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Parental Involvement in Education: Evidence from Field Experiments in Developing Countries

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Abstract:

Greater parental involvement in their children's studies has been shown to be effective even in disadvantaged communities in developed countries. Based on a study of randomized field experiments involving regular, face-to-face meetings between teachers and parents in a rural Bangladesh setting, we show that this finding can be extended also to developing countries. Regular parent–teacher meetings induced parents to spend more time assisting their children and monitoring their school work. Not only did this help to improve students' test scores but it also resulted in improvements in student attitudes and behavior. The treatment effects were robust across parental, teacher or school-level characteristics. These findings have major policy implications for developing countries where higher school enrolment levels have often not translated into improved educational outcomes: programs to stimulate parent–teacher interactions are cost-effective, easy to implement and scale up.

JEL Classifications: C93, I21, O15.
Keywords: parental-teacher meeting, educational outcomes, field experiments, Bangladesh

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1. Introduction

Parents can potentially play an important role in their children's overall learning and education, both at home and at school. Policy makers and educational experts have often advocated encouraging parents to become more involved in their children's academic lives. Enhancing parental involvement in childrens' education was a focal point of both President George W. Bush's No Child Left Behind Act and President Obama's Race to the Top initiative. These programs promoted parental engagement as a remedy for the United States' persistent socioeconomic and racial achievement gaps.[1]

There is evidence that greater involvement of families in schooling is helpful for children's education (e.g., Houtenville & Conway, 2008).[2] A number of recent studies on United States have demonstrated that increased parental involvement in children's learning is genrally associated with better grades, test scores, and attendance, as well as increased motivation and an easier transition to upper grades. Bergman (2016) finds that sending text messages to parents when their children had missed assignments improved students' performances in a low-income area of Los Angeles. Delivering brief weekly messages to parents about their children's progress almost halved the summer-school dropout rate in an urban school district in the Northeastern United States (Kraft and Rogers, 2015). In a study of schooling in North Carolina, Hastings and Weinstein (2008) found that informing parents of different public schools' average test scores led parents to choose higher-performing schools for their children.

However, the educational reality in developing countries is fundamentally different, as many children are first-generation students whose parents are often unable to follow what happens at school (Banerjee & Duflo, 2006). Schooling has long-term benefits for children but short-term costs for parents. Many low-income households in developing countries often keep their children out of school to supplement household earnings or to do household work. Many of

[1] In his 2009 address to the joint session of Congress, President Obama stated that "There is no program or policy that can substitute for a mother or father who will attend those parent-teacher conferences or help with the homework or turn off the TV, put away the video games, read to their child. Responsibility for our children's education must begin at home."

[2] The exception is the study by Robinson and Harris (2014). In *The Broken Compass: Parental Involvement with Children's Education*, which reviews longitudinal surveys of American families spanning three decades (from the 1980s to the 2000s), Robinson and Harris (2014) show that the children of parents who are very involved in their children's education perform worse than those of parents who are less involved. They suggest that conventional practices, such as parent–teacher meetings and checking in with teachers, do not help students' learning outcomes (*New York Times*, April 12, 2014, http://opinionator.blogs.nytimes.com/2014/04/12/parental-involvement-is-overrated/).

these parents are not motivated to send their children to school or encourage them to study. Nevertheless there is growing evidence that provding information to parents can help the children learning at home. A large number of recent studies have pointed to the dramatic growth in enrolment and school participation rates in developing countries.[3] But these studies also indicate that programs which increase school participation might not actually improve test scores. Furthermore, the programs are highly resource intensive, which imposes substantial costs on governments in resource-poor developing countries.

One practical approach to improving educational performance of students already enrolled in schools in developing countries may be to encourage greater parental parental participation in their education. Nguyen (2008) points out that, while parents may lack knowledge, they have the ability to process new information and change their decisions in a sophisticated manner. This is consistent with evidence from Pakistan that providing parents with information about schools and students' tests scores through report cards improved the test scores, increased primary school enrolments and reduced educational costs for private schools (Andrabi, Das, and Khwaja, 2015). Reinikka and Svensson (2005) also found that a newspaper campaign that aimed to provide information about education grants to both schools and parents improved student enrollment and learning outcomes significantly in Uganda. In Brazil, Bursztyn and Coffman (2012) found that sending text messages to poor parents when their children had skipped school increased school attendance of the children.

On the other hand, in India and Kenya, Banerjee et al. (2010) and Liebman et al. (2014) found that the effects on students' learning outcomes of information received by parents are negligible. These findings indicate merely providing information may not be sufficient to affect student performance if the parents have limited capacities to either help their children at home or influence school education quality. But when the information provided is bundled with a teaching intervention, Banerjee et al. (2010) found increases in test scores, suggesting that involving teachers may be another important element in impacting learning. In related studies in India, Berry (2015) and Banerji, Berry, and Shotland (2015) found that providing incentives for low income parents or literacy classes for mothers can helps to improve children's

[3] See, for example, the traditional remedial educational interventions to improve the quality on the supply side, by providing textbooks (Glewwe, Kremer, & Moulin, 2009), flipcharts (Glewwe et al., 2004), school meals (Afridi, 2010), additional teachers (Duflo, Dupas, & Kremer, 2011; Muralidharan & Sundararaman, 2013), and classroom computers (Banerjee et al., 2007).

educational outcomes. It has also been suggested that parental involvement in schools may improve accountability and transparency, resulting in improvement of school services (e.g., Kremer et al. 2013; Mbiti 2016).

In this paper, we report results of a randomized field experiment with a low-cost intervention that examined whether increasing parental engagement can improve the educational achievements of students from disadvantaged communities in rural Bangladesh: traditional, face-to-face meetings between teachers and parents, who are generally less involved in their children's educations.[4] Our chosen method - regular (monthly) face-to-face meetings between parents and teachers – is highly appropriate to developing country conditions because it is a low cost, easy to implement method that does not rely on written communications (important in situations where many parents have poor literacy).[5] As far as we are aware, the present study is the first to examine the effectiveness of active parental involvement through parent-teacher meetings in a developing country. The study closest to this one is the study in France reported by Avvisati et al. (2014), who conducted a field experiment in a relatively deprived educational district of Paris, holding three meetings with teachers over an academic year, to encourage parents to be more involved in their children's education. They found a 25% decline in truancy among low-income families and an improvement in behavior among all students in the selected classes, including those whose parents did not participate.

In our field experiments all parents of the children in selected grades were invited and encouraged to attend regular (monthly) face-to-face meetings and interactions with teachers in schools. The parents in control schools did not receive any such invitation or encouragement. In the treatment schools, the teachers showed each parent a report card that contained information about the performance of his/her own child and how the child is performing

[4] The most common demand side interventions include cash transfer programs and stipend/scholarship programs (see Glewwe and Muralidharan 2016 for a review). A few recent studies focused directly on the demand for schooling such as training mothers to enhance their children's learning (Banerji, Berry, and Shotland, 2015) and purchasing bicycles for girls to attend schools (Muralidharan and Prakash 2016). Generally these programs find positive effects on attendance and test scores, however, expensive to implement (see section 5.7 on cost effectiveness of the program).

[5] There are numerous reasons for the low level of parental involvement with school in rural and disadvantaged societies, such as men's physical labor, women's household chores and child-rearing duties, social norms, shyness (especially due to their lack of education), a lack of understanding or information about the structure of the school system and accepted communication channels, and a perception that teachers are not welcoming of such involvement. There is also a perception among teachers that parents are not interested in, or do not have the ability to help with, their children's schooling.

compared to other children in the classroom. In addition, the teachers also provided guidelines and suggestions as to what parents can do to help their children at home.

Our main results can be summarized as follows. First, involving parents in their children's education through monthly parent–teacher meetings has a significant positive impact on the children's school results, as their test scores rise by 0.3–0.4 standard deviations (SD). Second, the short-term treatment effects are largest for students with baseline test scores in the top third of the distribution, while lower-ranked students gain greater benefits from more frequent parent–teacher interactions over time. Third, the treated students showed more positive attitudes and higher aspirations, spent more time studying, and got more help from family members in studying. Their behavior, as reported by both teachers and parents, also improved. These results cannot be explained by increases in teachers' efforts or by reduced absenteesm among students; rather, they are plausibly attributable to increased parental involvement in their children's studies.

The finding that increased parent–teacher interactions can be a cost-effective tool for improving students' outcomes has important policy implications. Overall our results show that, regardless of the education level, if parents are provided with adequate information and encouraged to become involved, even parents from disadvantaged backgrounds in developing countries can make a significant contribution to their children's school performance.

