Reshaping Adolescents' Gender Attitudes: Evidence from a School-Based Experiment in India*

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Abstract

Women in developing countries face economic and social disadvantages; cultural norms and attitudes about gender equality reinforce these disadvantages. This paper evaluates an intervention aimed at changing gender attitudes, specifically, a multi-year school-based intervention in Haryana, India, that engaged adolescents in classroom discussions about gender equality. Using a randomized controlled trial, we find that the intervention improved gender attitudes by 0.24 standard deviations, an effect size comparable to that of having parents whose attitudes are one standard deviation more gender-equitable. Program participants also report more gender-equitable behavior such as increased interaction with the opposite sex. The change in attitudes is similar for boys and girls, but behavior change is larger among boys.

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1 Introduction

In many countries, the most salient gender inequality is in earnings and professional advancement. In developing countries, the gender gaps are often more far-reaching and manifest themselves throughout the life cycle – from survival at birth and early childhood, to educational opportunities, control over marriage and fertility, labor force participation, asset ownership, and late life care.[1] Moreover, many of these gender gaps are widening or stagnant despite economic progress, suggesting that economic development on its own is unlikely to close the gender gaps.

Strengthening economic incentives to invest in girls' health and education and to allow women to pursue careers will help solve the problem (Jensen, 2012), but entrenched attitudes about gender roles will likely be a barrier to progress. There is growing evidence in economics and related fields on the importance of cultural norms (Bertrand et al., 2015) and the fact that norms, even when originally shaped by economic forces, can linger well after the economic environment has changed (Alesina et al., 2013; Giuliano, 2017).

Gender attitudes (that is, preferences) might be quite sticky, but they also are amenable to change through intervention. Reserved seats for female politicians have the indirect effect of reducing gender-biased attitudes in India (Beaman et al., 2009), and television programming can change fertility preferences, even if unintentionally (Jensen and Oster, 2009; La Ferrara et al., 2012).

This paper evaluates a direct approach of changing gender attitudes through discussion and persuasion. We evaluate a school-based gender attitude-change program in the state of Haryana in India. Participants started the program when they entered seventh or eighth grade and participated for two and a half school years. The program centered around classroom discussions about gender equality that were held regularly (a 45-minute session every three weeks) and taught facts and endorsed gender equality, but as importantly, prompted students to reflect on their own views and their society's. The sessions covered a wide array of gender topics such as the gender allocation of chores at home, girls' education, and women working outside the home. Some sessions also taught communication skills to help students convince others of their views or persuade their parents to, say, permit them to marry at a later age. The program's messaging combined a human-rights case for gender equity with pragmatic reasons to value women, for example, their economic contributions.

[1] See important summaries of this topic by Sen (1990), Duflo (2012) and Jayachandran (2015).

The reason for targeting secondary school students is that adolescence is a critical time in the development of morality, when people are young enough to still have malleable attitudes but mature enough to reflect on complex moral questions (Kohlberg, 1976).[2] The intervention was designed and implemented by Breakthrough, a non-profit organization with extensive experience in gender-equality programming. The Government of Haryana granted Breakthrough permission to lead these classes during the regular school day.

We implement a randomized controlled trial across 314 schools, with data collected for roughly 14,000 students. We use this study design to examine how the program changed students' gender attitudes, aspirations, and behaviors. By attitudes, we mean views about what is right and wrong such as whether it is wrong for women to work outside the home. By aspirations, we mean goals for one's own life, for example to pursue higher education or a career; while the program was aimed at changing both boys' and girls' attitudes, one would expect impacts on aspirations to be concentrated among girls.[3] Finally, for behaviors, we mean those that are influenced by gender norms such as chores done at home and frequency of interaction with opposite-gender peers. Note that attitude change might be sufficient to prompt behavior change, but many moderating factors also might stand in the way. For example, a boy who personally now believes that boys should help out with chores at home might still feel that the social sanctions for doing so are too costly or might have parents who do not allow him to do so. Thus, we also examine whether the program changed perceptions of social norms or the costs of deviating from them, as well as how the home environment mediates the intervention's effects.

We find that the intervention improved gender attitudes, measured with an index that aggregates several survey responses, by 0.24 standard deviations. This coefficient is robust to a number of tests, including to the possibility that the intervention induced students to disingenuously offer more socially desirable survey responses (Crowne and Marlowe, 1960). One way to benchmark the effect size is to use the correlation between parents' and children's gender attitudes; the intervention's impact is comparable to having a parent whose attitudes are one standard deviation more gender-equitable. The intervention also produced

[2]Voigtlander and Voth (2015) examine if adolescence is the formative period for development of anti-Semitic views by studying Germans who grew up under the Nazi regime.

[3]Recent research highlights the role of aspirations in changing behavior and outcomes (Ray, 2016; Genicot and Ray, 2017). The intervention directly discussed educational and occupational goals, so we hypothesize a positive impact on girls' aspirations and intended behaviors for further education as well as non-traditional occupations.

more gender-equal behavior such as increased interaction with the opposite sex and greater mobility for girls, with the aggregated behavior index increasing by 0.22 standard deviations. However, the intervention did not have a significant impact on girls' educational and professional aspirations.

We find that improvement in gender attitudes is similar for boys and girls, and that the strongest treatment effects are on attitudes associated with education, employment, and women's roles. Behavior change is concentrated on increased interaction between the opposite sex and more mobility, but with little impact on household chores or decision-making. The behavior change is approximately half as large for girls as for boys, pointing to possible barriers for girls in operationalizing their personal attitudes. Interestingly, the program effects are similar for students whose parents have more versus less gender-progressive views.

Our study contributes to the literature on the determinants of gender attitudes. In addition to political quotas (Beaman et al., 2009) and television (Jensen and Oster, 2009; La Ferrara et al., 2012), other factors that have been shown to make attitudes more gender-progressive include mothers' labor force participation (Fernandez et al., 2004), having daughters (Washington, 2008) or sisters (Healy and Malhotra, 2013), and serving with women in the military (Dahl et al., 2017).

Our study also contributes to a large literature on gender gaps in outcomes in developing countries and, specifically India. Despite two decades of rapid economic development, outcomes remain considerably worse for women than men in India. This pattern is evident in educational outcomes: while boys and girls start secondary school at the same rate, only 0.73 girls enroll in tertiary school for every boy (World Bank, 2010). Women marry young and have children quickly, and face persistent lifelong barriers to mobility, educational achievement (Maitra et al., 2016), access to healthcare (Pande, 2003; Jayaraman et al., 2014), autonomy (Calvi, 2016), labor force participation (Afridi et al., 2016), occupational choice (Field et al., 2010) and ownership of productive assets (Agarwal, 1994; Deininger et al., 2013). A stark manifestation of gender bias is a skewed sex ratio – India had only 0.94 women per man in 2013. Within India, Haryana has some of the most skewed gender outcomes – the child sex ratio (for ages 0 to 6 years) was an alarming 0.83 girls per boy in 2011 (Govt. of India, 2011), reflecting widespread abortion of female fetuses and newborns, as well as discrimination in nutrition and healthcare provision (Jha et al., 2006). The literature exploring gender gaps in India has studied economic and cultural incentives for having sons

(Bhalotra et al., 2016; Jain, 2014); how parents' desire to have a son affects girls' health (Jayachandran and Kuziemko, 2011; Jayachandran and Pande, 2017); the role of enabling technologies for sex bias, for example, ultrasound machines (Bhalotra and Cochrane, 2010); and financial incentives to have or invest in girls (Anukriti, 2017), among other topics.

We also contribute a literature, mostly outside of economics, on interventions aimed at reshaping moral values and attitudes. Studies have found that media campaigns can reduce discriminatory attitudes, for example, about the mentally ill or racial minority groups (Donovan and Leivers, 1993; Evans-Lacko et al., 2013). Textbooks can also reshape preferences: In China, individuals taught with textbooks that were designed by the government to convey pro-Communist messages exhibit more pro-government views and express more skepticism of free markets as adults (Cantoni et al., 2017). Indeed, one way to take the Breakthrough intervention to scale in India is to incorporate the material into textbooks. Our paper is also related to a broader literature on using schools to deliver information on topics beyond the traditional school curriculum (Dupas, 2011; Duflo et al., 2015); we differ from past studies in that the aim of changing the curriculum in our case is to change preferences and not just increase students' knowledge. Finally, our study is related to work that provides information on the returns to girls' education (Jensen, 2012).

