender gaps in both cognitive and noncognitive skills.

Our findings are consistent with the broader literature. Dercon and Singh (2013) find gender gaps in education, subjective well-being and psychosocial competencies in Ethiopia, India, Peru and Vietnam. Specifically, our results align with their finding of an institutionalized gender bias in education against girls in India. Muralidharan and Sheth (2016) also find that boys in grades 2-5 perform significantly better than girls in math. Our results are also consistent with Gandhi Kingdon (2002),who shows that girls face significantly different treatment in the parental allocation of education. Overall, there is significant gender bias in how girls are treated in homes and schools, which probably further restricts their learning. But while these and several other studies document gender gaps in education-related outcomes and parental investments, we are unaware of previous studies that document the associations of pro-female gender attitudes with these outcomes.

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Figures

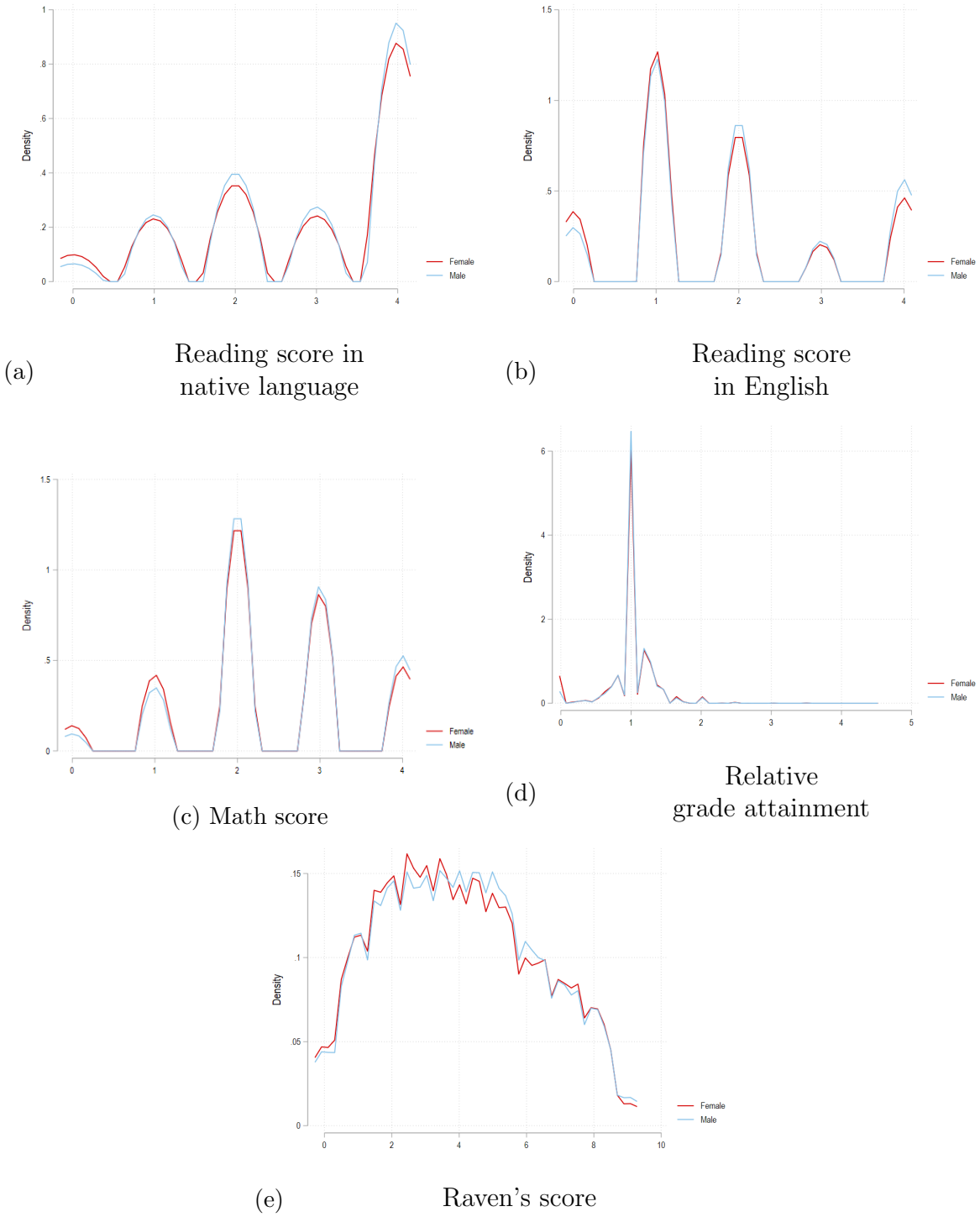
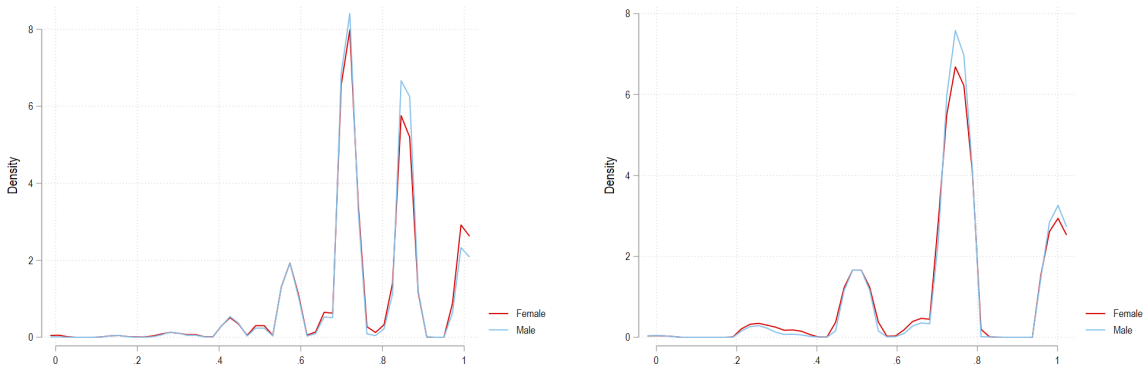
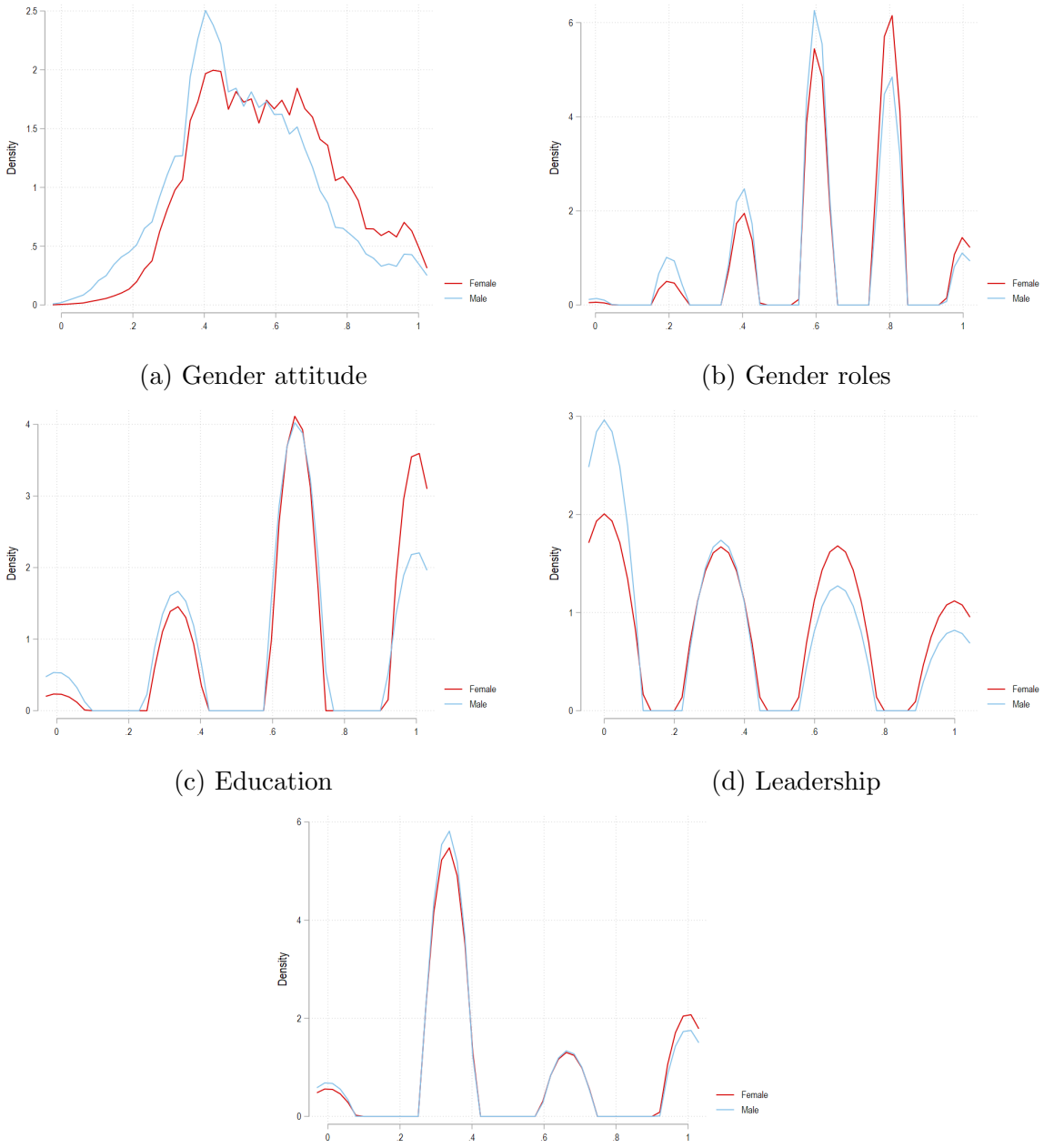