2. Study Context and Background

We implement the intervention in the rural areas of two southern districts (Khulna and Satkhira) of Bangladesh. Most of the children are underprivileged and have parents from relatively low socio-economic backgrounds. In our study area, approximately a quarter of parents have not completed primary school, and more than 80% of families have no members who have been educated past grade 10. Most mothers (80%) have fewer than eight years of education, and 98% work only in the home. Most fathers (90%) are engaged in agriculture, self-employment activities, or day labor. The average household size in our sample is five, and the average household monthly income is less than $150.

The school curriculum is the same in both rural and urban areas of Bangladesh.[6] Primary schooling is compulsory, and incentives are offered to get children to come to school; in particular, rural girls receive cash grants for attending school (Hahn, Islam, Nuzhat, Yang, & Smyth, 2016). Primary education in Bangladesh consists of grades 1–5. In 2015, the net enrolment rate in primary schools was 98% for girls and 97% for boys, while the rate in secondary schools was 54% for girls and 45% for boys. From 1990 to 2013, the gender parity index (the school enrolment ratio of girls to boys) increased from 0.83 to 1.06 in primary schools and from 0.51 to 1.08 in secondary schools. At the primary school level, the teacher–student ratio is about 1:50 (BANBEIS, 2013).

Since the early 1990s, numerous policies have been enacted to ensure that all students attend, and complete, primary education, including the compulsory primary education law in 1991. The government launched the Food for Education (FFE) program in 1993 to support poor children in completing primary schooling, and this was replaced in 2002 by the Primary Education Stipend Project (PESP), which provides cash transfers to households with children in poor areas. In addition, a variety of policies, including the elimination of official school fees and the provision of free textbooks, have also been put in place to encourage school enrolment (Hahn, Islam, Nuzhat, Yang, & Smyth, 2016).

A single curriculum serves all students across the country. Education is exam-driven, because the success of teachers and schools is measured by students' results on exams, which primarily demand the memorization and recall of content from textbooks (Holbrook, 2005). As a consequence, teachers often encourage students to perform rote learning, and mostly work to prepare students for their exams (Tapan, 2010). Students are generally promoted to the next grade at the end of the academic year, although they need to pass the final exam. The exception is at the end of grade 5, when students must face their first public examination, called the primary school certificate (PSC) exam. The results of the PSC exam are used to determine students' progression to secondary school.

However, education quality remains a major concern: nearly 50% of Bangladeshi students drop out of primary school before completing grade 5, and only around 2% of children achieve the prescribed competencies by the end of grade 5 (BANBEIS, 2013). Approximately 70% of children who complete primary school are unable to read, write, or count properly. Various

[6] Some specialized and private schools in urban areas also offer additional extracurricular activities.

factors, including absenteeism by both teachers and students, low classroom teaching time, and inflexibility in school hours, contribute to this trend. Studies have found that teacher absenteeism hovers around 25%, with many teachers not teaching even when present at school. In addition, student absenteeism ranges from 40% to 67%, and the daily effective instruction time in Bangladeshi primary schools is only 2.5 hours (UNESCO, 2010). Although recent government initiatives have increased female enrolments, the performances and retention rates of girls are significantly lower than those of boys (Hahn, Islam, Mahmooei, Patacchini, & Zenou, 2016).

3.1 Intervention, Sample, and Evaluation Design

The purpose of this study is to examine the effectiveness of a low-cost strategy for improving the behaviors of both education providers (teachers) and recipients (pupils) by holding regular meetings to inform parents about the educational progress of their primary school children. In this intervention, head teachers invite students' parents to monthly meetings, at which teachers show each parent or guardian their child's report card, explain how the child has performed on regular class tests or semester exams, and provide advice about measures that can be taken at home to improve the child's performance.

The parent–teacher meetings were started in the 2011 academic year. The schools invited all parents to a short information session in early April 2011, at which teachers explained the objectives of the monthly meetings. The schools set a date each month, usually one week in advance, and the teachers sent a verbal reminder or letter to parents via the students before each meeting. After the initial meeting in April, the first meetings were held in May/June 2011. On the days when the parents and teachers met at the schools, field investigators were also present. See Figure 1 for the project timeline.

The meetings took place over two successive years, 2011 and 2012. In 2011, the experiments were conducted among students in grades 4 and 5 at 40 of 76 randomly chosen primary schools, with a total of 4,062 students being involved. Five meetings were held between May/June and October 2011.[7] The meetings continued during the 2012 school year, but with the inclusion of the parents of students in grade 3 (students who had been in grade 2 in 2011) from the same

[7] In Bangladesh, the academic year starts in January. The final exam period, followed by the winter break, usually occurs from mid-November to the end of December. Sports and other activities dominate January and February.

treatment schools, adding 2,408 students. The students who had been in grade 5 in 2011 moved to secondary schools in 2012, and thus, only the parents of students who were in grade 4 in 2011 attended meetings in both 2011 and 2012 (see Table 1 for treatment by grade and year).

A standardized baseline survey was carried out in March 2011 in all of the selected primary schools, followed by midline tests at the end of 2011, and final follow-up tests in December 2012. Students in both the treatment and control groups were tested on knowledge of mathematics, English, science, and Bengali in baseline, midline and endline. In 2012, a separate test of reading, writing, and general knowledge/intelligent quotient (GK/IQ) was administered to students in both the treatment and control schools. The tests were developed with the help of retired primary school teachers, local educational professional and trainer teachers. We also surveyed students on their perspectives, time use for different activities, and non-cognitive and behavioral outcomes. Finally, more than one year after the completion of the program, we conducted a household survey (approximately 50% of the households) to determine the persistence of the effects among the parents, examining parental time allocation and perceptions regarding the meetings and their children's educational progress.

As the intervention required school teachers to do additional work (discussing students' progress with parents and conducting additional tests), a small incentives were provided. All teachers in both the treatment and control schools were given a lump sum honorarium of US $25 for each of the two years (the average monthly salary of a primary school teacher is $120–$160, depending on their years of service).[8] The schools typically had four or five teachers. The intervention was implemented by a local NGO, with the help of local administrators and approval from the Bangladesh Department of Primary Education.

[8] While the teachers in the control schools did not organize any meetings with parents, they still helped to collect data and to conduct the survey and tests. The teachers in the control schools were paid an equal amount in order to avoid any conflict or discontent among teachers. For the same reason, we also paid all teachers in a school, not only those teaching the classes directly involved. All of the teachers in the schools (not only the class teachers) were involved in conducting meetings and administering tests for the purpose of the study. The teachers were assisted by program staff members but were asked to do minimal paperwork which the program staff members could not do or were not authorized to do in the schools. Also, by giving the same amount to teachers in the control schools helps to avoid any other incentivizing effect on teachers besides to conducting parents meeting (teachers who receive money may put more efforts on teaching).

3.2. Descriptive Statistics

Table 2 shows the difference (and the t-statistics) in the baseline test scores (conducted in 2011) between the treatment and control groups for the results of the grade 4 and 5 students in mathematics, English, science, and Bengali. The test scores reported are normalized relative to the distribution of the baseline test scores of the control group.[9] Table 2 also shows the respective scores and statistics for the grade 3 students who were in the program in 2012. These test questions were focused on problems and questions from the textbooks. In addition, we also conducted a separate test that aimed to give us a better understanding of students' quantitative skills (e.g., numeracy, charts), English skills (e.g., sentence completion, translation), and general knowledge/intelligent quotient ('GK/IQ' test). The GK/IQ tests were developed by local educators, and are not based on the textbooks. Our results suggest that there is no statistically significant difference between the means of the control and treatment groups in the test scores of different subjects.

Table 3 reports statistics on schools' and teachers' characteristics. There is no statistically significant difference in student–classroom ratios,[10] student–teacher ratios, distances that teachers commute to the school, numbers of teachers, number of female teachers, number of classrooms, and post-job training opportunities. There is one class for each grade in each school. The teachers in the treatment schools do appear to be more experienced, but have lower education levels than their control counterparts. Thus, there are no systematic differences between the treatment and control schools regarding the characteristics of the students, teachers, or school facilities.