2 Description of intervention

The project emerged from the Government of Haryana's interest in testing policies to address gender-based discrimination. The intervention was designed and implemented by Breakthrough, a human rights organization with experience in social change programs. The program was implemented with the cohorts that started in grades 7 and 8 in the academic year 2014-15, and ran from April 2014 to October 2016 (i.e., one cohort that participated in the program in grades 7, 8 and half of 9, and a second cohort that participated in the program in grades 8, 9 and half of 10). We opted to focus on grades 7 to 10 for two reasons. First, students are at ages when attitudes are relatively malleable, yet old enough to engage with gender topics in a meaningful way. Second, data from the District Information System for Education (DISE, 2011) suggested that enrollment is high and dropout relatively low for these grades. The enrollment rate in grades 6 to 8 was 77% for boys and 80% for girls in 2009-2010, so a program targeting these ages could reach a large proportion of the adolescent population. Only 4.1% of students drop out between grades 7 and 8, suggesting that sample

attrition would not be a major concern (significant drop-out occurs after grade 10), although some students might transfer to private schools.

The objective of the gender attitude change program was to create awareness of gender-based discrimination, change dominant gendered perceptions and promote gender equitable attitudes, raise aspirations, and provide tools to participants to be able to translate attitude change and greater aspirations into behavior change. By changing fundamental gender attitudes, the program aimed to influence a wide range of behaviors related to female education, mobility, work, marriage and fertility.

The program emphasized both economic and human rights reasons for valuing girls. For instance, the intervention activities informed participants about benefits of girls' education such as how outcomes for children improve when the mother is more educated. The hypothesis is that this information causes girls to update their beliefs and place higher value on staying in school longer, and for both boys and girls to place higher value on educating their daughters down the road. The messaging also emphasized that equal education for girls is a basic human right.

To ensure that the intervention would be widely accepted, Breakthrough engaged with multiple stake-holders at the state, district and block levels, orienting and gathering inputs from various education officials, school principals and teachers. This helped them design a program that could be integrated into the regular school curriculum, and ultimately taught by school teachers. The central feature of the program was interactive classroom sessions led by a Breakthrough facilitator. Other elements of the program included teacher training, youth clubs, school activities, and a media and communications campaign. Breakthrough created an annual activity plan for each school to help embed the program into the ongoing school curriculum and activities.

Breakthrough facilitators visited each school roughly every three weeks and conducted 45 minute long sessions. The program consisted of 26 sessions held over the two and a half school years. Activities included discussions on topics such as gender identity, values, aspirations, goals, roles and stereotypes, recognition and tolerance towards discrimination. These helped, for example, reveal that girls and boys have similar aspirations for education and professional achievement. The activities also aimed to impart skills such as public speaking, communication between the genders, assertiveness, leadership, self-efficacy, and trust-building. These skills could help translate gender-equitable attitudes into behavioral

change. For instance, girls might be able to negotiate greater independence with their parents, leading to more mobility in the short run, and perhaps greater occupational choice in the long run. Through these topics, and interactive activities such as writing stories, recording observations, street theater, games, and dialogue with families, students explored gender identity and stereotypes, gained a better understanding of gender inequities and their consequences, understood their rights and entitlements, and were encouraged to communicate and act on what they had learned.

3 Study design and data

3.1 Experimental design

We conduct a randomized evaluation of the gender attitude change program, with randomization at the school level, using a sample of 314 government schools across Sonepat, Panipat, Rohtak and Jhajjar districts in Haryana.[4]

3.1.1 Sample selection

The sample size of 314 schools was chosen to be able to measure the immediate impact of the program on gender attitudes, aspirations and behavior, as well as on long-term outcomes such as educational attainment, occupational choice, marriage, and fertility.

Schools were selected for the study from the universe of 607 government-run secondary schools that offered grades six through nine in the four districts. From these schools, we focused on 347 schools with medium to high enrollment based on DISE (2011) data, and with low dropoff in enrollment between grades (as a proxy for attrition from the school). In villages with multiple schools, only one school per village was randomly selected.[5] After initial visits, we excluded 33 schools because of chronically low actual attendance, despite high official enrollment, leaving 314 schools that form the sample. Of these, 59 schools enroll only girls and 40 schools enroll only boys; the remaining 215 schools are co-ed. Schools have an average of 84 students per grade.

Our focus on government schools implies that girls and students from poorer families disproportionately participate in study. Boys are more likely to attend private schools than

[4]The child sex ratio in Haryana was 0.834 girls per boy in the 2011 census, compared to 0.919 in India overall. The child sex ratio in Sonepat was 0.798, 0.837 in Panipat, 0.820 in Rohtak and 0.782 in Jhajjar.

[5]If these schools were adjacent to each other or shared a building, we considered them a single school.

are girls.[6] Also, wealthier families send their children to private schools, so if every family is more likely to send their sons than daughters to private schools, the boys in government schools will be from relatively poorer families than the girls. When comparing boys to girls, we correct for this differential selection into our sample by household wealth for boys versus girls (on average, higher household wealth is associated with more progressive gender attitudes in our sample).

3.1.2 Random assignment

We randomly selected 150 of the sample schools to be in the treatment group; the remaining 164 serve as control schools. Figures 1 and 2 show the location of the study districts in Haryana and the schools assigned to the treatment and control groups. The randomization was stratified by district, co-ed status of the school, school size, and distance to the district headquarters. Table 1 reports baseline characteristics of schools by treatment status. The first panel of Table 1 confirms that the two samples are balanced on co-ed status, urban/rural, number of male and female students by grade, and number of teachers.

3.2 Data collection

We measure attitudes, aspirations, behavior, and a rich set of individual and household characteristics through baseline and endline surveys. The baseline survey was conducted between August 2013 and January 2014, covering 14,810 students and 5,483 parents. The endline survey was conducted between November 2016 and April 2017, covering 13,945 students, which represented a 94.2% resurvey rate.

3.2.1 Baseline data collection from students

To select students within schools for the sample, we randomly chose among those whose parents gave consent for their child to participate in the study and who personally agreed to participate, stratifying by gender and grade in the ratio Female 6th:Male 6th:Female 7th:Male 7th of 3:2:2:2. We surveyed more girls than boys because female enrollment is higher than male enrollment in government schools, and sampled more grade 6 girls than grade 7 girls because we expected lower attrition among them during our follow-up survey. An additional criterion was that the student attended school on the survey day. Students

[6]There are 731 private unaided schools which are disproportionately in urban areas. In addition, by excluding government schools where grades six and seven had a combined average enrollment of less than 45 students, our sample has, on average, larger villages than the universe of government schools.

with chronically low attendance or whose parents did not consent to the survey are underrepresented in the data (though the consent rate was not lower for girls, suggesting that providing consent was not systematically related to parental gender attitudes).[7]

Surveyors interviewed students for approximately 35 minutes on the school premises. The survey included questions about family background, school attendance, and gender attitudes, aspirations, and behavior. Table 1 summarizes key demographic variables for the sample at baseline. The average age for both boys and girls is between 11 and 12 years. Consistent with oversampling girls in sixth grade, girls are 56.8% of the sample and sixth graders are 52.6% of the sample. Religious and caste variables are consistent with the overall demographics for these districts, as reported in the 2011 Census (Govt. of India, 2011). Because of selection into government versus private schools, boys in government schools are from systematically poorer families, e.g., are less likely to have a flush toilet at home. Characteristics are balanced between the treatment and control groups. An F-test of joint significance fails to reject balance between the subsamples (F-stat is 1.90). (See Appendix Table 1.)