Figure 1: Kernel density functions for cognitive outcomes



(a) Self-esteem (b) Self-efficacy

Figure 2: Kernel density functions for non-cognitive outcomes



(a) Gender attitude

(b) Gender roles

(c) Education

(d) Leadership

(e) Freedom

Figure 3: Kernel density functions for gender attitudes

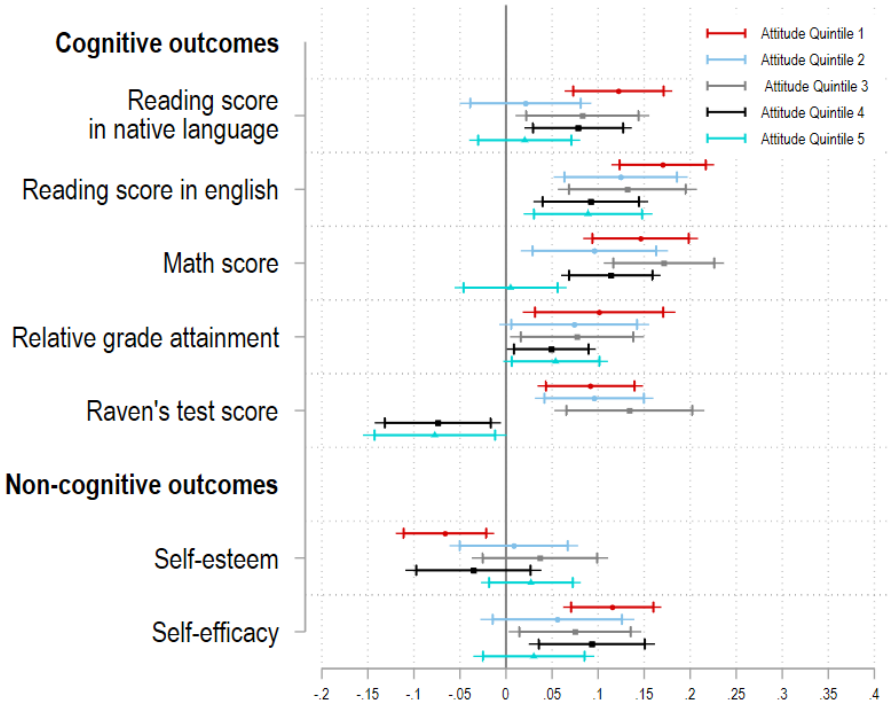


Figure 4: Heterogeneity analysis by attitude quintiles

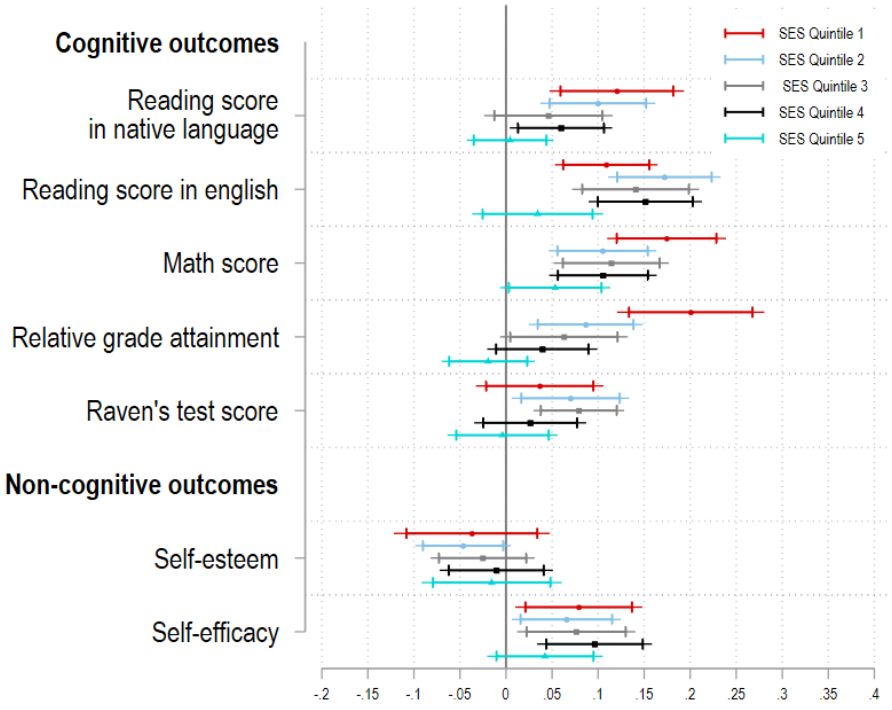


Figure 5: Heterogeneity analysis by SES quintiles

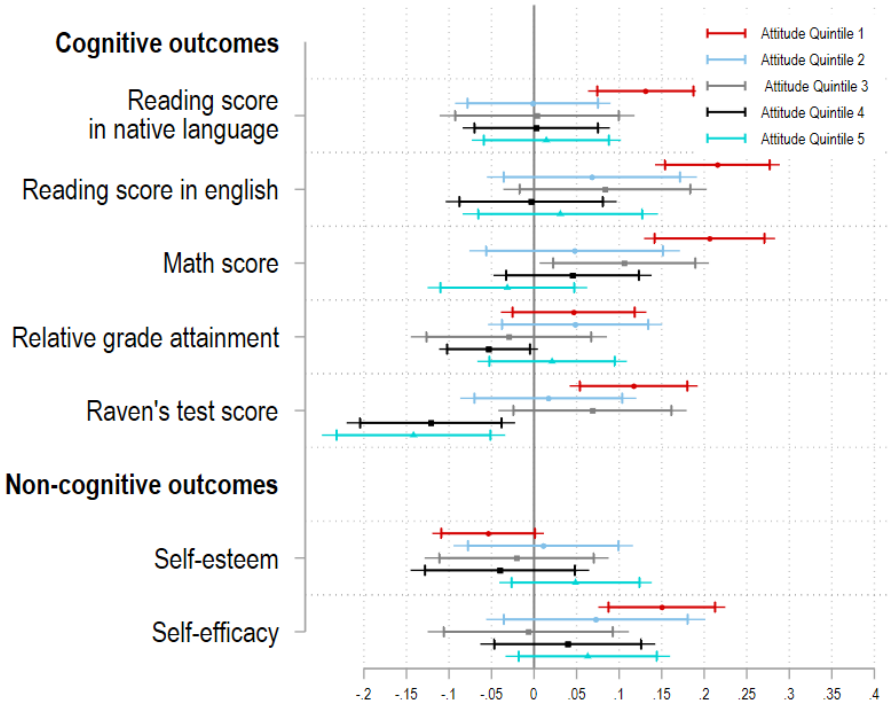


Figure 6: Gender gap by attitude quintiles (holding SES at Q4 and Q5)

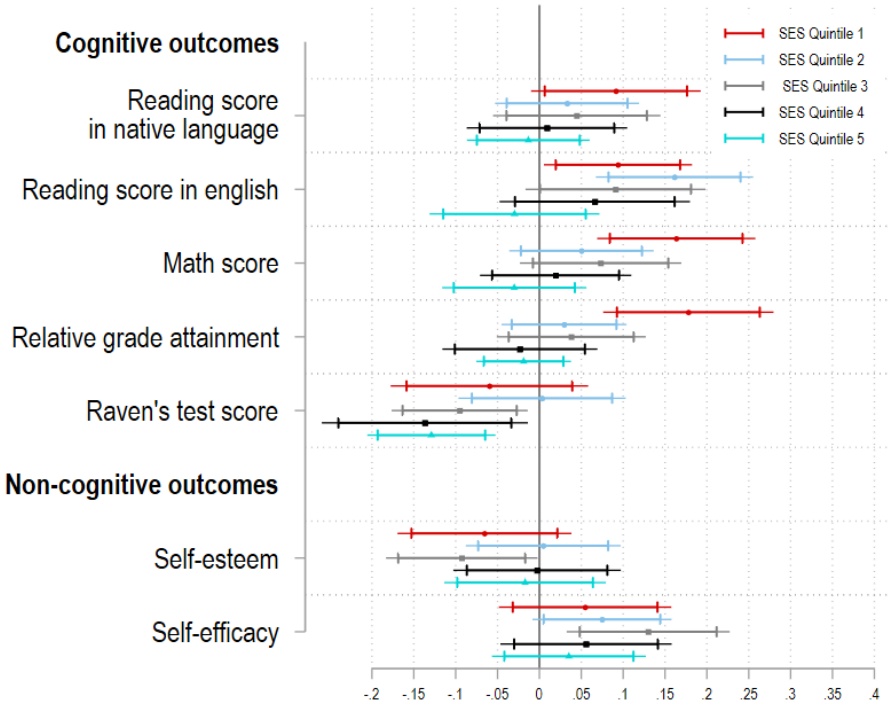


Figure 7: Gender gap by SES quintiles (holding attitudes at Q4 and Q5)

Tables

Table 1: Sample distribution

Districts	Villages	Households	Children
Palghar	78	6089	9910
Kurnool	80	5652	10352
Total	158	11741	20262