3.3 Attrition

Drop-outs of children from schools and absence in classes and exams are very common especially in early stages in primary schools in rural area of developing countries. The intervention could have unintended consequences. For example, weak students might drop out as a result of their parents meeting with the teachers since parents could give up the hopes about their children. If the student attrition rates are different between the treatment and control groups, not accounting for the difference could bias our estimation results. Appendix Table A1 shows that the attrition is low in both the treatment and control schools, and is similar between

[9] The scores were normalized for each group of students for each test, meaning that the mean and standard deviation of the control group at the baseline are 0 and 1, respectively.
[10] There is always a single classroom for each grade.

the treatment and control schools across grades and years. The attrition rates in year 1 at the midline for grade 4 students are 7.4% and 4.6% in the treatment and control schools, respectively. There is no attrition among grade 5 students in year 1. In year 2, the attrition rate for grade 5 students who were in grade 4 and sat for the baseline test in 2011 is 5.8% in the treatment schools and 6.9% in the control schools. We observe higher attrition rates for grade 3 students in both the treatment and control schools, at 11.6% and 11.8%, respectively, due largely to students who drop out of school before grade 4.[11] However, the field staff made a special effort to minimize attrition among students who had not dropped out of school by the time of the tests. All students and parents in both the treatment and control schools were reminded about the test, and field staff visited students' homes to encourage them to attend school on the test day.

Overall, the attrition rate is lower than in many other similar programs, such as the Balsakhi Program in India, administered by Pratham (see Banerjee et al., 2007), and the tracking of students in Kenya by Duflo et al. (2011), where nearly 20% of children were absent on a test day. Furthermore, the baseline test scores of children who missed the midline and endline exams at the treatment and control schools do not differ significantly (see Table A1), indicating that the factors that lead to attrition are the same in the two groups. This means that attrition is unlikely to bias the results presented in the following section.

If the children who attrited from the sample (missed the midline or endline test) differ in other dimensions, the results could be biased. We examine whether the missing students led to an attrition bias by following Lee (2009) in calculating conservative bounds on the true treatment effects under the assumption that the same forces drive attrition in the treatment and control groups, even if the two samples have different attrition rates. The results are reported in Table

[11] Anecdotal evidence suggests that teachers do not promote many low-performing students in grade 4 because schools are required to have a very high percentage of students passing the grade 5 PSC exam. Failure to do so could result in the suspension of a school's registration, a loss of additional funding, and disciplinary action against teachers. Thus, teachers try to promote only grade 4 students who are likely to pass grade 5, and filter out other students early in order to avoid having to explain a sharp drop in student numbers between grades 4 and 5. We also verify this record with the schools by considering children who were promoted to grade 4 before the intervention started in 2011. We find that almost 12% of students were dropped out in the progression from grade 3 to grade 4.

A2. In our case, we do not see any significant impact on our estimates, because the attrition is quite small and is similar between the treatment and control schools. [12]

4. Outcomes and Methods

The main outcomes of interest here are project-administered standardized test scores and PSC exam results at grade 5.[13] Learning outcome is measured by standardized tests for math, English, Bengali, and science. In addition, at the endline in December 2012, the project also administered a test for English reading, English writing and GK/IQ that was not part of the regular academic curriculum or testing regime.

Another outcome of interest is the presence of parents at the meetings. Parents' meetings with teachers at the schools were completely voluntary. We examine the numbers of meetings attended by parents or guardians. The parents who decided to come to the meetings are likely to have different characteristics to those who did not. We examine the correlates of parental presence at the meetings. Face-to-face meetings between parents and teachers are likely to reduce the absenteeism of both students and teachers. Students' test scores are expected to be influenced by teachers' presence in the classroom and at school. Teacher accountability is likely to be improved by regular reports to parents, which enable the parents to monitor school activities continuously. We report teachers' presence in the treatment and control schools based on several random visits to schools by anonymous counters. We also examine student absenteeism, given that it is likely to influence student test scores, along with the effects of students' time use, study habits and confidence, the teachers' perceptions about students, and parental efforts to help their children at home.

The randomized assignment of schools into the treatment and control groups produced balanced test scores at the baseline. The main parameter of interest is intent-to-treat (ITT) effects, which are the average of the causal effects for all children whose parents were invited to participate in the meetings. The schools were selected randomly for the treatment or control

[12] We also examine the correlates of attrition. We estimate a probit model of overall attrition and attrition by treatment status using students' and parents' characteristics. We also test the equality of the probit regression coefficients for stayers and attritors. We do not find any significant differences in the covariates that have very strong correlations with either the treatment status or absence in the midline or endline exams. The results are available upon request.

[13] The exams conducted by the schools differ across schools, so we do not consider them in our analysis. For the purpose of this study, we conducted the same tests in all treatment and control schools. We also used nationwide, externally-administered public exam results for the grade 5 students.

groups, but there was no selection within the treatment schools; all parents with students in the grades under study were invited to participate in the meetings. We run the following regression model to estimate the ITT effect on test scores:

$$y_{i,post} = \beta_0 + \beta_1 y_{i,base} + \beta_2 treatment_i + v_i, \quad (1)$$

where $y_{i,post}$ is the test score of a student at either the midline or endline; $y_{i,base}$ is the baseline test score for student i; $treatment_i$ is a dummy variable that takes the value of 1 if the observation is in the treatment group, and 0 otherwise. The differences in the change in test scores between the two groups are measured by $treatment_i$. Equation (1) is estimated separately for each subject using OLS. Standard errors are always clustered at the school level. We also run the regression for both male and female students separately.

β_2 is the ITT effect. It reflects the effects on all children of the same grade in the treatment schools whether their parents attended any meeting or not. There were multiple meetings (five in 2011 and eight in 2012), all of which were completely voluntary, and parents could come to any number of meetings. Most parents participated in at least one meeting, so the ITT effects are very close to the treatment-on-the-treated (TOT) effects (see section 5.2.2 for more details).

We examine the heterogeneity in treatment effects and parents' participation in meetings, and report these results for girls and boys separately. We also examine the heterogeneity by parents', teachers', and schools' characteristics. For example, parents of a boy might be more likely to come to meetings than those of a girl. Therefore, we examine parental presence based on the genders of the children in the treatment schools. We also examine the underlying mechanisms, to determine whether the improvement is due to parental efforts or additional efforts by teachers or students. Finally, we provide evidence of any possible spillover effects, due to parents' interactions with other parents, or information about such meetings taking places in schools, for example.

5. Results

5.1 Parental Participation at Meetings

Figures 1A and 1B show the presence of parents at the meetings in 2011 and 2012 for all students and by their children's grades. We observe that almost 85% of parents attended the first meeting in 2011, but that this declined over the following meetings. After three monthly

meetings, in September 2011, the schools' headmasters sent letters (in envelopes) encouraging parents to attend meetings at the schools that month. The letters were sent to test whether parents attached special importance to the meetings following the receipt of a letter.[14] In Figure 2A, we see that parental presence in September actually increased slightly. However, the October meeting had the lowest parental presence of all of the meetings.

Eight meetings were held in 2012, starting early in the academic year. As mentioned, the grade 5 students from 2011 moved to secondary schools in 2012, so their parents were no longer invited for the meetings, which took place only in primary schools. The parents of the students who were in grade 4 in 2011 (grade 5 in 2012) were invited to have meetings with the teachers again in 2012. In addition, all of the parents of students in grade 3 were invited to the meetings for the first time in 2012. Figure 2B shows that nearly overall 70% of parents attended the first meeting in March 2012, with a slightly higher presence of the parents of students in grade 5. The presence of the parents of students in grade 3 was relatively low, supporting the anecdotal evidence that parents are generally less concerned or motivated when their children are in the lower grades of primary school.

We again observe a gradual decline in parental presence in meetings later in 2012. In June 2012, teachers again sent parents envelopes with letters from the head teacher encouraging them to come to the next meeting. We observe an increase in parental presence the following month. Following teachers' and field staff members' recommendations and requests (as parents desired), we attempted to encourage more parents to come to the meetings by offering entertainment (e.g., sweets, *Paan-supari*[15]) at the July meeting. The entertainment plans were announced at the June meeting, and those absent from that meeting were informed later by program staff members. We observed a significant increase in parental presence at the July meeting compared to June, and therefore offered the parents sweets and paan-supari at each meeting over the following three months, during which there was no significant drop in parental presence.[16]

[14] Although the dates were announced during the previous meeting, the letter was handed out only the day before the scheduled meeting. This was done in consultation with the school teachers.

[15] *Paan-supari*, in short, is the South Asian tradition of chewing betel leaf (*paan*) with areca nut (*supari*) and slaked lime paste (*choon*), with many regional and local variations. In daily life, it is a common practice for entertaining guests at home and other meeting places.