We measure gender attitudes through a series of direct questions on female and male roles and rights (for instance, whether women should go to college and work outside the home) and social and domestic norms (for example, the appropriate age of marriage, and who should care for children). We also measured gender attitudes via questions about a vignette on investing in a son's or daughter's education. Responses to these questions were aggregated into a gender attitude index, which is described in more detail in Appendix Section A.1 and whose construction was pre-specified.

The survey included a module on aspirations for further education and occupation. Responses to these questions were aggregated into a gender aspirations index, which is described in Appendix Section A.2. Complementing this were questions on gender-equitable behavior among students – students' comfort with and interaction with the opposite gender; more autonomy for girls and lower engagement with traditional activities; lower boys' engagement in gender-discriminatory actions; and encouragement by both genders for girls and women in their lives to have progressive actions and aspirations. The gender behavior index for the baseline is described in Appendix Section A.3.

[7]Baseline data is missing for one school because the survey was accidentally collected in a different school in the village. The intervention and endline data collection were collected in the correct, originally sampled school.

One key concern is that students might report insincere gender-progressive attitudes because they are aware of being studied. If there is more such misreporting in the treatment group, which might occur because the treatment group knows they are part of a program trying to change their views, this would upward bias our findings. Therefore, we included at baseline a modified Crowne-Marlowe survey module designed by psychologists to measure the respondent's propensity to give socially desirable answers (Crowne and Marlowe, 1960). We use this social desirability measure to assess whether our results are driven by students' desire to make a favorable impression on the surveyor or themselves (see Appendix Section A.4).

3.2.2 Baseline data collection from parents

Parent attitudes are a key factor that shapes adolescents' attitudes (Dhar et al., 2017). To understand how parental attitudes influence program impacts, one parent of a random 40% subsample of the surveyed students participated in a survey at the student's home.[8] We selected at random whether to interview the father or the mother. If after multiple visits and follow-up phone calls, we could not interview the selected parent, we randomly chose a replacement household. We collected data for 2,379 fathers and 3,104 mothers. The completion rate was higher for mothers (89.6%) than for fathers (70.2%) because fathers were more often away for work during the daytime hours when the survey was conducted.

Parents answered questions on gender attitudes, their control of their child's behavior, aspirations for their child (in education, occupation, marriage and fertility) and their own behavior within the household (for instance, which spouse takes decisions on what to cook, how much to spend and whether to have a child or not).

Table 1 summarizes key variables describing the parents. The mean age is 35.2 years for mothers and 40.2 years for fathers. There is a high illiteracy rate for mothers, reflecting the low level of female schooling in the parents' generation. A comparatively small proportion (29.2%) of mothers work outside the home, which is consistent with low female labor force participation rates in rural India (Afridi et al., 2016).

3.2.3 Endline data collection from students

The endline data collection commenced in November 2016, a month after the intervention ended, and concluded in April 2017. To reduce sample attrition, we conducted two

[8]Budget constraints were the reason why only 40% of parents were chosen.

midline surveys designed to verify respondents' location and contact information, from January to March 2015 with a 98.5% tracking rate, and from February to June 2016 with a 93.8% tracking rate.

The endline survey was conducted primarily in the same school where the baseline was conducted (75.6% of endline respondents). A number of students had either moved to a different school, in the same or a different village, or dropped out of school entirely. These students were surveyed at home (24.3% of endline respondents). In case the student had moved to another village that was far from the survey districts and was difficult to track down in person, we conducted a truncated phone survey (0.11% of endline respondents). Appendix Table 2 examines the determinants, including treatment status, of the location of the endline survey. Treatment status, both by itself and interacted with baseline attitudes, aspirations, and behavior, is not correlated with where the endline survey took place. We were able to resurvey 13,989 baseline respondents at endline, corresponding to an attrition rate of 5.8%. Appendix Table 3 shows that the probability of sample attrition was unrelated to treatment status. In addition, attrition in the treatment versus control groups is not differential based on baseline attitudes, aspirations, or behavior.[9]

The 40-minute endline survey included questions to verify the identity of the respondent and match with baseline respondent, and repeated a number of questions on gender attitudes and behavior from the baseline, including the direct questions on gender attitudes and the vignettes. We added a number of new questions measuring attitudes, such as towards occupational decisions, marriage, fertility and social norms, that respondents were too young to answer at baseline. We randomly assigned respondents to receive one of two vignettes that captured attitudes towards men and women taking traditionally male or traditionally female occupations. The survey included questions on aspirations towards education, work, marriage and fertility, as well as perceptions on the social norms on these topics. Finally, we included questions, administered only to the treatment group, about respondents' involvement in the intervention.

Responses to individual questions are aggregated into indices of gender attitudes, aspirations and behavior that are our main outcomes. (Appendix Sections A.1, A.2 and A.3

[9]Appendix Table 4 details the reasons for attrition. Reasons include the respondent's death or poor health (50 respondents); refusal to participate by the student or parent (81); the survey team being unable to find them at the time of an appointment (46); inability to find the respondent's address (263); permanent migration (215); long-term migration (60); or other reasons (153).

describe how they are constructed). Appendix Table 5 reports summary statistics for a number of endline variables, as well as the analogous baseline variable, for the full sample of respondents. The gender indices are normalized, separately at baseline and endline, so that the control group mean and standard deviation each equal 1. The higher pooled gender indices at endline than baseline reflect the gains in the treatment group that we will assess directly in the next section.

Appendix Table 5 also summarizes a number of variables measured only at endline; 81.6% of endline respondents were enrolled in the same school as baseline, 3.6% in a private school in the same village, 3.6% in a government school in a different village, and 3.1% in a private school in a different village. Of the remaining, 0.2% had moved to an "open school," and 7.9% had dropped out of school. Finally, the table reports that most students engaged with the Breakthrough intervention; 79.1% were aware of activities associated with the intervention, and 72.7% recalled participating in one or more activities.

4 Empirical results

The intervention is hypothesized to make participants' attitudes less gender discriminatory against females, raise girls' aspirations, and increase gender-equitable behavior. Our empirical strategy uses the data described above within an ordinary least squares framework to estimate the impact of the program on these outcomes. This section describes the estimation models and presents the results.

4.1 Main treatment effects

4.1.1 Specification

We use a dataset with one observation per student and estimate the following regression specification.

$$Y_{ij} = \beta_0 + \beta_1 Treat_j + \beta_2 Y_{ij}^0 + \beta_3 \mathbf{X}_{ij} + \epsilon_{ij} \quad (1)$$

In this equation, Y_{ij} is the outcome of interest measured at endline for student i in school j. The first primary outcome is a gender attitudes index attitudes. The second is an aspirations index, and the third is a gender behavior index.

In equation (1), $Treat_j$ is a binary variable that equals 1 if the school was assigned to the treatment group, and 0 otherwise. Thus, β_1 represents the average effect of the intervention on the outcome. The outcomes are constructed so that a higher value represents more gender

progressiveness, so the hypothesis is $\beta_1 > 0$. Y_{ij}^0 is the baseline analogue of the outcome. The vector $\mathbf{X}_{ij}$ comprises our control variables. Our basic specification controls for grade-gender fixed effects, district-gender fixed effects and the following baseline characteristics: age, grade, number of brothers, number of sisters, whether or not the parents co-reside, whether the student is Muslim, whether the student is from a scheduled caste or tribe, whether the mother completed eighth grade, whether the mother works outside the home, residence in a rural area, an asset ownership index, and the school-gender average of Y_{ij}^0. ϵ_{ij} is an error term that we allow to be non-independent at the school level.