Table 2: Variables definitions

Variable name	Definitions
Panel A: Cognitive skills	
Reading score in native language	Takes values between 0 and 4 where 0 – when the child is unable to read even letters, 1 – if the child can read letters, 2 – if the child can read words, 3 – if the child can read sentences (grade 1 level text), and 4 – if the child can read a paragraph (grade 2 level text)
Reading score in English	Takes values between 0 and 4 where 0 – when the child is unable to read even letters, 1 – if the child can read letters, 2 – if the child can read words, 3 – if the child can read sentences (grade 1 level text), and 4 – if the child can read a paragraph (grade 2 level text)
Math score	Takes values between 0 and 4 where 0 – is when the child is unable to read numbers, 1 – if the child can recognize one-digit numbers, 2 – if the child can recognize two-digit numbers, 3 – if the child can perform a simple subtraction, 4 – if the child can perform a simple a division
Relative grade attainment	Actual grades completed/potential grades (where potential grade is the age-appropriate grade the child should have completed had the child started school on time and progressed without grade repetition)
Raven's test score	Total no. of correct responses on the 10-item Raven's test
Panel B: Noncognitive skills	
Self-esteem	Averaged over the following 9 binary variables: =1 if child feels proud of the job she/he does, =1 if child feels proud of the jobs her/his parents do, =1 if child feels proud about her/his school achievements, =1 if the child feels proud of where she/he lives, =1 if the child is happy with her/his shoes, =1 if the child is happy about her/his clothes, =1 if is happy about the work she/he does, =1 if the child is not worried about not having the correct uniform, =1 if the child is not worried about not having the correct books, pencils or tools

Table 2 – continued from previous page

Variable name	Definitions
Self-efficacy	Averaged over the following 5 binary variables: =1 if 1 if the child likes to make plans for her/his future studies/work, =1 if the child feels that she/he can improve her/his situation in life if she/he works hard, =1 if the child feels that she/he will get a better job if she/he studies hard, =1 if the child has some choice about the work she/he does, =1 if, aside from his family members, the child can make decisions about how he spends his time
Panel C: Gender Attitudes	
Gender roles	Averaged over the following five binary variables: =1 if child thinks boys should help more with household chores or that girls and boys should help equally, =1 if child thinks girls should not receive less gifts than boys, =1 if child disagrees that a father's job is to earn money for the family, and a mother's job is to look after the children, =1 if child thinks parents should not spend more money on boys' medical care (compared to girls), =1 if child thinks parents should not give dowry for their girl's marriage
Education	Averaged over the following three binary variables: =1 if child thinks family should not spend less money on girls' education compared to boys' education, =1 if child thinks wives should not have less education than their husbands, =1 if child disagrees that teachers should encourage boys to take more classes in math and science compared to girls
Leadership	Averaged over the following three binary variables: =1 if child disagrees that having a male masterhead/principal is better, =1 if child disagrees that having a male religious leader is better, =1 if child disagrees that having a male community leader is better
Freedom	Averaged over the following three binary variables: =1 if child disagrees that women should get the husband's permission to go shopping, =1 if child disagrees that women should get the husband's permission to go see a doctor, =1 if child thinks girls should play football, cricket or hopscotch

Table 2 – continued from previous page

Variable name	Definitions
Gender attitude	Averaged over the following variables - gender roles, freedom, education and leadership
Panel D: Child and parental inputs	
Enrolled	School enrollment status of a child
Days absent	No. of days absent from school
Chores	Average over the following 9 binary variables: =1 if child usually cooks, =1 if child usually sweeps, =1 if child usually cleans, =1 if child usually washes, =1 if child usually fetches water, =1 if child usually takes care of younger kids, =1 if child usually takes care of elderly, =1 if child usually helps parents with their work, =1 if child usually takes care of the cattle
Schooling expenditure (in Rupees)	Amount spent on child schooling in the last year
Panel E: Family background characteristics and SES	
Age	Age in years
Male	=1 if male
Birth order	Birth order of the child
SC	=1 if belongs to scheduled caste
ST	=1 if belongs to scheduled tribe
OBC	=1 if belongs to other backward caste
Hindu	=1 if Hindu
Salaried	=1 if main source of household income is salaried work
BPL	=1 if household has below poverty line card
MGNREGA	=1 if household receives benefits from MGNREGA
Mother's age	Mother's age in years
Mother's schooling	Mother's completed grades of schooling
Father's age	Father's age in years
Father's schooling	Father's completed grades of schooling
Household size	Number of individuals in a household
SES	Asset grandparents constructed using principal component analysis
Drinking water	=1 if household has access to tap water
Lighting	=1 if household has access to lighting
Cooking fuel	=1 if household has access to cooking fuel
Toilets	=1 if household has access to toilets
Grandparents' presence	=1 if grandparents in the household

Table 3: Summary statistics

	Mean pooled (1)	Mean males (2)	Mean females (3)	Difference (standard error) (4)
Panel A: Cognitive skills				
Reading score in native language	2.90	2.93	2.87	0.061**
	(1.259)	(1.227)	(1.293)	(0.024)
Reading score in English	1.78	1.85	1.71	0.142***
	(1.220)	(1.227)	(1.209)	(0.023)
Math score	2.40	2.44	2.35	0.096***
	(1.006)	(0.984)	(1.027)	(0.019)
Relative grade attainment	1.03	1.05	1.02	0.029***
	(0.331)	(0.308)	(0.354)	(0.008)
Raven's test score	4.00	4.03	3.96	0.065*
	(2.284)	(2.280)	(2.288)	(0.038)
Panel B: Noncognitive skills				
Self-esteem	0.76	0.76	0.76	0.001
	(0.147)	(0.142)	(0.153)	(0.003)
Self-efficacy	0.75	0.76	0.75	0.012***
	(0.182)	(0.177)	(0.187)	(0.003)
Panel C: Child and parental inputs				
Enrolled	0.90	0.92	0.87	0.051***
	(0.299)	(0.264)	(0.332)	(0.007)
Days absent	1.33	1.37	1.28	0.088***
	(2.012)	(2.079)	(1.931)	(0.032)
Chores	0.29	0.18	0.41	-0.227***
	(0.237)	(0.167)	(0.246)	(0.007)
Schooling expenditures	2075.70	2264.59	1868.47	396.128***
	(2872.1)	(3045.7)	(2653.3)	(50.093)
Panel D: Gender Attitudes				
Gender roles	0.65	0.63	0.68	-0.049***
	(0.200)	(0.206)	(0.191)	(0.005)
Education	0.68	0.65	0.73	-0.081***
	(0.274)	(0.281)	(0.259)	(0.008)
Leadership	0.38	0.33	0.43	-0.101***
	(0.359)	(0.350)	(0.361)	(0.011)
Freedom	0.49	0.48	0.51	-0.029***
	(0.295)	(0.290)	(0.300)	(0.007)

Table 3 – continued from previous page

	Mean pooled	Mean males	Mean females	Difference (standard error)
	(1)	(2)	(3)	(4)
Gender attitude	0.55	0.52	0.59	-0.065***
	(0.199)	(0.198)	(0.195)	(0.006)
Attitude quintile 1	0.33	0.32	0.34	-0.023***
	(0.0811)	(0.0878)	(0.0662)	(0.003)
Attitude quintile 2	0.46	0.46	0.46	-0.001
	(0.0206)	(0.0207)	(0.0204)	(0.001)
Attitude quintile 3	0.55	0.55	0.55	0.000
	(0.0243)	(0.0241)	(0.0246)	(0.001)
Attitude quintile 4	0.66	0.66	0.66	-0.004***
	(0.0352)	(0.0348)	(0.0355)	(0.001)
Attitude quintile 5	0.85	0.86	0.85	0.001
	(0.0884)	(0.0903)	(0.0871)	(0.005)
Panel E: Family and child characteristics				
Age in years	11.10	11.11	11.09	0.017
	(1.923)	(1.926)	(1.920)	(0.030)
Male	0.52	NA	NA	NA
	(0.499)			
Birth order	2.03	2.02	2.03	-0.003
	(1.051)	(1.052)	(1.049)	(0.016)
SC	0.14	0.14	0.14	0.006
	(0.347)	(0.350)	(0.343)	(0.005)
ST	0.43	0.42	0.43	-0.015**
	(0.494)	(0.493)	(0.496)	(0.007)
OBC	0.40	0.40	0.40	0.008
	(0.490)	(0.491)	(0.489)	(0.007)
Hindu	0.92	0.92	0.92	-0.003
	(0.276)	(0.278)	(0.274)	(0.004)
Salaried	0.03	0.02	0.03	-0.004*
	(0.156)	(0.150)	(0.163)	(0.002)
BPL	0.86	0.86	0.86	0.006
	(0.348)	(0.344)	(0.351)	(0.005)
MGNREGA	0.44	0.44	0.44	-0.003
	(0.496)	(0.496)	(0.497)	(0.008)
Mother's age	35.67	35.69	35.65	0.036
	(5.938)	(6.031)	(5.834)	(0.088)
Mother's schooling	1.61	1.59	1.63	-0.034
	(2.983)	(2.971)	(2.996)	(0.042)
Father's age	40.22	40.20	40.23	-0.026

Table 3 – continued from previous page

	Mean pooled	Mean males	Mean females	Difference (standard error)
	(1)	(2)	(3)	(4)
	(6.213)	(6.277)	(6.143)	(0.095)
Father's schooling	3.32	3.29	3.35	-0.066
	(4.017)	(3.983)	(4.054)	(0.058)
Household size	5.64	5.50	5.79	-0.290***
	(2.097)	(2.080)	(2.105)	(0.033)
SES	-0.02	-0.00	-0.03	0.027
	(1.910)	(1.898)	(1.923)	(0.032)
SES quintile 1	-2.51	-2.51	-2.51	-0.003
	(0.567)	(0.564)	(0.571)	(0.015)
SES quintile 2	-1.11	-1.11	-1.11	0.001
	(0.311)	(0.312)	(0.311)	(0.009)
SES quintile 3	-0.16	-0.16	-0.16	-0.004
	(0.255)	(0.255)	(0.254)	(0.008)
SES quintile 4	0.84	0.84	0.83	0.005
	(0.338)	(0.336)	(0.340)	(0.010)
SES quintile 5	2.87	2.85	2.89	-0.039
	(1.277)	(1.239)	(1.318)	(0.035)
Drinking water	0.98	0.98	0.98	-0.003
	(0.145)	(0.150)	(0.139)	(0.004)
Lighting	0.99	0.99	0.99	-0.000
	(0.0715)	(0.0718)	(0.0710)	(0.001)
Cooking fuel	0.23	0.23	0.23	0.001
	(0.420)	(0.421)	(0.420)	(0.008)
Toilets	0.30	0.30	0.30	-0.007
	(0.458)	(0.457)	(0.460)	(0.007)
Grandparents' presence	0.09	0.08	0.09	-0.006
	(0.281)	(0.277)	(0.286)	(0.004)
Observations	20262	10600	9662	

Notes: In Columns 1-3, standard deviations reported in parentheses. In Column 4, robust standard errors clustered at the village level in parentheses. *** p<0.01, ** p<0.05, * p<0.10. See Table 2 for variable definitions.