[16] Fryer and Holden (2012) provided incentives to parents (as well as teachers and students) to raise educational (math) achievement of children in Houston. They find that parents attended twice as many parent-teacher meetings when they were given incentives.

Figures 3A and 3B show that parental presence did not differ significantly based on the gender of the child in both years. When looking at meeting attendances by mothers or fathers, we see that the presence of mothers gradually increased (Figure 4A and 4B). This is generally true for both the first and second years of meetings. Regarding the numbers of meetings attended, we see that more than 40% of parents attended four or five (all) meetings in 2011 (Figure A1A), and more than 70% of parents attended more than half (four or more of eight meetings) of the meetings in 2012 (Figure A1B).

We examine the correlates of parental presence at meetings using various demographic and socio-economic variables as the controls in a regression analysis. We consider the numbers of meetings in which parents participated as an outcome of interest. We run a Poisson regression model because the dependent variable is an integer that describes a countable factor—the number of meetings. An OLS regression provides similar results. The estimated coefficients from the Poisson regression presented in Table 4 show that parental education and household income are not significant predictors of their attendance at meetings in either 2011 or 2012. In general, we do not see any strong determinants of parental presence at meetings. It seems that parents of all ages and education and income levels participated. The possibility that the decision to attend meetings is based on observed characteristics does not seem to be an important cause for concern. We find significant effects of the baseline GK/IQ test score, baseline English test core, and age of household head but only in either 2011 or 2012 and the magnitudes of the effects are relatively small.

5.2 Effects on Test Scores

5.2.1 Intent-to-Treat Effects

Table 5 reports the coefficients from OLS regressions that use test scores at the midline as the dependent variables and control for baseline test scores (using equation 1). Appendix Table A4 reports the corresponding results using simple difference in the midline (without conditioning on baseline) test scores. The results in Table 5 indicate that grade 4 students in the treatment schools gained almost 0.22 SD in math and 0.36 SD in English at the end of the first year of the program. The grade 5 students were not assessed separately as part of the project, but sat for the nationwide competitive exams (PSC exam) at the end of grade 5. This is a high-stake test that all students must take and pass in order to progress to secondary school. We obtained official test scores (cumulative grade point average, CGPA) from the PSC exams for all students at the schools. The coefficients indicate that students in the treatment schools have a

CGPA that is 0.2 SD higher. The raw mean CGPA for the treatment and control school students were 3.49 and 3.24 respectively, indicating that the students in the treatment schools have scores that are approximately 7.5% higher on the nationwide competitive exam. When looking at the distribution of test scores, we see that the percentage of students having higher CGPAs was larger while the percentage of students having lower CGPAs was smaller at the treatment schools than at the control schools (see Figure A2). The overall increase in grade 4 test scores is not significantly different between boys and girls. There are some differences in subjects' test scores but the differences are mostly small. For grade 5 students, the increase in CGPA is higher for boys (0.35) than for girls (0.21) and the difference is significant both economically and statistically at the conventional level.

Table 6 reports the regression results (using equation (1)) for the endline (2012) test scores for students in grades 5 and 3.[17] As earlier mentioned, the meetings took place only in primary schools. Students who were in grade 5 at the midline (2011) had moved to grade 6 in secondary schools by the endline (2012). The grade 5 results are based on the PSC exam results, which are available separately by subject for 2012. We have only overall CGPA available for 2011 as we were not able to obtain permission to get the subject-wise PSC marks by that time. The regression results suggest that the students in grade 5 at the endline gained in all subjects with the highest of 0.42 SD and 0.41 SD increase in math and English, respectively. Comparing the ITT estimates of the gains in midline (Table 5) and endline (Table 6) test scores, we observe net gains in the second year of the program by 0.10–0.20 SD, depending on the subjects. We also administered a separate test for all students at the endline in order to assess their reading and writing skills and GK/IQ. We see large gains in these areas: reading scores by 0.24 SD, and GK/IQ test scores by 0.23 SD. We also observe increase in writing score by 0.19 SD though the coefficient estimate is not significant statistically. The raw mean scores for the control (treatment) students in reading, and GK/IQ are 6.69 (7.47) and 5.19 (5.64), respectively. These indicate that the students at the treatment schools improve over the control-school students by approximately 11.6%, and 8.7% in reading and GK/IQ, respectively.

The students who were in grade 3 in 2012, whose parents were invited for meetings only in year 2, have relatively low gains. They made no gains in math and Bengali, but their test scores in English and science increased significantly, by 0.32 SD and 0.33 SD, respectively. We

[17] Appendix Table A5 reports the corresponding results for endline simple mean difference in test scores.

observe statistically insignificant gains in reading, writing and GK/IQ scores of 0.027 SD, 0.127 SD and 0.06 SD, respectively. The results suggest that the grade 3 students also benefit from their parents meeting with teachers, but that the gains are relatively modest compared to those for grade 5 students in both 2012 and 2011. These small gains are also associated with a smaller percentage of parents of grade 3 students attending the meetings, presumably because the stakes are not as high at grade 5 level (Figure 1B).[18]

We take the differences of parents', teachers', schools', and children's characteristics into account using the following regression model:

$$y_{i,post} = \alpha_0 + \alpha_1 y_{i,base} + \alpha_2 treatment_i + \alpha_4 X_i + u_i, \quad (2)$$

where X_i is a vector of control variables that describe school resources, teachers' characteristics, and parental characteristics.

The results for equation (2) are reported in Tables 7 and 8, confirming the findings obtained by controlling only for baseline test scores (as in Tables 5 and 6) or by using simple differences in post-treatment test scores (appendix Tables A4 and A5).[19] Parent–teacher meetings have substantial and positive impacts on both the midline and endline test scores. The treatment effect is positive and highly statistically significant across all subjects after controlling for students' baseline performance, school resources, teachers' characteristics, and parental characteristics. In year 1 of the intervention, the grade 4 students' English test scores increase by 0.32 SD, while those for both Bengali and math increase by approximately 0.31 SD. The science test scores show an increase of 0.18 SD, but this is not statistically significant. Overall, the students in grade 4 have a 0.28 SD increase in test scores at the midline in 2011, while the students in grade 5 have a 0.22 SD increase in test scores (CGPA) in 2011 (Table 7). Thus, controlling for schools', teachers', children's, and parents' characteristics does not change the size of the effects significantly. Overall, the gains in test scores are similar whether we control for these characteristics or not.

[18] As mentioned before, the stakes are not high in grade 3 exam, and a lot of students drop-out before they reach to grade 5 students. Parents are generally more concerned about children when they reach in grade 5.
[19] The sample sizes using parental controls are smaller, as is shown in Tables 7 and 8. We surveyed about 60% of the parents from both the treatment and control schools.

We also see significant improvements in test scores at the endline (Table 8). The grade 5 students saw an overall improvement of 0.36 SD in math, English, science, and Bengali. The gains in all of these subjects are individually significant, ranging between 0.3–0.4 SD. There are some gender differences in test scores, with the male students generally gaining more than the female students. This difference is more pronounced in the case of grade 5 students in year 1 of the program, where we see the PSC exam results being significantly higher for the treatment schools, but only for boys (Table 7). However, in year 2, this is not the case for either the PSC exams (for grade 5 students), where we see both boys and girls having higher test scores for each subject individually, or the project-administered tests (Table 8). In fact, overall we see slightly higher test scores for grade 5 female students in their PSC exams, though the differences between the male and female results are not significant. We observe some gender difference in test scores by subjects, but they do not follow a systematic trend. All of the baseline test scores are statistically significant across subject, grade, and year of the test. Overall, the results remain robust whether or not we control for the characteristics of households, parents, teachers and schools.

We compare our results with those from several other successful interventions in the literature. Andrabi et al. (2015) find that test scores increased by 0.11 SD as a result of their village-level information campaign intervention in Pakistan. The Balsakhi program in urban India, which provided low-performing students with additional teaching hours with a contract teacher (the Balsakhi), increased test scores by an average of 0.14 SD in its first year (Banerjee et al., 2007). The Extra Teacher Program in Kenya (Duflo et al., 2011), which also hired contract teachers, resulted in a 0.31 SD gain. The Computer-Assisted Learning program (Banerjee et al., 2007), which was also conducted in urban India, increased maths scores by 0.36 SD in its first year. Although these interventions had positive impacts on students' performance, they are costlier and have generally smaller treatment effects than our intervention.