We also estimate an enhanced specification with additional control variables.

$$Y_{ij} = \beta_0 + \beta_1 Treat_j + \beta_2 Y_{ij}^0 + \beta_3 \mathbf{X}_{ij} + \beta_4 \mathbf{Z}_j + \epsilon_{ij} \tag{2}$$

In this specification, $\mathbf{Z}_j$ consists of baseline student or school characteristics selected using LASSO (Belloni et al., 2014) that are predictive of the outcome in the control group or are unbalanced at baseline between treatment and control.[10]

4.1.2 Results

Table 2 reports the main treatment effects on gender attitudes, aspirations, and behavior. Odd columns report the results from the basic specification (equation 1), and even columns report estimates including the extended controls (equation 2). We find that the intervention made gender attitudes more progressive: Column (1) shows that treatment schools have a 0.244 standard deviation higher attitude index than control schools ($p < 0.01$). This coefficient is stable when extended controls are included in the specification in Column (2); the point estimate is 0.235 ($p < 0.01$), which is not statistically different from that reported in column (1). To account for potential endogenous attrition from the sample, we also estimate Lee bounds on the treatment effects (Lee, 2009). Appendix Table 6 shows that the attrition-adjusted lower bound on the point estimate is 0.227.

One concern is that participation in the program might tell respondents about socially desirable responses without necessarily changing their actual views or opinions. To test for this, we construct a social desirability score using responses to a modified Crowne-Marlowe module (conducted at baseline) that measures whether the respondent has a tendency to offer socially desirable answers. We then test for heterogeneous treatment effects based on

[10] Appendix Section A.8 lists the full set of additional variables from which LASSO selected.

this measure; it would be worrisome if the treatment effects were driven by students with a high propensity to give disingenuous answers. Reassuringly, Table 3 shows that there are no differential treatment effects on gender attitudes by the social desirability score (SDS). Meanwhile, the main effect of SDS is positive, suggesting that, overall, there is some upward shading of responses, and that the SDS is capturing this tendency. But importantly, there does not appear to be more of this shading up in the treatment group, and instead the treatment effects appear to reflect real changes in attitudes.

To benchmark the effect size, Table 4 shows the correlation in the control group between baseline factors that might affect attitudes and endline attitudes. The table shows that being a girl is associated with a 0.74 standard deviation higher gender attitude index, whereas a one standard deviation increase in parent gender attitudes increases child gender attitudes by 0.25 standard deviations. Thus, the treatment effect is comparable to the effect of having a parent whose attitudes are one standard deviation more progressive, and approximately one third of the girl-boy gap in attitudes.

Table 2 also shows a small effect of the treatment on aspirations. The average effect of the program is 0.041 standard deviations, which is statistically significant at the 5% level, or 0.047 standard deviations adding in extended controls (column 4; $p < 0.10$). However, this result is not robust to restricting the sample to respondents who report below-median social desirability scores (Table 3), and moreover, as we show below, the "effect" is driven by boys. Thus, we interpret the data as showing no clear evidence that the intervention raised aspirations.

The third primary outcome reported in Table 2 is the gender behavior index which increases by 0.22 standard deviations ($p < 0.01$) as a result of the intervention. The coefficient reported in Column (6) after including extended controls is similar.[11] The estimate is robust among respondents exhibiting above-median social desirability bias (Table 3) and the magnitude is robust to selective sample attrition by treatment status (Lee lower bound estimate is 0.20; see Appendix Table 6). Table 4 shows that the effect size on behavior is comparable to the girl-boy gap in behavior (0.22) and almost twice as large as the effect of a one standard deviation increase in parents' gender attitudes (0.12). Thus, our analysis suggests that the intervention led to a sizable reduction in gender-biased behavior.

[11]Since the three main results presented with extended controls are similar to those presented with basic controls, subsequent tables present results without the extended control variables.

4.2 Disaggregated results and heterogeneity analysis

This section disaggregates the effects shown in Section 4.1. We first examine thematic sub-indices to show which specific attitudes and which specific behaviors the intervention affected.

We examine the effect of the program on four sub-indices of attitudes, reported in Table 5: towards opportunity for education (column 2), employment outside the home (column 3), women's roles in society (column 4), and fertility behavior (column 5).[12] These findings potentially reveal which topics students paid most attention to, which attitudes are more malleable, or perhaps where the program thrust was greatest. The effects on attitudes towards education, employment, and women's roles are large and statistically significant – with the strongest effect (0.305, $p < 0.01$) on employment attitudes, followed by impact on the gender roles index (0.210, $p < 0.01$) and on education index (0.177, $p < 0.01$). However, the effect on gender-equitable fertility attitudes is smaller (0.076, $p < 0.01$), which is likely due to the Breakthrough sessions having very limited discussion of this outcome, but could also be due to such attitudes being difficult to change, or school-age participants being too distant from their own child-bearing years to absorb messages on this topic.

Turning to behavior, Table 6 reports that the intervention generated more interaction with the opposite sex (0.353, $p < 0.01$) and greater mobility for girls (0.225, $p < 0.01$), but no impact on gender-equal distribution of household chores or decision-making. A potential explanation for these patterns is that greater interaction and mobility are directly controlled by program participants, but that the distribution of household tasks and other decisions are controlled by adult family members, which makes it more difficult for adolescents to change these behaviors.

We next examine how the program impacts differ across individuals. Girls might be more receptive to the programs' messages, or conversely might already hold progressive views which lowers potential for the program to further improve them. In the following specification, γ_5 represents the differential impact of the intervention on girls compared to boys:

$$Y_{ij} = \gamma_0 + \gamma_1 Treat_j + \gamma_2 Y_{ij}^0 + \gamma_3 \mathbf{X}_{ij} + \gamma_4 \mathbf{Z}_j + \gamma_5 Treat_j * Female_{ij} + \epsilon_{ij} \quad (3)$$

Columns (1) to (3) in Table 7 report the results. We do not find significant differential

[12]The specific questions that constitute these sub-indices are listed in Appendix Section A.1.

effects of the program on girls' attitudes or aspirations, although the point estimates are negative (-0.045 and -0.043, respectively). The program had a significantly smaller impact on the behavior index for girls (interaction coefficient of -0.146, $p < 0.01$), indicating that in treatment schools, boys reported relatively more gender-equal behavior than girls, although the net effect on girls' gender-equal behavior is also positive. One interpretation of this finding is that boys and girls can adopt gender-equal attitudes with relatively equal ease, but girls face more constraints on translating their attitudes into behavior. For instance, while girls and boys might agree that studying with opposite-gender peers can help them learn, girls might face more family or societal barriers to operationalizing their plans.

The program's effects might also be different for students from families with more gender progressive versus conservative views. Analyzing these heterogeneous effects yields insights into the production function of gender attitudes – for example, is the intervention a substitute or complement to parents' views in shaping children's attitudes? To resolve these questions empirically, we estimate γ_5 in equation (4), which represents the differential impact of the intervention on children from families with above-median parental gender attitudes at baseline.

$$Y_{ij} = \gamma_0 + \gamma_1 Treat_j + \gamma_2 Y_{ij}^0 + \gamma_3 \mathbf{X}_{ij} + \gamma_4 \mathbf{Z}_j + \gamma_5 Treat_j * ParentAttitudes_{ij} + \epsilon_{ij} \qquad (4)$$

Columns (4), (5) and (6) of Table 7 do not find significant differential effects of the treatment by parents' gender attitudes, and moreover, the coefficients are small in magnitude compared to the main effects. We thus have little evidence to conclude that pro-girl parent attitudes facilitate or hinder the success of the intervention in this context.

Positive messages delivered as part of the program might effect participants' self-esteem, offering a pathway for intervention to affect behavior. Thus, we next estimate the impact of the intervention on a self-esteem index, described in Appendix Section A.6. As reported in Table 8, the intervention increased the self-esteem index by 0.12 standard deviations ($p < 0.01$).

The program's content might directly increase awareness of gender-based discrimination, which might decrease the information constraint to more gender-equitable attitudes, aspirations and behavior. To empirically test this channel, we analyze the impact of the treatment on an index measuring awareness of gender-based discrimination (see Appendix Section A.5). Table 8 reports that the intervention had a small effect on awareness of gender-

based discrimination (0.064, $p < 0.01$), with a similar but somewhat smaller effect size when extended controls are included in Column (3).