Table 4: Gender gaps in cognitive and noncognitive skills

	Unconditional gender gaps	Conditional gender gaps	Conditional gender gaps
	(1)	(2)	(3)
Panel A: Cognitive skills			
Reading score in native language	0.047**	0.043**	0.045**
	(0.019)	(0.018)	(0.018)
Observations	20,262	19,061	19,061
R-squared	0.001	0.145	0.256
Reading score in English	0.117***	0.111***	0.110***
	(0.019)	(0.017)	(0.016)
Observations	20,262	19,061	19,061
R-squared	0.003	0.225	0.311
Math score	0.093***	0.087***	0.094***
	(0.018)	(0.016)	(0.016)
Observations	20,262	19,061	19,061
R-squared	0.002	0.210	0.317
Relative grade attainment	0.081***	0.065***	0.072***
	(0.022)	(0.021)	(0.021)
Observations	20,252	19,051	19,051
R-squared	0.002	0.181	0.274
Raven's test score	0.028*	0.018	0.010
	(0.017)	(0.016)	(0.015)
Observations	20,262	19,061	19,061
R-squared	0.000	0.073	0.228
Panel B: Noncognitive skills			
Self-esteem	0.004	0.001	0.002
	(0.017)	(0.016)	(0.016)
Observations	20,262	19,061	19,061
R-squared	0.000	0.017	0.108
Self-efficacy	0.066***	0.065***	0.060***
	(0.019)	(0.018)	(0.018)
Observations	20,262	19,061	19,061
R-squared	0.001	0.012	0.169
Family and child level characteristics	No	Yes	Yes
Village fixed effects	No	No	Yes

Notes: Each cell here presents the coefficient on the male dummy obtained from different regressions of the outcomes (indicated in Panels A and B) on the male dummy and selected covariates. In Column 1, we report gender gaps for all outcomes. In Column 2, we report gender gaps controlling for family- and child-level characteristics listed in Panel E, Table 3. In Column 3, we report gender gaps controlling for family- and child-level characteristics as well as village fixed effects. Robust standard errors clustered at the village level in parentheses. *** p<0.01, ** p<0.05, * p<0.10.

Table 5: Gaps in gender attitudes

	Unconditional gender gaps	Conditional gender gaps	Conditional gender gaps
	(1)	(2)	(3)
Gender attitude	-0.236***	-0.231***	-0.232***
	(0.021)	(0.020)	(0.020)
Observations	20,229	19,030	19,030
R-squared	0.027	0.095	0.320
Gender roles	-0.256***	-0.255***	-0.261***
	(0.026)	(0.026)	(0.025)
Observations	20,247	19,047	19,047
R-squared	0.015	0.064	0.213
Education	-0.311***	-0.312***	-0.307***
	(0.030)	(0.029)	(0.028)
Observations	20,245	19,045	19,045
R-squared	0.022	0.043	0.201
Leadership	-0.279***	-0.274***	-0.275***
	(0.030)	(0.029)	(0.029)
Observations	20,254	19,053	19,053
R-squared	0.020	0.066	0.229
Freedom	-0.095***	-0.081***	-0.087***
	(0.022)	(0.023)	(0.023)
Observations	20,260	19,059	19,059
R-squared	0.002	0.053	0.253
Family and child level characteristics	No	Yes	Yes
Village fixed effects	No	No	Yes

Notes: Each cell represents the coefficient on the male dummy obtained from different regressions of the gender attitude variables on the male dummy and selected covariates. In Column 1 we report unconditional gender gaps for all attitudes. In Column 2, we report gender gaps controlling for family- and child-level characteristics. In Column 3, we report gender gaps controlling for family- and child-level characteristics as well as village fixed effects. *** p<0.01, ** p<0.05, * p<0.10. Robust standard errors clustered at the village level in parentheses.

Table 6: Gender gaps in skills, controlling for gender attitudes

	Conditional gender gaps with gender attitudes	Conditional gender gaps with gender attitude fixed effects	Conditional gender gaps with gender attitude and household fixed effects
	(1)	(2)	(3)
Panel A: Cognitive skills			
Reading score in native language	0.068***	0.062***	0.083***
	(0.019)	(0.018)	(0.022)
Observations	19,030	19,030	14,074
R-squared	0.261	0.259	0.688
Sharpened q-values			[0.001]
Reading score in English	0.127***	0.122***	0.127***
	(0.017)	(0.017)	(0.023)
Observations	19,030	19,030	14,074
R-squared	0.314	0.314	0.709
Sharpened q-values			[0.001]
Math score	0.112***	0.113***	0.123***
	(0.017)	(0.017)	(0.022)
Observations	19,030	19,030	14,074
R-squared	0.323	0.320	0.703
Sharpened q-values			[0.001]
Relative grade attainment	0.079***	0.080***	0.095***
	(0.023)	(0.023)	(0.027)
Observations	19,020	19,020	14,061
R-squared	0.275	0.274	0.689
Sharpened q-values			[0.001]
Raven's test score	0.034**	0.037**	0.028
	(0.016)	(0.016)	(0.017)
Observations	19,030	19,030	14,074
R-squared	0.237	0.235	0.765
Sharpened q-values			[0.039]
Panel B: Noncognitive skills			
Self-esteem	-0.020	-0.025	-0.031
	(0.017)	(0.017)	(0.020)
Observations	19,030	19,030	14,074
R-squared	0.115	0.117	0.690
Sharpened q-values			[0.004]
Self-efficacy	0.070***	0.081***	0.076***
	(0.019)	(0.019)	(0.020)
Observations	19,030	19,030	14,074
R-squared	0.178	0.176	0.683
Sharpened q-values			[0.001]
Family and child level characteristics	Yes	Yes	Yes
Village fixed effects	Yes	Yes	Yes
Attitude fixed effects	No	Yes	Yes
Household fixed effects	No	No	Yes

Notes: Each cell represents the coefficient on the male dummy obtained from different regressions of the outcome (indicated in Panels A and B) on the male dummy and selected covariates. In Column 1, we report gender gaps controlling for gender attitudes, family- and child-level characteristics as well as village fixed effects. In Column 2, we report gender gaps controlling for family- and child-level characteristics, attitude-quintile fixed effects and village fixed effects. Finally, in Column 3 we report gender gaps controlling for family- and child-level characteristics, attitude-quintile fixed effects, village fixed effects, and household fixed effects. Sharpened q-values are reported in brackets in Column 3. *** p<0.01, ** p<0.05, * p<0.10. Robust standard errors clustered at the village level in parentheses.

Table 7: Attitude and SES gradients in cognitive and noncognitive skills

	Reading score in native language	Reading score in English	Math score	Relative grade attainment	Raven's test score	Self-esteem	Self-efficacy
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Panel A: Attitude quintiles							
Attitude Q2 (vs Q1)	0.043	0.050*	0.030	-0.008	-0.024	-0.126***	-0.045
	(0.029)	(0.029)	(0.027)	(0.025)	(0.034)	(0.037)	(0.041)
Attitude Q3 (vs Q1)	0.063*	0.091***	0.108***	0.025	0.008	-0.241***	0.033
	(0.033)	(0.029)	(0.030)	(0.028)	(0.046)	(0.043)	(0.040)
Attitude Q4 (vs Q1)	0.055	-0.002	0.086***	0.026	0.114***	-0.204***	0.038
	(0.036)	(0.030)	(0.033)	(0.030)	(0.042)	(0.049)	(0.053)
Attitude Q5 (vs Q1)	0.186***	0.143***	0.187***	0.078**	0.248***	-0.253***	0.228***
	(0.037)	(0.032)	(0.035)	(0.037)	(0.061)	(0.059)	(0.046)
p-value from F-test (Q1=Q2=Q3=Q4=Q5)	<0.01	<0.01	<0.01	0.111	<0.01	<0.01	<0.01
p-value from t-test (Q5=Q2)	<0.01	<0.01	<0.01	<0.01	<0.01	0.020	<0.01
Panel B: SES quintiles							
SES Q2 (vs Q1)	0.188***	0.088***	0.131***	0.156***	0.025	-0.068**	0.057**
	(0.029)	(0.027)	(0.029)	(0.027)	(0.040)	(0.030)	(0.026)
SES Q3 (vs Q1)	0.209***	0.130***	0.213***	0.164***	0.039	-0.011	0.081**
	(0.033)	(0.033)	(0.032)	(0.031)	(0.044)	(0.038)	(0.035)
SES Q4 (vs Q1)	0.300***	0.197***	0.273***	0.181***	0.075	-0.048	0.160***
	(0.036)	(0.036)	(0.034)	(0.038)	(0.050)	(0.043)	(0.036)
SES Q5 (vs Q1)	0.315***	0.280***	0.299***	0.195***	0.125*	-0.062	0.149***
	(0.043)	(0.046)	(0.040)	(0.039)	(0.066)	(0.051)	(0.045)
p-value from F-test (Q1=Q2=Q3=Q4=Q5)	<0.01	<0.01	<0.01	<0.01	0.428	0.135	<0.01
p-value from t-test (Q5=Q2)	<0.01	<0.01	<0.01	0.206	0.085	0.892	0.018
Family and child level characteristics	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Village fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	19,030	19,030	19,030	19,020	19,030	19,030	19,030
R-squared	0.259	0.314	0.320	0.274	0.235	0.117	0.176

Notes: Each column presents coefficients on the attitude quintiles and SES quintiles included in regressions reported in Column 2, Table 6. Robust standard errors clustered at the village level in parentheses. *** p<0.01, ** p<0.05, * p<0.10.