5.2.2 Treatment-on-Treated Effects

Although assignment to the treatment group is randomized at the school level, parents in the treatment group choose whether or not to attend the monthly meetings. Those who attended meetings may have been involved in their children's education more before the experiment anyway, leading to a selection bias. The parents who attended the most meetings could differ from the others in a number of dimensions, both observable and unobservable. It is difficult to determine the incremental benefits of attending additional meetings. Parents who missed

meetings might still obtain the information through later informal interactions with teachers or from other parents who attended the meetings. Also, the meetings are meant to increase the accountability of both parents and teachers for the children's education, so they might motivate the parents to make an additional effort, regardless of whether they attended more or less.
When the take-up is low, the treatment-on-the-treated (ToT) effect can be evaluated separately. In this project, no structured monthly parent–teacher meetings like the intervention took place at the control schools. In the treatment schools, 90% of students' parents attended at least one of the five monthly meetings in 2011, and more than 95% of parents attended two or more meetings in 2012. Thus, there is a powerful first-stage effect of assignment to the treatment school on parent–teacher meetings. Hence, TOT effect here is likely to be very close to the ITT effect presented. In practice, one could estimate the ToT parameter by using the variable 'Attend' to indicate whether or not a parent attended a meeting, with assignment to a treatment or control school as an instrument, and then running two-stage least squares. In our case, the ToT is the ITT/take-up rate. With a take-up rate of nearly 90%, the ToT parameter is approximately 1.1 times higher than the ITT estimates presented in Tables 7 and 8.

We examine whether the children of parents who attended more meetings tend to achieve higher test scores. Table A6 reports results from a regression of endline test scores on the number of meetings, conditioning on parental, teacher and school characteristics. We run the regression in Table 9 among only treatment-school students. The results indicate that an additional meeting is associated with a 0.10 SD–0.15 SD increase in test scores, depending on students' subjects and grades. These results cannot be interpreted as causal effects, since the decision to participate in a given number of meetings is endogenous.

However, the incremental benefits of an extra meeting with teachers might not be constant. As parents learn more about their child's level and progress by attending a few meetings, or perhaps even only one, the benefit of having more meetings is likely to diminish. On the other hand, attending more meetings might lead parents to feel more confident asking questions or interacting with teachers. Hence, more meetings could enhance the likelihood of effective interactions and engagements with teachers.

As parents were incentivized with sweets and *paan supari* from July 2012 meetings, we also consider running a regression to test the effect of the incentive for the sample of parents who participated in those meetings. However, we observe that only a small fraction of parents (less

than 2%) who participated were coming for the first time, with most having participated at least once previously. Since we have no way to know whether they would have come if the entertainment had not been offered, it is difficult to estimate the benefit of participating in one meeting.

5.3 Distributional Effects

The program was implemented in poor, remote rural communities. It was not intended to help any particular group, given that most children, whether high or low performing, had disadvantaged backgrounds. We now check whether the program had different effects based on students' abilities (baseline test scores) before the intervention. If the treatment benefits the top-performing students disproportionally, it will raise the average test score, but also widen the gap between high and low performers.

We examine the distributional effects by splitting the students into three groups: top, middle and bottom thirds by their rankings in the baseline test distribution[20]. Equation (1) was estimated separately for the three groups. The results, without controlling for covariates, are similar, and are not reported here for the sake of brevity. Table 9 reports the estimated treatment effects for the three groups. It is clear that the top performers (top 33%) gain most at the midline tests. In grade 4, the top performers' overall test score gains are almost double those of the low performers (0.49 SD vs. 0.26 SD). The treatment effect is positive and highly significant for students in the top third (top performers) for all subjects except for science, in the bottom third only for maths and English, and in the middle third only for Bengali. The top third of students in grade 5 also have more than double the gains of other students in CGPA score. These gains are higher both separately for all of the individual subjects of grade 4 students and for the overall GPA of grade 5 students. Thus, in the short term, the meetings in 2011 benefitted the high-performing students most.

However, at the end of the second year, we see that the effects are almost similar across student groups, with the students in the bottom third and middle third of the baseline distribution gaining almost as much as those in the top third. The gains in both overall test scores are not statistically different across the three groups of students in grade 5 (who were also in the program in grade 4), which suggests that the incremental gains from continued parent–teacher meetings are higher among low-performing students, although they might not benefit in the

[20] We use average over all subjects in ranking students.

very short term. It could also be possible that these parents take longer to prepare themselves to be able to help their children at home. However, it should be noted that though the difference in gains in test scores among these groups of students diminished over time, we still observe some significant differences across subjects especially between bottom third and top third students in English, science and Bengali.

Among grade 3 students, some evidence from our findings suggests that the positive gains accrue more to the bottom and middle thirds of students. We only find statistically significant gains in English, Science and the overall test scores, with mid- and low-ranked students seeing the highest gains. Low-performing students might be gaining more from more frequent interactions with their parents, as there were more meetings with teachers in 2012. These frequent meetings might make the parents more comfortable interacting with teachers and other parents, allowing them to learn more.[21] Thus, there is the potential to incentivize or nudge parents to attend meetings, especially the parents of low-performing children. Indeed, we see that meeting attendance among the parents of lower-ranked students in grade 3 is relatively higher than that of their counterparts in grade 5 while the attendance of parents of grade 3 top-ranked students is lower than that of their grade 5 counterparts (Figure A3). This finding suggests more frequent meetings could be associated with better performances among lower-performing children in the classroom.

5.4 Heterogeneous Treatment Effects

We test the heterogeneous treatment effects using the following specification:

$$y_{i,post} = \delta_0 + \delta_1 y_{i,base} + \delta_2 treatment_i + \delta_3 treatment_i \times X_i + \delta_4 X_i + \varepsilon_i \qquad (3)$$

This specification tests whether the treatment effect for students with specific characteristics differs from the overall treatment effect; thus, the term $treatment_i \times X_i$ measures the change in treatment effect due to characteristics X_i. We run two separate regressions, one using interactions with only parents' and students' characteristics, and the other one using interactions with teachers' characteristics and school resources.[22] We focus on key variables

[21] One could also argue that the parent–teacher meetings were more organized and systematic, because more meetings were held in 2012.

[22] We report conservative estimates here by interacting parental and teacher/school characteristics separately in different regressions. The results using all of these interactions in the same regression are identical.

such as parents' age, household size, students' gender, parents' education, and household income. For the teachers' and schools' characteristics, we use the student–teacher ratio, number of classrooms, teachers' experience, buildings (whether brick-built or not), and whether the school has electricity connections.[23]

The interaction coefficients reported in Panel A of Table 10 suggest that the treatment effect (endline test scores) for grade 5 students does not vary much by household (log) income, education, or other characteristics. The results in Panel B of Table 10 also indicate that the effects do not vary across schools with different teachers and characteristics. When we consider the heterogeneous effects for grade 3 across parental and household characteristics, we see that none of the interaction terms are statistically significant (Table A7). For school and teacher characteristics, all interaction terms are insignificant, except for the interaction with number of classrooms. Grade 3 students in schools with more classrooms benefit more from the treatment. The estimated variations in treatment effects are statistically insignificant in most other cases, and show inconsistent signs across subjects.

When examining the heterogeneous treatment effects at the midline, we see similar results across households', schools', and teachers' characteristics. All coefficients of the interaction terms are statistically insignificant for students in grade 4 or 5 at the midline test (Table A8). Overall, it can be concluded that the impact of the intervention does not vary significantly across the characteristics of the participating students' families, teachers, or schools.

5.5 Understanding the Mechanisms

Parent–teacher interactions at the meetings could influence children's educational outcomes in a number of ways. We provide some evidence regarding the channels through which test scores and other outcomes are likely to be impacted.

5.5.1 Teachers' and Students' Presence

Both students and teachers might change their behavior due to the interventions; for instance, teachers might put in more effort, and students might attend school more regularly. We check student attendance data from class rosters after the intervention in both 2011 and 2012. On average, students were absent on 2.1 days in treatment schools and 1.7 days in control schools

[23]Most of the continuous variables such as age, education, etc. have been converted into binary variables for interactions with the treatment indicator. These make interpretation of the coefficients easier.

(Table A9) during the first month after the intervention (June 2011). The absences declined more in treatment schools than in control schools in year 1 (2011), suggesting an improvement in children's attendance at the treatment schools. The decline in absence is mainly due to students in grade 5. In year 2 (2012), we do not see any significant difference in students' attendances. Overall, students' presence varies somewhat across months, and control schools have slightly higher absence rates than treatment schools.