5 Conclusion

One approach to rooting out gender discrimination in a society is to try to directly change people's attitudes. This paper examined whether a school-based gender attitude change intervention could succeed in making adolescents' attitudes less discriminatory, raise girls' aspirations, and reduce gender-biased behavior. The approach centered on having students think about and discuss gender differences and gender equality in classroom sessions held periodically over three school years. Using a sample of nearly 14,000 respondents from 314 secondary schools in Haryana, India, we find that the intervention succeeded in making gender attitudes more progressive, with an accompanying effect on gender-equal behavior. It did not appear to boost girls' educational and career aspirations, however. While the magnitude of attitude change is similar for boys and girls, the magnitude of behavior change is much greater for boys compared to girls, suggesting that girls might face greater barriers to putting their new attitudes into practice. More broadly, while an intervention among adolescents to change gender attitudes is a potentially effective way to address prevailing gender inequalities, participants also face constraints to realizing all potential gains.

Our setting of north India is one with particularly strong gender discrimination, and the impacts of a similar intervention might be different in places with less gender discrimination. *A priori*, it is also difficult to know whether more gender-egalitarian initial attitudes would facilitate or hinder program adoption, or vice versa. Cross-cultural differences in how much autonomy adolescents have also mean that the extent to which attitude change translates into near-term behavior change will also vary with the context.

One limitation is that our research design does not allow us to know which elements of the intervention are the most effective in changing attitudes or outcomes. Unpacking these elements requires variation in implementation, which was not this case in this experiment. However, learning the most effective parts of intervention might have important policy implications, and we leave that to future studies.

In addition, the current analysis reports the short-term impacts of the program. Also important is whether the effects are sustained in the long run, leading to changes in educational achievement, occupational choice, marriage, and fertility years after the intervention

has ended. Examining long term effects requires tracking the respondents into adulthood, and we leave that to future research as well.

Nonetheless, our findings underscore that attitudes associated with gender equality can be altered in the short run with an appropriate program, and that such an attitude change intervention is also associated with more equitable behavior. While it is possible for non-profits like Breakthrough to scale up the program in India and elsewhere, the most promising way to scale up is likely for the government to hire special-purpose teachers, each covering several schools, who deliver the curriculum, or incorporating some of the session content into textbooks and standardized school assignments.

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Figure 1: Map of study districts within Haryana