Table 8: Pathways

	Enrolled	Days absent	Chores	Schooling expenditure
	(1)	(2)	(3)	(4)
Panel A: Gender gaps stratified by attitude quintiles				
Attitude Q1	0.069***	0.041	-0.888***	0.212***
	(0.013)	(0.033)	(0.038)	(0.030)
Observations	5,753	5,183	5,753	5,753
Attitude Q2	0.029**	-0.031	-0.896***	0.118***
	(0.011)	(0.059)	(0.052)	(0.035)
Observations	2,867	2,631	2,867	2,867
Attitude Q3	0.040***	0.094**	-0.835***	0.134***
	(0.013)	(0.038)	(0.040)	(0.038)
Observations	2,941	2,656	2,941	2,941
Attitude Q4	0.064***	0.004	-0.911***	0.176***
	(0.009)	(0.036)	(0.031)	(0.034)
Observations	3,871	3,476	3,871	3,871
Attitude Q5	0.028***	0.030	-0.896***	0.111***
	(0.009)	(0.035)	(0.047)	(0.035)
Observations	3,580	3,262	3,580	3,580
Panel B: Gender gaps stratified by SES quintiles				
SES Q1	0.055***	0.074**	-1.038***	0.097***
	(0.013)	(0.031)	(0.045)	(0.023)
Observations	3,508	2,898	3,508	3,508
SES Q2	0.059***	0.042	-1.012***	0.064***
	(0.012)	(0.031)	(0.044)	(0.024)
Observations	3,814	3,413	3,814	3,814
SES Q3	0.058***	0.002	-0.855***	0.157***
	(0.013)	(0.033)	(0.049)	(0.029)
Observations	3,861	3,521	3,861	3,861
SES Q4	0.061***	0.007	-0.842***	0.219***
	(0.011)	(0.035)	(0.038)	(0.041)
Observations	4,049	3,751	4,049	4,049
SES Q5	0.020***	0.020	-0.768***	0.211***
	(0.006)	(0.041)	(0.037)	(0.045)
Observations	3,783	3,627	3,783	3,783
Family and child level characteristics	Yes	Yes	Yes	Yes
Village fixed effects	Yes	Yes	Yes	Yes

Notes: Each cell presents the coefficient on the male dummy obtained from different regressions of the outcomes (listed in Columns 1-4) on the male dummy and other selected covariates (obtained with the specification used in Table 6, Column 1), successively stratifying our sample by attitude quintiles and wealth quintiles. Robust standard errors clustered at the village level are in parentheses. *** p<0.01, ** p<0.05, * p<0.10.

Appendix A

Table A1: Summary statistics using DHS-NFHS sample

	Mean pooled	Mean males	Mean females	Difference (standard error)
	(1)	(2)	(3)	(4)
Male	0.51	NA	NA	NA
	(0.500)			
Age in years	11.07	11.04	11.10	-0.063*
	(2.030)	(2.023)	(2.037)	(0.037)
Hindu	0.84	0.84	0.83	0.007
	(0.369)	(0.366)	(0.372)	(0.006)
SC	0.18	0.18	0.18	0.003
	(0.385)	(0.386)	(0.384)	(0.007)
ST	0.18	0.17	0.18	-0.014**
	(0.382)	(0.376)	(0.388)	(0.007)
BPL	0.54	0.53	0.54	-0.013
	(0.499)	(0.499)	(0.498)	(0.009)
Household size	6.05	5.94	6.18	-0.238***
	(2.712)	(2.707)	(2.713)	(0.047)
SES	0.00	0.03	-0.04	0.069**
	(1.844)	(1.833)	(1.854)	(0.031)
SES quintile 1	-2.74	-2.72	-2.76	0.042
	(0.744)	(0.740)	(0.748)	(0.028)
SES quintile 2	-0.90	-0.90	-0.89	-0.011
	(0.454)	(0.465)	(0.442)	(0.019)
SES quintile 3	0.25	0.24	0.25	-0.009
	(0.327)	(0.329)	(0.324)	(0.012)
SES quintile 4	1.19	1.19	1.20	-0.005
	(0.114)	(0.113)	(0.115)	(0.005)
SES quintile 5	2.40	2.43	2.38	0.053*
	(0.836)	(0.860)	(0.810)	(0.029)
Cooking fuel	0.30	0.31	0.29	0.018**
	(0.458)	(0.462)	(0.454)	(0.008)
Drinking water	0.51	0.50	0.51	-0.006
	(0.500)	(0.500)	(0.500)	(0.008)
Toilets	0.46	0.46	0.46	0.007
	(0.498)	(0.499)	(0.498)	(0.008)
Observations	13004	6663	6341	

Table A1 – continued from previous page

	Mean pooled	Mean males	Mean females	Difference (standard error)
	(1)	(2)	(3)	(4)

Notes: This table recreates summary statistics using the DHS-NFHS data. The sample is composed of children aged 8-14, from the rural regions of Andhra Pradesh and Maharashtra. In Columns 1-3, standard deviations are reported in parentheses. In Column 4, robust standard errors clustered at the DHS-NFHS area level in parentheses. *** p<0.01, ** p<0.05, * p<0.10.

Table A2: Gender gaps in child characteristics between DHS-NFHS and our sample

	Rural India vs our sample	Urban India vs our sample	Rural AP and MH vs our sample	Northern states vs our sample
	(1)	(2)	(3)	(4)
Age in years	0.033	0.055*	0.080*	0.014
	(0.030)	(0.032)	(0.047)	(0.033)
Relative grade attainment	0.039***	0.037***	0.023**	0.043***
	(0.008)	(0.008)	(0.011)	(0.008)
Hindu	-0.008*	-0.024***	-0.010	-0.001
	(0.004)	(0.005)	(0.007)	(0.005)
SC	0.003	0.009	0.003	0.010*
	(0.005)	(0.006)	(0.009)	(0.006)
ST	-0.005	0.000	-0.001	-0.013*
	(0.007)	(0.008)	(0.010)	(0.007)
BPL	0.011**	0.015***	0.019*	0.009
	(0.005)	(0.006)	(0.010)	(0.006)
Household size	-0.003	-0.055	-0.052	0.073*
	(0.034)	(0.036)	(0.058)	(0.038)
SES	-0.023	-0.038	-0.043	-0.041
	(0.033)	(0.034)	(0.044)	(0.035)
SES quintile 1	-0.007	0.011	-0.045	-0.009
	(0.015)	(0.020)	(0.031)	(0.016)
SES quintile 2	-0.001	-0.002	0.012	-0.002
	(0.009)	(0.011)	(0.021)	(0.010)
SES quintile 3	-0.001	0.002	0.005	-0.000
	(0.008)	(0.009)	(0.014)	(0.010)
SES quintile 4	0.005	-0.001	0.010	0.014
	(0.011)	(0.011)	(0.011)	(0.012)
SES quintile 5	-0.115***	-0.080**	-0.092**	-0.123***
	(0.036)	(0.036)	(0.045)	(0.038)
Cooking fuel	-0.005	-0.011	-0.018	-0.006
	(0.008)	(0.008)	(0.011)	(0.008)
Drinking water	-0.003	-0.005	0.003	-0.009**
	(0.004)	(0.005)	(0.009)	(0.005)
Toilets	-0.008	-0.010	-0.014	-0.014*
	(0.007)	(0.007)	(0.011)	(0.008)
Enrolled	0.036***	0.054***	0.038***	0.018**
	(0.008)	(0.008)	(0.008)	(0.008)
Observations	325,941	124,341	33,266	106,867

Notes: Each cell represents the coefficient on the interaction term between the "dataset" dummy (taking the value 0 in our sample, 1 in the DHS-NFHS sample) and the male dummy, obtained from different regressions of child characteristics on the male dummy, the dataset dummy and the interaction term. Column 1 captures gender differences in child characteristics between the DHS-NFHS sample in rural India with our sample. All remaining columns similarly capture gender differences between the different DHS-NFHS subsamples and our sample. In Column 4, the northern states include Rajasthan, Delhi, Haryana, Punjab and Uttar Pradesh. *** p<0.01, ** p<0.05, * p<0.10. Robust standard errors clustered at the area/village level in parentheses.