The intervention could also change teachers' behavior. Field staff members made random visits to the schools on days other than those of the meetings in order to check teachers' absences from schools. If a teacher could not be found in the school compound for any reason during the random unannounced spot visit, he/she was considered absent on that day. We see some evidence that teacher absenteesm was somewhat lower in treatment schools, but the difference is not statistically significant (Table A10). Each school has an average of five teachers, and we find that, on average, more than two teachers were absent in total during eight unannounced visits to a given school. Thus, a random visit in a given month found an average of approximately 0.3 of five teachers absent, resulting in an absence rate of about 6%. Overall, the teachers' absence rates in both the treatment and control schools are lower than has been suggested by some studies on teachers' absences in developing countries (see for example Chaudhury et al., 2006). [24] This difference could be due to the frequent visits to these schools (both treatment and control) at other times by field staff members (to conduct meetings at the treatment schools and to administer baseline and follow-up exams, and surveys of both students and teachers at both treatment and control schools).[25] Thus, the lower absence rate in this study may not be directly comparable with that of Chaudhury et al. (2006). However, the estimates presented here show that our results are not driven significantly by the difference in teachers' presence in treatment and control schools.

5.5.2 Parents', Teachers' and Students' Evaluations

One important question to examine is whether parental knowledge and awareness changed following the intervention, and whether any learning or positive change persisted. We conducted a follow-up survey at the household level in early 2014, more than a year after the

[24] Chaudhury et al. (2006) find that absence rate of teachers in Bangladeshi primary school is 23.5% in one of the two random visits in schools, with higher absent in rural areas.
[25] These schools also received letters from local education officers offering to help in conducting the research, especially in running the surveys, meetings (only in treatment schools), and students' tests.

intervention ended. This survey also allows us to examine whether the treatment effect is sustained after the end of the intervention, making long-lasting differences in children's future educational aspirations.[26] We randomly surveyed about 60% of the households in both the treatment and control groups.[27] The test scores are not different between the children in the households that were surveyed and those in the households that were not.

Table 11 (Panel A) reports parents' evaluations of their children one year after the end of the intervention. The survey indicates a greater parental involvement one year after the intervention ends: fathers, mothers, and older siblings of the children in the treatment schools were more likely to help them with study. The parents of the children in the treatment schools report that their children have more private tutors (40% in treatment schools compared to only 18% in control schools), and are less likely to fail to progress to the next grade. These children also spend less time at home doing household chores.

The parental evaluations are consistent with the students' self-reported evaluations, conducted immediately after the program ended in late 2012. The results are presented in Panel B of Table 11. Children in the treatment schools are more likely to have a proper breakfast before going to school (53%) than those in the control schools (48%). The students in the treatment group are also more ambitious: 28% want to be either a doctor or an engineer, while only 20% of children in the control schools expressed the same ambition. Students in the treated schools have more positive behaviors towards their classmates, and are more likely to do their homework regularly. They spend about 1.1 more hours weekly studying at home, more than a quarter of an hour a day extra. Finally, the treatment group students feel more confident before exams; 70% of students in the treatment schools and 59% in the control schools reported feeling confident in sitting for the exam.

We also find that students' evaluations are consistent with those of their teachers. The class teachers in both the treatment and control schools reported on the behavior and performance of each student. They were asked to report several items about each student at the end of the intervention in 2012, including their attendance, class performance and homework, and an

[26] We did not ask parents the questions during the intervention, to avoid the potential Hawthorne effect. While this is less of a concern after over a year, we cannot rule out changes in parents' behaviours completely, as they were invited in the meetings.
[27] We attempted to visit either odd or even numbered students by their class roll numbers, which are based on their classroom rankings.

overall assessment of the student's character, discipline, and honesty. Overall, teachers reported 92% of children in the treatment schools and 88.5% in the control schools to have good attendance, while 85% of their children in the treatment schools and 79% in the control schools were reported to have good performances (Panel C, Table 11). Students in the treatment schools also turn in their homework more regularly: 83% of students in the treatment schools and 77% in the control schools, as reported by teachers. When asked to assess each child's overall behavior, discipline and honesty, the teachers in the treatment schools reported that 77% of children behave very well, while the number in the control schools is 73%. Overall the assessment by teachers suggest that the students who were targeted by the program directly develop more positive behaviors and attitudes in school.

The 2014 parent survey asked parents in the treatment group for their opinion of the parent–teacher meetings in this intervention. Most of the parents in the treatment schools think that parent–teacher meetings contribute to students' learning, and more than 90% believe that they should continue. These results indicate that schools can improve teachers' perceptions and students' cognitive and non-cognitive behaviors through interactions with parents and their direct engagement in their children's education.

5.6 Spillover Effects

We examine the spillover effects among students who were in grade 4 in 2012, and whose parents were not invited to any meetings. These students were in grade 3 in 2011 and were not part of the intervention in any year. However, it is likely that the parents of the untreated classes (in the treatment schools) interacted with others, especially within the villages, or at least heard about parent–teacher meetings happening in schools.

The results in Table 12 suggest that there are some positive spillover effects. The ITT estimates for the grade 4 students in the treatment and control schools suggest that the English test scores of students in the treatment schools improved by 0.25 SD. We do not see any other significant differences, except for a 0.35 SD increase in writing scores. The effects on the other subjects are positive but statistically insignificant. The total test scores are 0.11 SD higher, but the effect is not statistically significant.

5.7 Cost-effectiveness of the Intervention

The intervention is remarkably low cost. We paid each teacher only $25 per academic year to conduct the meetings. The total added cost for teachers to run the program in a school was

therefore $125 per academic year. Even when we include the costs of hiring field staff members and providing entertainment for parents, the cost for each school is still less than $300 per academic year. This amounts to about $1.25 per student per academic year for the teacher costs[28], or $3 for the full program costs, including counters and field staff members.[29] If we consider the estimate in Table 8, the meetings raised the students' overall test scores by 0.36 SD by the end of the program's second year. Thus, the cost per average 0.1 SD increase in test scores per student is $0.35 over an academic year, or $0.8 for the full program.[30]

Parent–teacher meetings are routine in schools in many countries, and the Bangladeshi government does officially mandate that school teachers meet regularly with parents. In practice, though, no such meetings happen in public schools, with a few exceptions in select, urban public schools. These meetings could be almost free of cost if the government were to enforce the mandate for them. Thus, this program could be less costly to scale up than other similar programs that have been evaluated (e.g., Banerjee et al., 2007; Kremer, Miguel, & Thornton, 2009).[31] However, note that it is difficult to compare the cost-effectiveness of different educational interventions implemented across a range of countries, due to differences in context, reporting about estimated effect sizes, and outcomes of interest. There are also differences in testing instruments, costs and prices, and target populations. On the surface, though, it seems that our intervention is more cost-effective than those studied by Kremer et al (2013) and Glewwe and Muralidharan (2016). For example, Kremer et al (2013) study 15 interventions, with effects ranging from 0.14 SD to 0.6 SD for each $100 spent in these studies. If we follow the same approach as Kremer et al. (2013), our results indicate that for each $100 spent in our program (including administrative and other expenses), we could obtain more than a few folds increase in test scores. [32]

6. Conclusion

Engaging parents in their children's education, both at home and at school, is a potentially important way of supporting better learning outcomes. But the evidence for this comes largely

[28] On average there are about 50 students in each grade. The total costs include costs for both grades (grade 4 and grade 5 in 2011, and grade 5 and grade 3 in 2012) with about 100 students in total in each year.
[29] These estimates do not include the costs associated with administering tests for the project in the schools, because exams are an integral, routinely conducted part of education, and there will be no need to conduct independent exams once the system of parent–teacher meetings is in place and enforced.
[30] Ignoring the opportunity cost of parents' time in attending the meetings.
[31] The least-expensive program evaluated and considered in these studies was the Balsakhi Program in India, where the corresponding gain was $0.67 per 0.1 SD increase in test scores.
[32] This is calculated as the effect size reported in Table 8 multiplied by the number of children under consideration, divided by the total costs of the program in hundreds of dollars.

from developed countries and there is no rigorous research to confirm that this also holds in the very different circumstances in developing counties, particularly in the more disadvantaged non-urban settings. This paper presents strong evidence, much stronger evidence than found from studies of programs in India, Kenya, and other developing countries, that parents' involvement in school activities can have a significant positive effect on students' learning even in low-income countries.