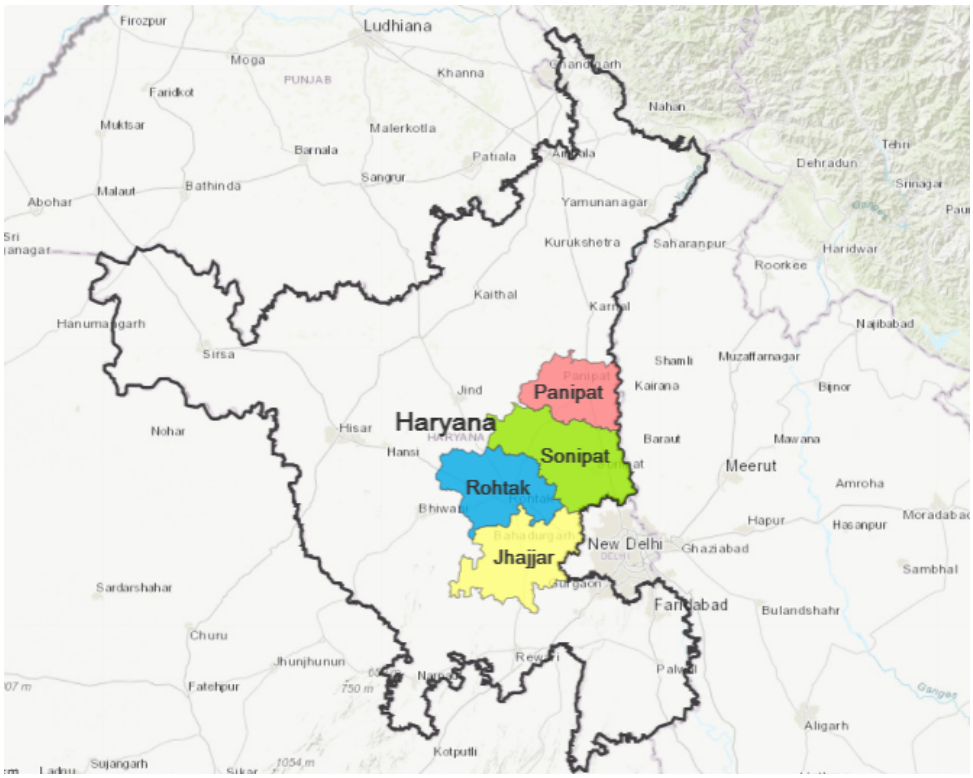


Figure 2: Map of treatment and control schools with the study districts

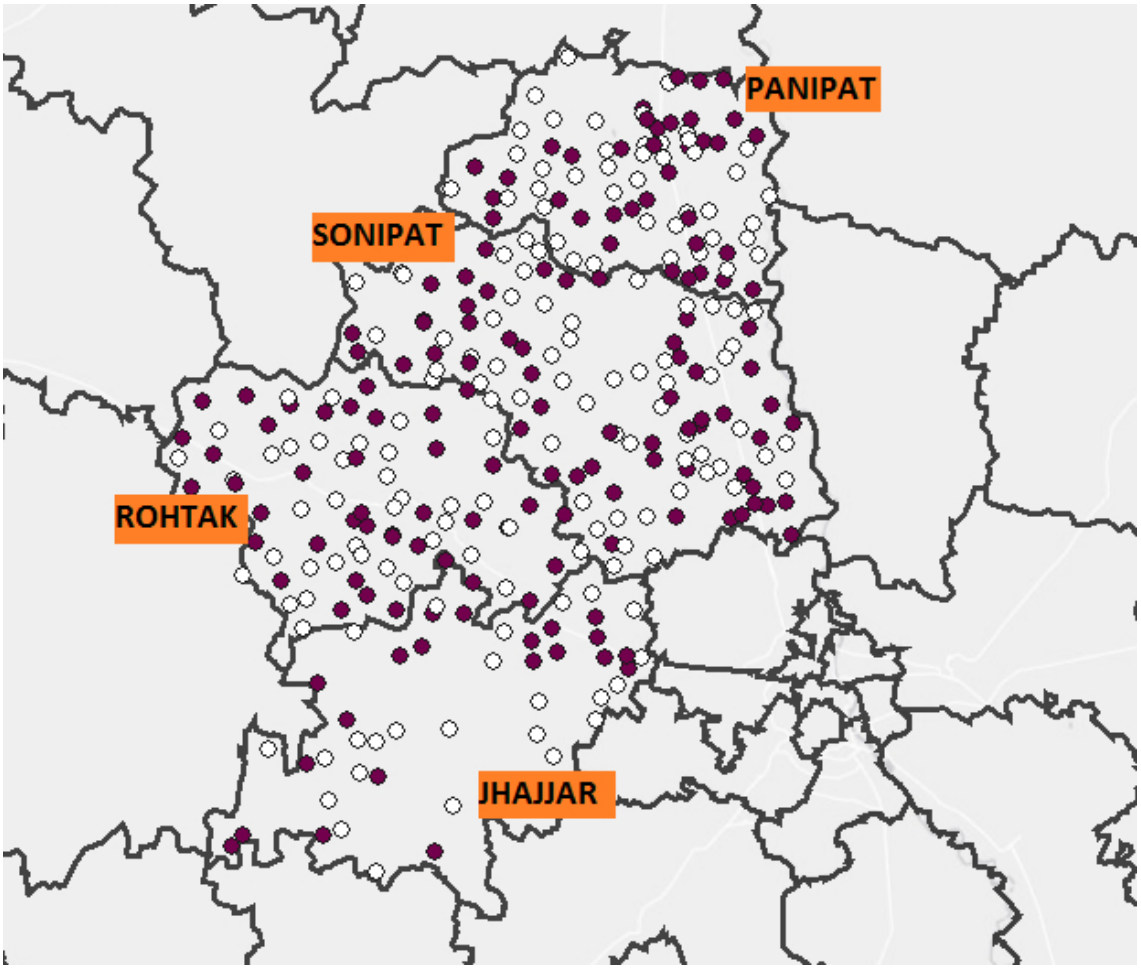


Table 1: Descriptive statistics: School and student characteristics at baseline

Variable	Treatment	Control	Standardized Diff
Number of schools	149	164	
Urban	0.107	0.073	0.119
	[0.311]	[0.261]	
School is Coed	0.698	0.677	0.045
	[0.461]	[0.469]	
Number of males in 6th and 7th	53.912	52.995	0.021
	[48.392]	[40.152]	
Number of females in 6th and 7th	66.709	63.078	0.061
	[60.389]	[58.318]	
Number of males in 8th, 9th and 10th	80.133	78.556	0.025
	[65.607]	[60.103]	
Number of females in 8th, 9th and 10th	101.698	95.196	0.069
	[99.874]	[90.023]	
Total number of teachers	17.766	17.173	0.066
	[9.988]	[7.987]	
Number of students	7,052	7,758	
Student's age	11.833	11.854	-0.017
	[1.258]	[1.246]	
Female	0.565	0.543	0.044
	[0.496]	[0.498]	
Hindu	0.945	0.953	-0.037
	[0.227]	[0.211]	
Enrolled in grade 6	0.526	0.521	0.010
	[0.499]	[0.500]	
Enrolled in grade 7	0.474	0.479	-0.010
	[0.499]	[0.500]	
Scheduled caste	0.266	0.284	-0.042
	[0.421]	[0.432]	
Mother's age	35.183	35.247	-0.015
	[4.084]	[4.272]	
Father's age	40.251	40.294	-0.009
	[4.568]	[4.678]	
Mother is illiterate	0.369	0.374	-0.011
	[0.460]	[0.461]	
Mother works full-time	0.291	0.292	-0.002
	[0.445]	[0.446]	
Dwelling has flush toilet	0.155	0.131	0.069
	[0.362]	[0.337]	

Notes. Table reports variable means and standard deviations.

Table 2: Average effects of the gender attitude-change intervention

	Gender Attitudes Index (1)	Gender Attitudes Index (2)	Aspirations Index (3)	Aspirations Index (4)	Behavior Index (5)	Behavior Index (6)
Treated	0.244***	0.235***	0.041**	0.047*	0.217***	0.224***
	[0.019]	[0.027]	[0.018]	[0.024]	[0.023]	[0.030]
Outcome variable baseline control	Yes	Yes	Yes	Yes	Yes	Yes
Basic controls	Yes	Yes	Yes	Yes	Yes	Yes
Extended controls	No	Yes	No	Yes	No	Yes
Observations	13989	5816	13989	5816	13989	5816
Clusters	314	313	314	313	314	313
R-squared	0.20	0.21	0.15	0.17	0.09	0.12

Notes: Asterisks denote significance: $*p < .10$, $**p < .05$, $***p < .01$. Regressions in all columns control for the baseline analogue of the outcome variable, the school-gender average of the baseline analogue of the outcome, and the following set of baseline variables: student age, number of brothers, number of sisters, whether or not the parents coreside, whether the student is Muslim, whether the student is from a scheduled caste or tribe, whether the mother completed grade 8, whether the mother works outside the home, residence in a rural area and a number of variables recording asset ownership at baseline (House is pukka, House is connected to electricity, Flush toilet, No flush toilet, Family owns the house, Household owns Radio or Tape Recorder, Household owns TV/Cable TV/Satellite TV/Dish TV, Household owns refrigerator, Household gets newspapers daily, Tap water and Household owns water pump). The standard controls also include grade-gender and district-gender fixed effects. The extended controls add in additional student and school characteristics, selected via a LASSO procedure. All regressions also include a variable indicating if any component of the index was missing and imputed with the gender-district-treatment average. Standard errors are clustered by village.

Table 3: Robustness check for social desirability bias

	Gender Attitudes Index (1)	Aspirations Index (2)	Behavior Index (3)
Treated	0.242***	0.070***	0.206***
	[0.021]	[0.022]	[0.027]
Low social desirability score	-0.078***	-0.045**	-0.057**
	[0.020]	[0.022]	[0.022]
Treated*Low social desirability score	0.007	-0.065**	0.027
	[0.030]	[0.032]	[0.033]
Outcome variable baseline control	Yes	Yes	Yes
Basic controls	Yes	Yes	Yes
Extended controls	No	No	No
Observations	13989	13989	13989
Clusters	314	314	314
R-squared	0.20	0.16	0.09

Notes: Asterisks denote significance: $*p < .10$, $**p < .05$, $***p < .01$. Social desirability score is a baseline measure of the student's propensity to give socially desirable answers. See notes to Table 2 for details on the control variables.

Table 4: Benchmarking effect sizes

	Gender Attitudes Index (1)	Aspirations Index (2)	Behavior Index (3)
Female	0.739***	0.038	0.217**
	[0.090]	[0.080]	[0.094]
Baseline Parent Gender Attitudes Index	0.254***	0.138	0.118
	[0.090]	[0.092]	[0.091]
Age	-0.067***	-0.056***	-0.052***
	[0.016]	[0.017]	[0.016]
Asset index	0.181	0.341**	0.369**
	[0.141]	[0.154]	[0.144]
Outcome variable baseline control	No	No	No
Basic controls	Yes	Yes	Yes
Extended controls	No	No	No
Observations	3052	3052	3052
Clusters	164	164	164
R-squared	0.15	0.11	0.10

Notes: Asterisks denote significance: $*p < .10$, $**p < .05$, $***p < .01$. Sample consists of endline respondents whose parent was interviewed at baseline. See notes to Table 2 for details on the control variables.

Table 5: Effect of intervention on attitude subindices

	Education Attitudes Sub-Index	Employment Attitudes Sub-Index	Attitudes towards Female Gender Roles Sub-Index	Fertility Attitudes Sub-Index
	(1)	(2)	(3)	(4)
Treated	0.177***	0.305***	0.210***	0.076***
	[0.019]	[0.020]	[0.020]	[0.018]
Outcome variable baseline control	Yes	Yes	Yes	No
Basic controls	Yes	Yes	Yes	Yes
Extended controls	No	No	No	No
Observations	13989	13989	13989	13989
Clusters	314	314	314	314
R-squared	0.16	0.23	0.11	0.04

Notes: Asterisks denote significance: $*p < .10$, $**p < .05$, $***p < .01$. See notes to Table 2 for details on the control variables. Standard errors are clustered by village.

Table 6: Effects of intervention on behavior subindices

	Interaction with the Opposite Sex Sub-Index	Participation in HH Chores Sub-Index	Decision-making Sub-Index	Mobility Sub-Index
	(1)	(2)	(3)	(4)
Treated	0.353***	0.006	0.011	0.225***
	[0.033]	[0.020]	[0.021]	[0.020]
Outcome variable baseline control	Yes	Yes	Yes	Yes
Basic controls	Yes	Yes	Yes	Yes
Extended controls	No	No	No	No
Observations	13989	13989	13989	13989
Clusters	314	314	314	314
R-squared	0.10	0.08	0.02	0.13

Notes: Asterisks denote significance: $*p < .10$, $**p < .05$, $***p < .01$. See notes to Table 2 for details on the control variables. Standard errors are clustered by village.