Table A3: Empowerment statistics for women in the DHS-NFHS sample

	Rural Kurnool and Palghar	Rural AP and MH	Rural India
	(1)	(2)	(3)
Age in years	29.98	30.47	29.65
	(9.422)	(9.696)	(9.784)
Relative grade attainment	1.54	2.23	2.03
	(1.609)	(1.569)	(1.651)
Married	0.80	0.77	0.73
	(0.400)	(0.422)	(0.445)
Employed	0.36	0.41	0.25
	(0.482)	(0.492)	(0.431)
Hindu	0.82	0.85	0.76
	(0.384)	(0.355)	(0.425)
SC	0.94	0.88	0.78
	(0.232)	(0.323)	(0.411)
ST	0.06	0.11	0.17
	(0.232)	(0.307)	(0.374)
Justifies wife beating	0.61	0.54	0.44
	(0.489)	(0.499)	(0.496)
Owns assets	0.15	0.25	0.25
	(0.360)	(0.431)	(0.430)
Controlling husband	0.31	0.33	0.47
	(0.465)	(0.638)	(0.823)
Domestic violence	0.37	0.34	0.33
	(0.486)	(0.473)	(0.472)
Household size	5.93	5.59	5.87
	(3.275)	(2.620)	(2.670)
SES	-0.00	0.00	0.00
	(2.585)	(2.584)	(2.545)
SES quintile 1	-0.95	-0.99	-1.03
	(0.155)	(0.169)	(0.128)
SES quintile 2	-0.70	-0.74	-0.65
	(0.00100)	(0.00469)	(0.00955)
SES quintile 3	-0.43	-0.49	-0.37
	(0.00265)	(0.00453)	(0.0700)
SES quintile 4	-0.24	-0.29	-0.20
	(0.115)	(0.106)	(0.146)
SES quintile 5	2.93	2.67	2.46
	(5.327)	(4.952)	(5.025)
Cooking fuel	0.45	0.33	0.21

Table A3 – continued from previous page

	Rural Kurnool and Palghar	Rural AP and MH	Rural India
	(1)	(2)	(3)
	(0.498)	(0.472)	(0.407)
Drinking water	0.52	0.50	0.33
	(0.500)	(0.500)	(0.472)
Toilets	0.47	0.48	0.48
	(0.499)	(0.500)	(0.500)
Observations	874	25589	494951

Notes: This table shows female demographic and empowerment statistics for ever-married women aged 15-49, from the rural districts and regions from which our main sample is drawn. The data comes from the 2015-16 DHS-NFHS survey. In Columns 1-3, we successively present statistics at the district, region and national level. Column (1) presents summary statistics for women in rural Palghar and Kurnool. Column (2) presents summary statistics from rural Maharashtra and Andhra Pradesh, and finally column (3) contains statistics from rural India. "Justifies wife beating" is a dummy variable that takes a value 1 if a woman approves of a husband beating his wife in certain circumstances, and zero otherwise. "Owns assets" is a dummy variable that takes the value 1 if a woman owns land or a house on her own, zero otherwise. "Controlling husband" is a dummy variable that takes the value 1 if a woman experienced controlling behavior from her husband, zero otherwise. "Domestic violence" is a dummy variable that records woman's experience with any emotional, sexual or physical violence from her husband. Standard deviations are reported in parentheses.

Table A4: Gender gaps with and by village level characteristics

	All sample	Below median sex-ratio	Above median sex-ratio	Below median female literacy	Above median female literacy
	(1)	(2)	(3)	(4)	(5)
Panel A: Cognitive skills					
Reading score in native language	0.075**	0.113**	0.039	0.146**	0.001
	(0.033)	(0.053)	(0.036)	(0.055)	(0.032)
Observations	7,699	3,811	3,888	3,915	3,784
R-squared	0.712	0.730	0.689	0.699	0.719
Reading score in English	0.147***	0.201***	0.093**	0.231***	0.058
	(0.036)	(0.053)	(0.045)	(0.054)	(0.039)
Observations	7,699	3,811	3,888	3,915	3,784
R-squared	0.709	0.726	0.693	0.682	0.728
Math score	0.119***	0.177***	0.064	0.202***	0.030
	(0.034)	(0.044)	(0.047)	(0.056)	(0.031)
Observations	7,699	3,811	3,888	3,915	3,784
R-squared	0.683	0.706	0.660	0.685	0.680
Relative grade attainment	0.075*	0.122*	0.027	0.217***	-0.078**
	(0.043)	(0.066)	(0.054)	(0.065)	(0.036)
Observations	7,688	3,804	3,884	3,906	3,782
R-squared	0.690	0.694	0.688	0.708	0.662
Raven's test score	0.014	0.046	-0.018	0.030	-0.002
	(0.022)	(0.030)	(0.031)	(0.034)	(0.026)
Observations	7,699	3,811	3,888	3,915	3,784
R-squared	0.738	0.757	0.721	0.722	0.755
Panel B: Noncognitive skills					
Self-esteem	-0.040	-0.066*	-0.014	-0.033	-0.045
	(0.025)	(0.033)	(0.036)	(0.039)	(0.030)
Observations	7,699	3,811	3,888	3,915	3,784
R-squared	0.716	0.731	0.700	0.678	0.761
Self-efficacy	0.123***	0.104**	0.139***	0.242***	-0.007
	(0.029)	(0.047)	(0.033)	(0.040)	(0.026)
Observations	7,699	3,811	3,888	3,915	3,784
R-squared	0.715	0.679	0.755	0.685	0.763
Family and child level characteristics	Yes	Yes	Yes	Yes	Yes
Village fixed effects	No	No	No	No	No
Attitude fixed effects	Yes	Yes	Yes	Yes	Yes
Household fixed effects	Yes	Yes	Yes	Yes	Yes

Notes: Each cell represents the coefficient on the male dummy obtained from different regressions of the outcome (indicated in Panels A and B) on the male dummy, selected family and child covariates, attitude and household fixed effects similar to the specification in Table 6 column 3, now additionally including village-level covariates such as child sex-ratio, percentage of individuals belonging to the scheduled tribe, percentage of individuals belonging to the scheduled caste, female literacy rate, and female labor force participation rate. Robust standard errors clustered at the village level in parentheses. *** p<0.01, ** p<0.05, * p<0.10.

Table A5: Association between gender attitudes and cognitive and noncognitive skills

	Reading score in native language	Reading score in English	Math score	Relative grade attainment	Raven's test score	Self-esteem	Self-efficacy
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Gender roles	0.180***	0.134**	0.167***	-0.000	0.386***	0.004	0.132
	(0.063)	(0.067)	(0.048)	(0.046)	(0.088)	(0.097)	(0.093)
Education	0.086**	0.026	0.080**	0.044	0.017	-0.004	-0.082
	(0.039)	(0.040)	(0.039)	(0.037)	(0.058)	(0.058)	(0.069)
Leadership	0.029	0.050	-0.033	-0.009	-0.037	-0.187***	0.016
	(0.040)	(0.036)	(0.035)	(0.027)	(0.064)	(0.045)	(0.052)
Freedom	0.158***	0.120***	0.243***	0.146***	0.232***	-0.165***	0.340***
	(0.045)	(0.046)	(0.043)	(0.039)	(0.068)	(0.057)	(0.062)
SES Q2 (vs Q1)	0.188***	0.087***	0.131***	0.157***	0.026	-0.067**	0.059**
	(0.028)	(0.027)	(0.029)	(0.027)	(0.040)	(0.030)	(0.026)
SES Q3 (vs Q1)	0.208***	0.129***	0.211***	0.163***	0.038	-0.010	0.081**
	(0.032)	(0.033)	(0.032)	(0.031)	(0.044)	(0.038)	(0.035)
SES Q4 (vs Q1)	0.300***	0.197***	0.272***	0.181***	0.077	-0.048	0.162***
	(0.036)	(0.036)	(0.033)	(0.038)	(0.049)	(0.043)	(0.035)
SES Q5 (vs Q1)	0.318***	0.280***	0.303***	0.199***	0.136**	-0.057	0.162***
	(0.042)	(0.046)	(0.040)	(0.039)	(0.065)	(0.051)	(0.045)
Family and child level characteristics	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Village fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	19,030	19,030	19,030	19,020	19,030	19,030	19,030
R-squared	0.261	0.314	0.323	0.275	0.237	0.115	0.178

Notes: Each column represents the full set of coefficient estimates on gender attitude indices and SES dummies obtained with the specification used in Table 6 column 1; from regressions of outcomes (indicated in Panels A and B of Table 3) on the male dummy, gender attitude indices (indicated in Panel C of Table 3), family- and child-level characteristics (indicated in Panel E of Table 3) and village fixed effects. Robust standard errors clustered at the village level in parentheses. *** p<0.01, ** p<0.05, * p<0.10.

Table A6: Cognitive skills and gender attitudes for boys

	Reading score in native language	Reading score in English	Math score	Relative grade attainment	Raven's test score	Self-esteem	Self-efficacy
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Gender roles	0.183**	0.062	0.157**	-0.027	0.386***	0.017	0.048
	(0.073)	(0.092)	(0.064)	(0.052)	(0.104)	(0.101)	(0.132)
Freedom	0.077	0.123**	0.181***	0.084**	0.174**	-0.186***	0.278***
	(0.051)	(0.053)	(0.049)	(0.042)	(0.074)	(0.060)	(0.064)
Education	0.088*	0.047	0.065	0.030	-0.081	-0.020	-0.050
	(0.045)	(0.048)	(0.045)	(0.037)	(0.067)	(0.058)	(0.067)
Leadership	0.001	0.036	-0.046	0.004	-0.156*	-0.156***	0.013
	(0.047)	(0.046)	(0.042)	(0.032)	(0.086)	(0.049)	(0.064)
Observations	9,937	9,937	9,937	9,929	9,937	9,937	9,937
Family and child level characteristics	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Village fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Notes: Each cell presents the coefficient on an attitude index obtained from regressions of cognitive and non-cognitive skills (listed in Columns 1-7) on the gender attitude indices and other covariates (obtained with the specification used in Table 6, Column 1). Robust standard errors clustered at the village level in parentheses. *** p<0.01, ** p<0.05, * p<0.10.

Table A7: Replicating Table 6, Column 2; using Column 3 sample

	Conditional gender gaps with gender attitude fixed effects
Panel A: Cognitive skills	
Reading score in native language	0.083***
	(0.022)
Observations	14,074
R-squared	0.688
Reading score in English	0.127***
	(0.023)
Observations	14,074
R-squared	0.709
Math score	0.122***
	(0.022)
Observations	14,074
R-squared	0.703
Relative grade attainment	0.095***
	(0.027)
Observations	14,061
R-squared	0.689
Raven's test score	0.028
	(0.017)
Observations	14,074
R-squared	0.765
Panel B: Noncognitive skills	
Self-esteem	-0.031
	(0.020)
Observations	14,074
R-squared	0.690
Self-efficacy	0.076***
	(0.020)
Observations	14,074
R-squared	0.683
Family and child level characteristics	Yes
Village fixed effects	Yes
Attitude fixed effects	Yes
Household fixed effects	No

Notes: Each cell represents the coefficient on the male dummy obtained from different regressions of the outcome (indicated in Panels A and B) on the male dummy and selected covariates. Specifically, we report gender gaps controlling for family- and child-level characteristics, attitude-quintile fixed effects and village fixed effects, using the same sample as the one used in Table 6, Column 3. *** p<0.01, ** p<0.05, * p<0.10. Robust standard errors clustered at the village level in parentheses.