The study shows that the full effects of such programs takes some time to be visible. In the short term, better performing students (those with baseline test scores in the top third) benefitted more from the program; but over time, as the meetings progressed, gradually the low-performing students too began to benefit. There were also positive spillover effects in the treatment schools among students in classes that were not in the part of the intervention. The treatment effect is stable and robust, and observed regardless of education level and experience of the teachers, or the socioeconomic backgrounds of the students. We observed some parents needed a nudge to motivate them to meet with teachers. We found parents and other household members spending more time at home helping children to do homework or study. The intervention led to significant improvement in the attitudes, behavior, and confidence of children.

Thus our findings extend the existing literature and confirms that the positive effect of parents' involvement on students learning observed in developed countries can also hold in low-income countries. Educational outcomes of children in developing countries such as Bangladesh can be significantly improved through programs that stimulate greater parent-teacher interaction and encourage parents to be more involved in their children's studies. Such programs have immense potential for scaling up because they are low-cost and easy to implement, even in disadvantaged communities where parents have low levels of literacy.

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Table 1: Parent–teacher Meetings by Year and Grade

	Program in 2011	Program in 2012	Follow-up in 2014
Grade 4	✓	✓	✓
Grade 5	✓		✓
Grade 3		✓	✓

Table 2: Test for Differences in Mean Baseline Test Scores

	Maths	**English**	**Science**	**Bengali**	**GK/IQ**
Grade 4			**Year 2011 (Baseline)**		
Difference	0.0587	–0.0391	–0.0282	0.0228	–0.0179
t-stat	1.4291	–0.9394	–0.7373	0.5337	–0.494
N	*T* = 1244	*C* = 1059			
Grade 5					
Difference	–0.0461	–0.0683	0.0159	–0.0541	0.0021
t-stat	–1.1413	–1.5857	0.3576	–1.2527	0.0505
N	*T* = 1046	*C* = 717			
Grade 3			**Year 2012 (baseline)**		
Difference	–0.0582	–0.0046	0.0103	0.0180	0.0602
t-stat	–1.4902	–0.1197	0.4927	0.8848	1.51
N	*T* = 1222	*C* = 1186			

Notes: This table gives the mean difference in normalized pre-intervention test score between the treatment and control school students, conducted at the beginning of the academic year. The control group mean and standard deviation are 0 and 1, respectively. *t*-statistics of the differences are presented in the second row.

Table 3: School and Teacher Characteristics

	Treatment	Control	*t*-stat (T-C)
	I	II	III
Number of teachers	5.2	4.8	–1.35
Number of female teachers	2.8	2.6	–0.69
Number of students in in grades 4 and 5	60.8	61.3	0.08
Number of classrooms	4.22	4.35	–0.39
Student–classroom ratio	50.6	53.3	–0.43
Years in a teaching job (experience)	10.9	8.8	**2.3**
Amount of professional training	1.9	1.8	0.3
Years of education	18.7	20.2	**–6.3**
Distance travel from home to school (km)	5.0	4.2	1.15
Monitoring schools by TEO* (satisfactory)	0.68	0.64	0.79

*TEO = Thana (sub-district) Education Officer

Notes: This table gives the average characteristics of treatment and control schools, and the difference before the intervention begins in 2011. *t*-statistics are presented in column (III). The differences that are significant statistically are in bold.

Table 4: Correlates of Parental Presence at Meetings (Poisson Regression Model)

Dependent variable:	(1)	(2)	(3)	(4)
Number of meetings attended	**2011**		**2012**	
Age of the household head	–0.00148	–0.00172	–0.00449**	–0.00235
	(0.00275)	(0.00271)	(0.00179)	(0.00178)
Household size	0.00987	0.00661	0.00949	0.00300
	(0.0148)	(0.0130)	(0.00837)	(0.00855)
Head above primary education	–0.0499	–0.0307	0.0152	–0.0186
	(0.0430)	(0.0351)	(0.0230)	(0.0208)
Mother above primary education	0.0219	0.0160	0.0428	0.0401
	(0.0429)	(0.0370)	(0.0384)	(0.0380)
(Log) household income	–0.136	–0.0993	0.0274	0.0323
	(0.0734)	(0.0659)	(0.0329)	(0.0359)
Gender of household head	0.0512	0.0534	0.133*	0.0998
	(0.0710)	(0.0857)	(0.0743)	(0.0841)
Gender of student (female = 1)	0.00709	0.0107	–0.0139	–0.0195
	(0.0268)	(0.0218)	(0.0143)	(0.0156)
Grade dummy (grade five = 1)	–0.168	–0.140	0.0482	–0.00900
	(0.0908)	(0.0896)	(0.0324)	(0.0388)
baseline Bengali		0.00790		0.00390
		(0.0301)		(0.00933)
baseline English		–0.0228		–0.0174**
		(0.0162)		(0.00799)
baseline mathematics		–0.00649		0.000594
		(0.0179)		(0.00611)
baseline science		–0.0156		0.0118
		(0.0286)		(0.00716)
baseline GK/IQ		0.0528*		0.000883
		(0.0245)		(0.0106)
Observations	2232	2016	1728	1376

Notes: The last column (results for 2012) is based on students from grade 5, as baseline marks for grade 3 students are missing. The sample for 2011 (year 1 of the intervention) includes students in grade 4 and 5 (and their parents, in this table) in that year, while the sample for 2012 consists of students (and their parents) who were in grades 5 and 3 in 2012. Standard errors are clustered at the school level and reported in parentheses. * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

Table 5: ITT Estimates of Test Scores: Midline Results, 2011

	(1)	(2)	(3)	(4)	(5)	(6)
	Grade 4					**Grade 5**
	Math	English	Science	Bengali	ALL	CGPA
Treatment effect	0.224*	0.362**	0.139	0.306***	0.260**	0.200**
	(0.118)	(0.138)	(0.115)	(0.112)	(0.115)	(0.0966)
Baseline test score	0.376***	0.370***	0.396***	0.0986**	0.553***	0.0787
	(0.0461)	(0.0558)	(0.0475)	(0.0473)	(0.0534)	(0.0565)
Observations	2197	2203	2202	2204	2204	1768
Adjusted R^2	0.149	0.145	0.120	0.031	0.195	0.014
Male (N=1072)						
Treatment effect	0.237*	0.398***	0.151	0.320**	0.259**	0.348***
	(0.128)	(0.132)	(0.120)	(0.123)	(0.118)	(0.102)
Female (N=1025)						
Treatment effect	0.209*	0.319*	0.123	0.283**	0.254**	0.209*
	(0.123)	(0.162)	(0.129)	(0.120)	(0.124)	(0.123)

Notes: This table gives the regression adjusted treatment effects conditioning on baseline test scores. The midline tests were conducted after year 1 of the intervention. 'ALL' represents the average of the test scores for all subjects (maths, English, science and Bengali). The test scores are normalized, with baseline mean and standard deviation of the control group are 0 and 1, respectively. Standard errors are clustered at the school level and reported in parentheses. * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

Table 6: ITT Effects on Test Scores: Endline Results, 2012

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
ALL Grade 5 (*N*=1870)	Math	English	Science	Bengali	ALL	GK/IQ	Reading	Writing
Treatment effect	0.420***	0.413***	0.339***	0.309***	0.377***	0.235*	0.244*	0.190
	(0.129)	(0.126)	(0.106)	(0.100)	(0.0990)	(0.128)	(0.148)	(0.146)
Baseline test score	0.210***	0.171***	0.219***	0.167***	0.281***	0.412***	0.219***	0.258***
	(0.0552)	(0.0579)	(0.0386)	(0.0406)	(0.0616)	(0.0844)	(0.0605)	(0.0971)
Adjusted R^2	0.100	0.067	0.086	0.070	0.135	0.120	0.041	0.042
Male (*N*=950)								
Treatment effect	0.370**	0.424***	0.324***	0.374***	0.377***	0.268**	0.184	0.143
	(0.142)	(0.140)	(0.121)	(0.114)	(0.108)	(0.127)	(0.153)	(0.138)
Female (*N*=920)								
Treatment effect	0.469***	0.401***	0.340***	0.245**	0.371***	0.203	0.304*	0.242
	(0.136)	(0.129)	(0.112)	(0.106)	(0.103)	(0.153)	(0.161)	(0.179)
ALL Grade 3 (*N*=2253)								
Treatment effect	-0.0873	0.317***	0.332***	-0.00594	0.141	0.00906	0.0529	0.127
	(0.0787)	(0.0907)	(0.107)	(0.107)	(0.0860)	(0.0937)	(0.126)	(0.149)
Baseline test score	0.304***	0.314***	0.318***	0.339***	0.489***	0.358***	0.221***	0.219***
	(0.0334)	(0.0367)	(0.0391)	(0.0381)	(0.0482)	(0.0402)	(0.0543)	(0.0657)
Adjusted R^2	0.091	0.101	0.125	0.120	0.179	0.080	0.029	0.027
Male (*N*=1127)								
Treatment effect	-0.0796	0.266***	0.331***	-0.0368	0.125	0.0427	0.00860	0.203
	(0.0871)	(0.0928)	(0.106)	(0.102)	(0.0828)	(0.105)	(0.135)	(0.137)
Female (N=1126)								
Treatment effect	-0.0959	0.367***	0.331***	0.0247	0.156	-0.0245	0.0969	0.0512
	(0.0929)	(0.110)	(0.123)	(0.123)	(0.103)	(0.112)	(0.136)	(0.177)