Table 7: Heterogeneity of effects by gender and baseline parent attitudes

	Gender Attitudes Index	Aspirations Index	Behavior Index	Gender Attitudes Index	Aspirations Index	Behavior Index
	(1)	(2)	(3)	(4)	(5)	(6)
Treated	0.269***	0.065**	0.298***	0.258***	0.034	0.214***
	[0.028]	[0.027]	[0.030]	[0.037]	[0.035]	[0.039]
Treated*Female	-0.045	-0.043	-0.146***			
	[0.037]	[0.036]	[0.040]			
Treated*Above median baseline parent attitudes				-0.047	0.009	0.023
				[0.050]	[0.049]	[0.050]
Treat+Treat*Female=0	0.00	0.36	0.00			
Treat+Treat*Above median parent attitudes=0				0.00	0.23	0.00
Outcome variable baseline control	Yes	Yes	Yes	Yes	Yes	Yes
Basic controls	Yes	Yes	Yes	Yes	Yes	Yes
Extended controls	No	No	No	No	No	No
Observations	13989	13989	13989	5816	5816	5816
Clusters	314	314	314	313	313	313
R-squared	0.20	0.15	0.09	0.21	0.15	0.11

Notes: Asterisks denote significance: $*p < .10$, $**p < .05$, $***p < .01$. See notes to Table 2 for details on the control variables. Standard errors are clustered by village. The sample in columns (4), (5) and (6) is restricted to respondents whose parent was interviewed at baseline.

Table 8: Effect of intervention on self-esteem and awareness of gender discrimination

	Gender-based Discrimination index (1)	Gender-based Discrimination index (2)	Self-esteem Index (3)	Self-esteem Index (4)
Treated	0.064***	0.054**	0.117***	0.117***
	[0.019]	[0.025]	[0.017]	[0.017]
Outcome variable baseline control	No	No	Yes	Yes
Basic controls	Yes	Yes	Yes	Yes
Extended controls	No	Yes	No	N.A.
Observations	13989	5816	13989	13989
Clusters	314	313	314	314
R-squared	0.31	0.30	0.02	0.02

Notes: Asterisks denote significance: $*p < .10$, $**p < .05$, $***p < .01$. See notes to Table 2 for details on the control variables. Standard errors are clustered by village. Standard errors are clustered by village.

Appendix Table 1: Randomization check on student characteristics

	Treated (1)
Age	-0.006
	[0.006]
Female	-0.043
	[0.106]
Scheduled caste	-0.020
	[0.017]
Scheduled tribe	0.016
	[0.076]
Muslim	0.020
	[0.037]
No. of female siblings	-0.002
	[0.004]
No. of male siblings	-0.002
	[0.008]
Parents stay with the student	0.011
	[0.017]
Mother finished middle school (Grade 8)	-0.015
	[0.013]
Mother works part-time	0.005
	[0.020]
Mother works full-time	-0.002
	[0.016]
Basic controls	Yes
Observations	14,854
Clusters	314
R-squared	0.02

Notes: Asterisks denote significance: $*p < .10$, $**p < .05$, $***p < .01$. Sample consists of baseline respondents.

Appendix Table 2: Determinants of endline survey location

	Survey conducted in school (1)
Treated	-0.006
	[0.012]
Treat*Baseline Gender Attitudes Index	-0.008
	[0.008]
Treat*Baseline Aspirations Index	0.007
	[0.007]
Treat*Baseline Behavior Index	0.011
	[0.008]
Baseline Gender Attitudes Index	0.013**
	[0.006]
Baseline Aspirations Index	0.005
	[0.005]
Baseline Behavior Index	0.006
	[0.005]
Basic controls	Yes
Extended controls	No
Observations	13989
Clusters	314
R-squared	0.06

Notes: Asterisks denote significance: $*p < .10$, $**p < .05$, $***p < .01$. Sample consists of endline respondents from treatment schools. See notes to Table 2 for details on the control variables. Standard errors are clustered by village.

Appendix Table 3: Determinants of sample attrition

	Sample attrition (1)
Treated	-0.001
	[0.005]
Treat*Baseline Gender Attitudes Index	-0.007*
	[0.004]
Treat*Baseline Aspirations Index	0.004
	[0.004]
Treat*Baseline Behavior Index	0.003
	[0.004]
Baseline Gender Attitudes Index	-0.001
	[0.003]
Baseline Aspirations Index	-0.007***
	[0.003]
Baseline Behavior Index	-0.007***
	[0.003]
Outcome variable control group mean	0.06
Basic controls	Yes
Extended controls	No
Observations	14810
Clusters	313
R-squared	0.08

Notes: Asterisks denote significance: $*p < .10$, $**p < .05$, $***p < .01$. Sample comprises baseline respondents. See notes to Table 2 for details on the control variables. Standard errors are clustered by village.

Appendix Table 4: Reasons for sample attrition

		Female	Male	Total
Tracked				
Surveyed				
	In school	6226	4328	10554
	At home	1548	1868	3416
	Over phone	14	5	19
Could not be surveyed				
	Child deceased or unwell	24	26	50
	Child or parent refused assent	43	38	81
	Rescheduled but never completed	15	31	46
Not tracked				
	Address unavailable	150	113	263
	Family and child had moved	113	102	215
	Family is in village but child had moved	47	13	60
	Other	61	90	151

Notes: Sample comprises baseline respondents.

Appendix Table 5: Descriptive statistics: Baseline and endline data

Outcome Variable	Baseline Analogue	Endline
Number of observations	14,810	13,989
Gender Attitudes Index	0.015	0.135
	[1.006]	[0.989]
Aspirations Index	0.007	0.027
	[1.008]	[0.988]
Behavior Index	-0.013	0.111
	[1.014]	[1.000]
Self-esteem Index	-0.002	0.056
	[1.005]	[0.954]
School Attendance	N/A	0.919
		[0.272]
Same school	N/A	0.816
		[0.387]
Private school in same village/town	N/A	0.036
		[0.186]
Govt school in different village/town	N/A	0.036
		[0.186]
Private school in different village/town	N/A	0.031
		[0.174]
Dropped out of school	N/A	0.079
		[0.270]
Program participation (treatment group only)	N/A	0.728
		[0.421]

Notes. Table reports variable means and standard deviations.

Appendix Table 6: Bounds on treatment effects

	Gender Attitudes Index (1)	Aspirations Index (2)	Behavior Index (3)
Treated	0.244***	0.041**	0.217***
	[0.019]	[0.018]	[0.023]
Treated (Lower bound)	0.227***	0.022	0.199***
	[0.019]	[0.018]	[0.023]
Treated (Upper bound)	0.256***	0.049***	0.230***
	[0.019]	[0.018]	[0.023]
Outcome variable baseline control	Yes	Yes	Yes
Basic controls	Yes	Yes	Yes
Extended controls	No	No	No
Observations	13,989	13,989	13,989
Observations (Lee bounds)	13,946	13,946	13,946
Clusters	314	314	314

Notes: Asterisks denote significance: $*p < .10$, $**p < .05$, $***p < .01$. Sample consists of endline respondents from treatment schools. See notes to Table 2 for details on the control variables. Standard errors are clustered by village.

A Data Appendix

A.1 Gender attitudes index

Gender attitudes that were most directly targeted by the intervention are the main variable of interest. We aggregate responses to individual questions into indices, both an endline index as well as a baseline analogue, to capture the wide ranging nature of the intervention. Each response was converted to a binary variable by coding as 1 if the respondent answered "Strongly Agree" or "Agree" with a gender-progressive statement (or "Strongly Disagree" or "Disagree" with a gender-regressive statement), and 0 otherwise. The gender index is the weighted average value of the eighteen dummies, ranging from 0 to 1, with weights constructed by normalizing the variables to have the same standard deviation and then recovering the weights given by the inverse covariance matrix (Anderson, 2008) and as used in Dhar et al. (2014).[13] Finally, we normalized the index by subtracting the mean and dividing by the standard deviation of the difference. A higher gender index means more gender equitable views.

To construct the baseline index, we aggregate and then normalize the following nine underlying survey questions which were asked on a 5-point scale (see Dhar et al. (2014) for a more complete description).

B1. A woman's most important role is being a good homemaker

B2. A man should have the final word about decisions in his home

B3. A woman should tolerate violence to keep her family together

B4. Wives should be less educated than their husbands

B5. Boys should get more opportunities/ resources for education

B6. Men and women should get equal opportunities in all spheres of life

B7. Girls should be allowed to study as far as they want

B8. Daughters should have a similar right to inherited property as sons

B9. It would be a good idea to elect a woman as the village Sarpanch

For the endline index, we aggregated and normalized responses to 18 questions which were as follows, classified by topic. We also divided the attitude questions above into four mutually exclusive sub-indices as auxiliary analyses: gender equality in education, gender equality in employment, women's roles, and fertility preferences.