Table A8: Heterogeneity Analysis

	Reading score in native language	Reading score in English	Math score	Relative grade attainment	Raven's test score	Self-esteem	Self-efficacy
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Panel A: by attitude quintiles							
Attitude Q1	0.122***	0.170***	0.146***	0.101**	0.091***	-0.066**	0.115***
	(0.030)	(0.028)	(0.032)	(0.042)	(0.029)	(0.027)	(0.027)
Observations	5,753	5,753	5,753	5,747	5,753	5,753	5,753
Attitude Q2	0.021	0.125***	0.096**	0.074*	0.096***	0.008	0.056
	(0.036)	(0.037)	(0.041)	(0.042)	(0.033)	(0.036)	(0.043)
Observations	2,867	2,867	2,867	2,867	2,867	2,867	2,867
Attitude Q3	0.083**	0.132***	0.172***	0.077**	0.134***	0.037	0.075**
	(0.037)	(0.039)	(0.033)	(0.037)	(0.042)	(0.038)	(0.037)
Observations	2,941	2,941	2,941	2,940	2,941	2,941	2,941
Attitude Q4	0.078***	0.092***	0.114***	0.049**	-0.074**	-0.036	0.093***
	(0.030)	(0.032)	(0.028)	(0.025)	(0.035)	(0.038)	(0.035)
Observations	3,871	3,871	3,871	3,869	3,871	3,871	3,871
Attitude Q5	0.020	0.089**	0.005	0.054*	-0.077*	0.027	0.030
	(0.031)	(0.036)	(0.031)	(0.029)	(0.040)	(0.028)	(0.034)
Observations	3,580	3,580	3,580	3,579	3,580	3,580	3,580
Panel B: by SES quintiles							
SES Q1	0.121***	0.109***	0.174***	0.201***	0.037	-0.037	0.079**
	(0.037)	(0.028)	(0.033)	(0.041)	(0.035)	(0.043)	(0.035)
Observations	3,508	3,508	3,508	3,506	3,508	3,508	3,508
SES Q2	0.100***	0.172***	0.105***	0.087***	0.070**	-0.047*	0.066**
	(0.032)	(0.031)	(0.030)	(0.032)	(0.032)	(0.026)	(0.030)
Observations	3,814	3,814	3,814	3,813	3,814	3,814	3,814
SES Q3	0.046	0.141***	0.114***	0.063*	0.079***	-0.025	0.076**
	(0.036)	(0.035)	(0.032)	(0.035)	(0.025)	(0.029)	(0.033)
Observations	3,861	3,861	3,861	3,860	3,861	3,861	3,861
SES Q4	0.060**	0.151***	0.105***	0.039	0.026	-0.011	0.096***
	(0.028)	(0.031)	(0.030)	(0.031)	(0.031)	(0.031)	(0.032)
Observations	4,049	4,049	4,049	4,045	4,049	4,049	4,049
SES Q5	0.005	0.035	0.054*	-0.019	-0.004	-0.016	0.042
	(0.024)	(0.036)	(0.031)	(0.026)	(0.031)	(0.039)	(0.032)
Observations	3,783	3,783	3,783	3,780	3,783	3,783	3,783
Family and child level characteristics	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Village fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Notes: Each cell presents the coefficient on the male dummy obtained from different regressions of the outcomes (listed in Columns 1-7) on the male dummy and other selected covariates (obtained with the specification used in Table 6, Column 1), successively stratifying our sample by attitude quintiles and SES quintiles. The number of observations is reported under each cell. Robust standard errors clustered at the village level in parentheses. *** p<0.01, ** p<0.05, * p<0.10.

Table A9: Complementarity between Attitudes and SES

	Reading score in native language	Reading score in English	Math score	Relative grade attainment	Raven's test score	Self-esteem	Self-efficacy
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Panel A: Gender gap by attitude quintiles (holding SES at Q4 and Q5)							
Attitude Q1	0.131***	0.216***	0.206***	0.046	0.117***	-0.054	0.150***
	(0.034)	(0.037)	(0.039)	(0.044)	(0.038)	(0.033)	(0.038)
Observations	2,492	2,492	2,492	2,487	2,492	2,492	2,492
Attitude Q2	-0.001	0.069	0.048	0.048	0.017	0.010	0.073
	(0.047)	(0.063)	(0.063)	(0.052)	(0.053)	(0.054)	(0.066)
Observations	1,176	1,176	1,176	1,176	1,176	1,176	1,176
Attitude Q3	0.003	0.084	0.106**	-0.030	0.069	-0.021	-0.007
	(0.058)	(0.061)	(0.051)	(0.059)	(0.057)	(0.055)	(0.060)
Observations	1,194	1,194	1,194	1,193	1,194	1,194	1,194
Attitude Q4	0.003	-0.003	0.046	-0.054*	-0.121**	-0.041	0.039
	(0.044)	(0.051)	(0.047)	(0.030)	(0.050)	(0.053)	(0.052)
Observations	1,502	1,502	1,502	1,502	1,502	1,502	1,502
Attitude Q5	0.014	0.031	-0.031	0.021	-0.141**	0.048	0.063
	(0.045)	(0.059)	(0.048)	(0.045)	(0.055)	(0.046)	(0.049)
Observations	1,385	1,385	1,385	1,384	1,385	1,385	1,385
Panel B: Gender gap by SES quintiles (holding attitudes at Q4 and Q5)							
SES Q1	0.092*	0.094**	0.163***	0.178***	-0.060	-0.065	0.055
	(0.052)	(0.045)	(0.048)	(0.052)	(0.060)	(0.053)	(0.053)
Observations	1,471	1,471	1,471	1,469	1,471	1,471	1,471
SES Q2	0.033	0.161***	0.050	0.029	0.003	0.005	0.075*
	(0.044)	(0.048)	(0.044)	(0.038)	(0.051)	(0.047)	(0.042)
Observations	1,592	1,592	1,592	1,592	1,592	1,592	1,592
SES Q3	0.045	0.091*	0.073	0.038	-0.095**	-0.093**	0.130***
	(0.051)	(0.055)	(0.049)	(0.045)	(0.041)	(0.046)	(0.050)
Observations	1,445	1,445	1,445	1,444	1,445	1,445	1,445
SES Q4	0.009	0.066	0.019	-0.023	-0.137**	-0.003	0.055
	(0.049)	(0.058)	(0.046)	(0.047)	(0.063)	(0.051)	(0.052)
Observations	1,338	1,338	1,338	1,337	1,338	1,338	1,338
SES Q5	-0.013	-0.029	-0.030	-0.019	-0.129***	-0.017	0.035
	(0.037)	(0.052)	(0.044)	(0.029)	(0.039)	(0.049)	(0.047)
Observations	1,556	1,556	1,556	1,556	1,556	1,556	1,556
Family and child level characteristics	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Village fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Notes: Each cell presents the coefficient on the male dummy obtained from different regressions of the outcomes (listed in Columns 1-4) on the male dummy and other selected covariates (obtained with the specification used in Table 6, Column 1), successively stratifying our sample by attitude quintiles and SES quintiles. Robust standard errors clustered at the village level in parentheses. *** p<0.01, ** p<0.05, * p<0.10.

Table A10: Attitude, SES and birth order gradients in cognitive and noncognitive skills

	Reading score in native language	Reading score in English	Math score	Relative grade attainment	Raven's test score	Self-esteem	Self-efficacy
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Panel A: Attitude quintiles							
Attitude Q2 (vs Q1)	0.042	0.049*	0.030	-0.008	-0.024	-0.125***	-0.045
	(0.029)	(0.030)	(0.027)	(0.024)	(0.034)	(0.037)	(0.041)
Attitude Q3 (vs Q1)	0.063*	0.091***	0.108***	0.025	0.007	-0.241***	0.033
	(0.033)	(0.029)	(0.030)	(0.028)	(0.046)	(0.043)	(0.040)
Attitude Q4 (vs Q1)	0.055	-0.002	0.086***	0.025	0.113***	-0.205***	0.038
	(0.035)	(0.030)	(0.033)	(0.030)	(0.042)	(0.049)	(0.053)
Attitude Q5 (vs Q1)	0.186***	0.144***	0.187***	0.077**	0.248***	-0.253***	0.228***
	(0.037)	(0.032)	(0.036)	(0.037)	(0.061)	(0.059)	(0.046)
p-value from F-test (Q1=Q2=Q3=Q4=Q5)	<0.01	<0.01	<0.01	0.118	<0.01	<0.01	<0.01
p-value from t-test (Q5=Q2)	<0.01	<0.01	<0.01	<0.01	<0.01	0.019	<0.01
Panel B: SES quintiles							
SES Q2 (vs Q1)	0.188***	0.088***	0.131***	0.156***	0.024	-0.067**	0.057**
	(0.029)	(0.027)	(0.029)	(0.027)	(0.040)	(0.030)	(0.026)
SES Q3 (vs Q1)	0.208***	0.130***	0.213***	0.164***	0.038	-0.010	0.081**
	(0.033)	(0.033)	(0.032)	(0.031)	(0.044)	(0.038)	(0.035)
SES Q4 (vs Q1)	0.300***	0.198***	0.273***	0.180***	0.074	-0.049	0.160***
	(0.036)	(0.036)	(0.034)	(0.038)	(0.050)	(0.043)	(0.036)
SES Q5 (vs Q1)	0.315***	0.281***	0.300***	0.194***	0.124*	-0.062	0.149***
	(0.043)	(0.046)	(0.040)	(0.039)	(0.066)	(0.051)	(0.045)
p-value from F-test (Q1=Q2=Q3=Q4=Q5)	<0.01	<0.01	<0.01	<0.01	0.436	0.132	<0.01
p-value from t-test (Q5=Q2)	<0.01	<0.01	<0.01	0.224	0.083	0.909	0.018
Panel C: Birth order dummies							
First born	-0.013	0.028	0.015	-0.050	-0.073*	-0.005	-0.041
	(0.033)	(0.029)	(0.030)	(0.035)	(0.040)	(0.040)	(0.032)
Second born	-0.038	-0.013	-0.013	-0.002	-0.041	0.036	-0.029

Table A10 – continued from previous page

	Reading score in native language	Reading score in English	Math score	Relative grade attainment	Raven's test score	Self-esteem	Self-efficacy
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	(0.030)	(0.025)	(0.029)	(0.033)	(0.032)	(0.038)	(0.029)
Third born	-0.027	-0.002	-0.016	0.014	-0.024	0.019	-0.012
	(0.026)	(0.023)	(0.025)	(0.027)	(0.028)	(0.032)	(0.026)
p-value from F-test (First=Second=Third)	0.342	0.024	0.107	<0.01	0.079	0.049	0.310
Family and child level characteristics	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Village fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	19,030	19,030	19,030	19,020	19,030	19,030	19,030
R-squared	0.259	0.314	0.320	0.275	0.235	0.117	0.176

Notes: Each column presents coefficients on the attitude quintiles, SES quintiles and the birth order dummies obtained using the specification in Table 6, Column 2. Robust standard errors clustered at the village level in parentheses. *** p<0.01, ** p<0.05, * p<0.10.

Table A11: Attitude and SES gradients in cognitive and noncognitive skills with PCA-based attitude index

	Reading score in native language	Reading score in English	Math score	Relative grade attainment	Raven's test score	Self-esteem	Self-efficacy
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Panel A: by Attitude quintiles							
Attitude Q2 (vs Q1)	0.066**	0.072**	0.023	-0.015	-0.050	-0.167***	-0.020
	(0.030)	(0.030)	(0.028)	(0.027)	(0.041)	(0.041)	(0.040)
Attitude Q3 (vs Q1)	0.051	0.084***	0.106***	-0.007	-0.017	-0.287***	0.030
	(0.035)	(0.031)	(0.032)	(0.031)	(0.048)	(0.044)	(0.043)
Attitude Q4 (vs Q1)	0.070*	0.011	0.086**	0.003	0.087*	-0.291***	0.039
	(0.036)	(0.033)	(0.034)	(0.033)	(0.050)	(0.053)	(0.057)
Attitude Q5 (vs Q1)	0.161***	0.123***	0.158***	0.045	0.221***	-0.313***	0.221***
	(0.038)	(0.034)	(0.037)	(0.038)	(0.059)	(0.059)	(0.047)
p-value from F-test (Q1=Q2=Q3=Q4=Q5)	<0.01	<0.01	<0.01	0.400	<0.01	<0.01	<0.01
p-value from t-test (Q1=Q5)	<0.01	0.121	<0.01	0.061	<0.01	<0.01	<0.01
Panel B: by SES quintiles							
SES Q2 (vs Q1)	0.188***	0.087***	0.131***	0.156***	0.027	-0.066**	0.058**
	(0.029)	(0.027)	(0.030)	(0.027)	(0.040)	(0.030)	(0.026)
SES Q3 (vs Q1)	0.209***	0.130***	0.213***	0.164***	0.040	-0.007	0.082**
	(0.033)	(0.033)	(0.032)	(0.031)	(0.044)	(0.038)	(0.035)
SES Q4 (vs Q1)	0.301***	0.197***	0.273***	0.182***	0.077	-0.047	0.162***
	(0.036)	(0.036)	(0.034)	(0.038)	(0.050)	(0.043)	(0.036)
SES Q5 (vs Q1)	0.316***	0.281***	0.300***	0.195***	0.126*	-0.063	0.151***
	(0.043)	(0.046)	(0.040)	(0.039)	(0.066)	(0.050)	(0.045)
p-value from F-test (Q1=Q2=Q3=Q4=Q5)	<0.01	<0.01	<0.01	<0.01	0.428	0.129	<0.01
p-value from t-test (Q1=Q5)	<0.01	<0.01	<0.01	0.208	0.087	0.934	0.019
Family and child level characteristics	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Village fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	19,030	19,030	19,030	19,020	19,030	19,030	19,030
R-squared	0.258	0.313	0.319	0.274	0.235	0.121	0.175

Notes: Each column represents the coefficient estimates on the PCA-based attitude quintiles and PCA-based SES quintiles obtained using the specification in Table 6, Column 2, further adding birth order dummies to the covariate set. Standard errors are clustered at the village level in parentheses. *** p<0.01, ** p<0.05, * p<0.10.

Appendix B

Sampling strategy for Kurnool, Andhra Pradesh

Step 1: We use the 2011 Census data for India to create a "master list" of all villages in Kurnool district. Villages are nested within a sub-district in India and we exclude sub-districts in Kurnool that have Magic Bus (our partner) presence. We also exclude all villages that have a population of less than 1000 individuals as smaller villages might make it difficult for Magic bus to achieve its session size of 30-35 children.

Step 2: For all the in-scope villages identified in Step 1, we next calculate the following village-level indicators: child sex ratio, percentage of SC population, log (number of households), and literacy rate. We exclude outlier villages that have very low or high child sex ratios (less than 800 or above 1400). We also exclude large villages with a population of more than 1000 households per village as that would make house listing too resource intensive. Steps 1 and 2 result in 351 in-scope rural villages in Kurnool.

Step 3: We next go through the village census maps to identify villages from this pool, that is, we map the 351 villages and examine only "pairs" of villages that are too close (less than 2 km apart) and randomly discard one village from each such pair. We carry this exercise to minimize contamination bias and spillovers. This step results in 276 in-scope villages.

Step 4: Next using principal component analysis, we develop a village-level composite index based on number of households (log-transformed), child sex ratio, percentage of SC population, and overall literacy rate. Based on the composite index, villages are divided into four equal strata. From within each stratum, we randomly select 30 villages, which results in a total of 120 villages (4 strata $\times$ 30 villages).

Step 5: The survey agency is provided with the list of 120 villages (in randomized order within each strata) to conduct a house listing exercise. They will collect data in the first 80 villages (that is, the first 20 villages from within each strata minimizing travel costs), unless it is impossible to effectively collect data (e.g., if the village authority prohibits the survey agency from collecting data).

Step 6: After completing the house listing exercise, we randomize the 80 study villages into treatment and control groups of 40 each. Randomization is conducted within each stratum.

Step 7: From each treatment village, we randomly sample 200 age eligible (8-14 year old) children and from each control village, we randomly sample 70 age eligible (8-14 year

old) children. We implement the baseline survey in all 80 villages during August-November 2015.

Sampling strategy for Palghar, Maharashtra

Step 1: We use the 2011 Census data for India to create a "master list" of all villages in Thane district (which was later split into Palghar and Thane districts). Villages are nested within a sub-district in India and we exclude sub-districts in Thane that have Magic Bus (our partner) presence. We also exclude all villages that have a population of less than 1000 individuals as smaller villages might make it difficult for Magic bus to achieve its session size of 30-35 children.

Step 2: For all the in-scope villages identified in Step 1, we next calculate the following village-level indicators: child sex ratio, percentage of ST population, log (number of households), and literacy rate. We exclude outlier villages that have very low or high child sex ratios (less than 800 or above 1600). We also exclude large villages with a population of more than 1000 households per village as that would make house listing too resource intensive. Steps 1 and 2 result in 449 in-scope rural villages.

Step 3: We next go through the village census maps to identify villages from this pool, that is, we map the 449 villages and examine only "pairs" of villages that are too close (less than 2 km apart) and randomly discard one village from each such pair. We carry this exercise to minimize contamination bias and spillovers. This step results in 324 in-scope villages.

Step 4: Next using principal component analysis, we develop a village-level composite index based on number of households (log-transformed), child sex ratio, percentage of ST population, and overall literacy rate. Based on the composite index, villages are divided into four equal strata. From within each stratum, we randomly select 30 villages, which results in a total of 120 villages (4 strata $\times$ 30 villages).

Step 5: The survey agency is provided with the list of 120 villages (in randomized order within each strata) to conduct a house listing exercise. They will collect data in the first 78 villages (that is, the first 20 villages from strata 2 and 3 and first 19 villages from strata 1 and 4, minimizing travel costs), unless it is impossible to effectively collect data (e.g., if the village authority prohibits the survey agency from collecting data).

Step 6: In response to Magic Bus Foundation's request for including a few urban study sites, we also sample 2 urban wards in Thane, Maharashtra. Of the 4 eligible urban wards in Bhiwandi, we randomly draw 2 urban wards to be included in our study.

Step 7: After completing the house listing exercise, we randomize the 78 study villages into treatment and control groups of 39 each. Randomization is conducted within each stratum. Between the two urban wards, one is randomly assigned to the treatment group and the other urban ward serves as a control.

Step 8: From each treatment village/ward, we randomly sample 200 age eligible (8-14 year old) children and from each control village/ward, we randomly sample 70 age eligible (8-14 year old) children. We implement the baseline survey in all 78 villages and 2 urban wards during August-November 2015. Note that our final sample of villages all belong to Palghar (split-off from Thane) district in India.