Education attitudes

E1. Wives should be less educated than their husbands

E2. Boys should be allowed to get more opportunities and resources for education than girls

E3. Education Vignette: If you were the head of the family whom would you have sent to the town for further studies?

[13] Some questions were asked to a random 50% of respondents to reduce the survey's length. For missing values, the value was imputed as the sample average for the gender-district-treatment status.

Employment attitudes

E4. A woman's most important role is to take care of her home, feeding kids and cook for her family

E5. Men are better suited than women to work outside of the house

E6. Work Vignette: Marriage is more important for Pooja than her job

E7. Work Vignette: Being a teacher would be a more suitable job for Pooja

E8. Do you think women should be allowed to work outside home?

Women's role attitudes

E9. Daughters should have a similar right to inherited property as sons

E10. It would be a good idea to elect a woman as the village Sarpanch

E11. A man should have the final word about decisions in his home

E12. A woman should tolerate violence in order to keep her family together

E13. Parents should maintain stricter control over their daughters than their sons

E14. Girls should attain higher education so that they find better husbands *less* Boys should attain higher education so that they find better wives

E15. A shy demeanour makes a boy a more suitable groom *less* A shy demeanour makes a girl a more suitable bride[14]

E16. When a girl laughs, she should cover her mouth *less* When a boy laughs, he should cover his mouth

E17. At what age would you like your sister/female cousins/friends to get married *less* At what age would you like your brother/male cousins/friends to get married?[15]

Fertility attitudes

E18. Suppose the first two children born to a husband and wife are both girls. Which of the following should they do? *less* Suppose the first two children born to a husband and wife are both boys. Which of the following should they do?[16]

[14]Only one of these two questions was asked to each respondent. We impute missing values as the sample mean for the gender-district-treatment status. We then code the question as gender-regressive if the value for demure bride is greater than a demure groom.

[15]We code two dummies from this – the first for saying that the age for girls > 19 and the other that the gap between boys and girls is larger than the control group median response.

[16]This question is coded as gender-progressive if the respondent says have no more children after both. The question is coded as gender-regressive if the respondent says that 'have more children' after two girls but says 'have no more children' after two boys.

A.2 Gender aspirations index

Similar to the gender attitudes index, we construct a gender aspirations index that captures change in educational and occupational aspirations of students in treatment versus control schools. The responses are normalized based on their variance and averaged. The three questions used for the baseline index were as follows.

B1. Have you ever discussed your education goals with your parent or adult relative?

B2. What is the highest level of education you would like to complete if finances and opportunity of the school/college are available?

B3. What occupation do you expect to have when you are 25 years old?

The five questions used for the endline index were as follows.

E1. How many marks, according to you, will you score in the SSE 10th board examinations?

E2. Have you ever discussed your education goals with your parents or adult relatives?

E3. Suppose you were to get married right after school, would you want to continue your education after marriage?

E4. What is the highest level of education you would like to complete if finances and opportunity of the school/college are available?

E5. What occupation do you expect to have when you are 25 years old?[17]

A.3 Gender behavior index

We construct a gender behavior index that captures change in gender equitable behavior in treatment versus control schools. The responses are normalized based on their variance and averaged. The five questions used for the baseline index were as follows.

B1. Are you comfortable talking to children of the opposite gender who are not related to you inside or outside school?

B2. How frequently have you been teased, whistled at or called names by someone of the opposite gender?

B3. Does the child help with: cook/clean/wash clothes, take care of young siblings/old people in the household, went shopping for household provisions

B4. Are you allowed to go to the school alone or with friends?

B5. During last week was the student absent from school?

The endline index was constructed using twelve questions. These questions are as follows.

Interaction with the opposite sex

E1. Are you comfortable talking to children of the opposite gender who are not related to you inside and outside school?

[17]White collar occupations are coded as more progressive.

E2. How frequently have you been teased, whistled at or called names by someone of the opposite gender?

E3. Do you sit next to students of the opposite gender in class?

E4. Do the boys in your class ever do the following to the girls? (Various instances of harassment)

Participation in household chores

E5. In the past one week, did you... cook/clean/wash dishes, take care of young siblings/old people in the household, and went shopping for household provisions/paid bills?

E6. In the past month, have you missed school due to household based responsibilities?

Decision-making

E7. I am able to talk to my parents about what work I would like to do in the future (included in the index for girls only)

E8. Who mostly makes decisions about the following, or if this is in the future for you, who do you expect will make this decision- Will you make the decision, make the decision jointly with parents or will parents make the decision for you?

- Whether or not you will continue in school past 10th grade
- If you will work after you finish your studies
- What type of work you will do after you finish your studies
- What types of chores you do at home (for example, cooking, cleaning dishes, taking care of your siblings)

E9. During last week how many days were you absent from school?

Mobility

E10. Are you allowed to go to the school alone or with friends?

E11. Do you discourage your sister from working outside home?

E12. Do you discourage your sister from studying in college if it is far away?

A.4 Social desirability scale

The following questions from Crowne and Marlowe (1960) were asked at baseline with agree-disagree options. The scale is a low score means respondents answered in a socially undesirable direction all the time. A mid-score would mean that respondents tend to show an average degree of concern for social desirability. A high score would mean highly concerned about social approval.

B1. It is sometimes hard for me to go on with my work if I am not encouraged

B2. I sometimes feel resentful when I don't get my way

B3. On a few occasions, I have given up doing something because I thought too little of my ability

B4. There have been times when I felt like rebelling against people in authority even though I knew they were right

B5. No matter who I'm talking to, I'm always a good listener

B6. There have been occasions when I took advantage of someone

B7. I'm always willing to admit it when I make a mistake

B8. I sometimes try to get even rather than forgive and forget

B9. I am always courteous, even to people who are disagreeable

B10. I have never been irked when people expressed ideas very different from my own

B11. There have times when I was quite jealous of the good fortune of others

B12. I am sometimes irritated by people who ask favors of me

B13. I have deliberately said something that hurt someone's feelings

A.5 Gender discrimination awareness index

1. Do you know about female foeticide and infanticide?
2. Are female foeticide and infanticide practiced in Haryana?
3. According to you, what is the main reason for female foeticide and infanticide?
4. In Haryana, are the number of girls less than the number of boys?

A.6 Self esteem index

We test for self-esteem using an index composed of the following questions.

1. On the whole, I am satisfied with myself
2. I feel that I have a number of good qualities
3. I am able to do things as well as most other people

A.7 Social norms index

Questions from either Set 1 or Set 2 were used to construct the social norm index. Students were randomized to receive either Set 1 questions or Set 2 questions.

Set 1

1. Do you think that people in your village/community think that women should be allowed to work outside home?
2. Do you think that people in your village/community think that women should be allowed to work outside home?
3. Do you think the community will oppose you since [if] you disagree with them?
4. If the community did not oppose you, would you encourage your sister/cousin sister to work outside home after marriage?

Set 2

1. Do you think that girls should be allowed to study in college even if it is far away
2. Do you think that people in your village/community think that girls should be allowed to study in college even if it is far away?
3. Do you think the community will oppose you since [if] you disagree with them?
4. If the community did not oppose you, would you encourage your sister/cousin sister to study in college even if it is far away?

A.8 Additional variables

These variables are used by LASSO to select the extended controls in equation (2).

School-level variables from baseline parent survey

- Average mothers' gender attitude index
- Average fathers' gender attitude index

School and village characteristics from other data sources

- Woman sarpanch (both baseline and endline)
- Teacher strength (Full time, guest)
- Fraction female teachers
- Extracurricular, physical education teachers
- Presence of Counsellor
- PTA meetings
- Frequency of extracurricular activities
- School facility construction
- Coed versus single sex school
- Rural location
- Village-level adult literacy rate by gender
- Village-level female labor force participation