Notes: This table gives the regression adjusted treatment effects conditioning on baseline test scores. The endline tests were conducted after year 2 of the intervention. 'ALL' represents the average of the test scores for all subjects (maths, English, science and Bengali). Sample size differs slightly as some students' test scores were missing or not reported in one or the other subjects. The test scores are normalized, so that the baseline mean and standard deviation of the control group are 0 and 1, respectively. For GK/IQ, reading and Writing the test scores are normalized at the endline with control mean and standard deviation are 0 and 1, respectively. Standard errors are clustered at the school level and reported in parentheses. * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

Table 7: ITT Estimates *with Controls*: Midline Results, 2011

	(1)	(2)	(3)	(4)	(5)	(6)
			Grade 4			**Grade 5**
Panel A	Maths	English	Science	Bengali	ALL	CGPA
Treatment Effect	0.305**	0.319**	0.182	0.308**	0.281**	0.219**
	(0.142)	(0.156)	(0.126)	(0.117)	(0.132)	(0.105)
Baseline Test Score	0.122***	0.110***	0.247***	0.0400**	0.0499***	0.00860*
	(0.0148)	(0.0178)	(0.0317)	(0.0174)	(0.00518)	(0.00515)
HH Characteristics	Yes	Yes	Yes	Yes	Yes	Yes
School Characteristics	Yes	Yes	Yes	Yes	Yes	Yes
Teacher Characteristics	Yes	Yes	Yes	Yes	Yes	Yes
N	1582	1586	1585	1587	1587	1385
adj. R^2	0.196	0.194	0.188	0.080	0.259	0.044
Panel B						
Male	0.253*	0.296*	0.186	0.289**	0.266**	0.426***
	(0.140)	(0.149)	(0.130)	(0.133)	(0.128)	(0.0941)
Female	0.206	0.214	0.0755	0.248*	0.232	0.0600
	(0.141)	(0.185)	(0.151)	(0.126)	(0.148)	(0.123)

Notes: Panel A of this table reports the regression coefficients α1 and α2 for each subject using Equation (1). The baseline test scores in the regressions are the pre-intervention test scores for each subject. 'ALL' indicates the mean test score for all subjects (maths, English, science and Bengali). The estimated coefficient of 'treatment' (α2) is given in the first row. For the male and female sub-samples, we report only the coefficient of 'treatment' (α2). The test scores are normalized, so that the baseline mean and standard deviation of the control group are 0 and 1, respectively. Standard errors are clustered at the school level and reported in parentheses. The regression includes child gender, parental and household characteristics, and teacher and school characteristics. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table 8: ITT Estimates *with Control*: Endline Results, 2012

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Grade 5	Math	English	Science	Bengali	ALL	GK/IQ	Reading	Writing
Treatment Effect	0.425***	0.344**	0.343***	0.324***	0.361***	0.294**	0.226	0.184
	(0.158)	(0.159)	(0.129)	(0.114)	(0.125)	(0.144)	(0.146)	(0.143)
Baseline test score	0.189***	0.188***	0.248***	0.152***	0.281***	0.372***	0.199***	0.256**
	(0.0478)	(0.0706)	(0.0500)	(0.0441)	(0.0776)	(0.0798)	(0.0587)	(0.126)
N	1152	1152	1152	1152	1152	1091	1091	1091
adj. R^2	0.103	0.069	0.116	0.082	0.142	0.140	0.098	0.057
Male	0.455**	0.276	0.285*	0.388***	0.346**	0.386***	0.179	0.0905
	(0.200)	(0.182)	(0.143)	(0.139)	(0.146)	(0.137)	(0.158)	(0.135)
Female	0.403***	0.427***	0.398***	0.274**	0.383***	0.198	0.259	0.280
	(0.138)	(0.154)	(0.130)	(0.108)	(0.117)	(0.174)	(0.166)	(0.186)
Grade 3								
Treatment Effect	–0.0846	0.348***	0.312***	0.0348	0.165*	0.0270	0.0590	0.313*
	(0.0746)	(0.0903)	(0.107)	(0.101)	(0.0839)	(0.0960)	(0.125)	(0.160)
Baseline test score	0.304***	0.304***	0.299***	0.348***	0.484***	0.387***	0.240***	0.232***
	(0.0336)	(0.0346)	(0.0393)	(0.0364)	(0.0446)	(0.0504)	(0.0461)	(0.0754)
N	1049	1049	1049	1049	1049	896	896	896
adj. R^2	0.167	0.157	0.178	0.187	0.243	0.143	0.077	0.068
Male	–0.0622	0.369***	0.378***	–0.0159	0.176*	0.102	-0.0608	0.439**
	(0.0909)	(0.110)	(0.121)	(0.106)	(0.0913)	(0.115)	(0.142)	(0.170)
Female	–0.0698	0.348***	0.236*	0.0957	0.166	-0.0543	0.175	0.190
	(0.0897)	(0.112)	(0.119)	(0.121)	(0.102)	(0.120)	(0.137)	(0.171)

Notes: This table reports the regression coefficients α1 and α2 for each subject using Equation (1). The baseline test scores in the regressions are the pre-intervention test scores for each subject. 'ALL' indicates the mean test score for all subjects (maths, English, science and Bengali). The estimated coefficient of 'treatment' (α2) is in the first row. For the male and female sub-samples, we report only the coefficient of 'treatment' (α2). The test scores are normalized, so that the baseline mean and standard deviation of the control group are 0 and 1, respectively. For GK/IQ, reading and Writing the test scores are normalized at the endline with control mean and standard deviation are 0 and 1, respectively. Standard errors are clustered at the school level and reported in parentheses. As no baseline tests for GK/IQ, reading and writing were conducted, we use standardized ALL scores as baseline score for these regressions. The regression includes child gender, parental and household characteristics, and teacher and school characteristics. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table 9: Distributional Impact

Panel A: Midline Results (Year 1: 2011)

	(1)	(2)	(3)	(4)	(5)	(6)
	Maths	English	Science	Bengali	ALL	CGPA
			Grade 4			**Grade 5**
Bottom third	0.326**	0.247*	0.111	0.194	0.255*	0.153
	(0.136)	(0.140)	(0.135)	(0.151)	(0.134)	(0.169)
Middle third	0.197	0.227	0.0712	0.277*	0.218	0.105
	(0.148)	(0.150)	(0.172)	(0.160)	(0.155)	(0.165)
Top Third	0.447**	0.529**	0.266	0.496***	0.493**	0.350*
	(0.172)	(0.219)	(0.194)	(0.163)	(0.191)	(0.176)

Panel B: Endline Results (Year 2: 2012)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Grade 5	Maths	English	Science	Bengali	ALL	GK	Reading	Writing
Bottom third	0.358*	0.137	0.183	0.325*	0.268	0.290**	0.123	0.133
	(0.208)	(0.229)	(0.179)	(0.162)	(0.175)	(0.126)	(0.201)	(0.157)
Middle third	0.406**	0.283*	0.269	0.346***	0.327**	0.305*	0.109	0.230
	(0.169)	(0.169)	(0.174)	(0.127)	(0.145)	(0.154)	(0.200)	(0.188)
Top Third	0.368*	0.479**	0.316**	0.107	0.307*	0.251	0.384**	0.325
	(0.197)	(0.198)	(0.155)	(0.168)	(0.154)	(0.296)	(0.177)	(0.277)
Grade 3								
Bottom third	–0.0519	0.327**	0.432***	0.0618	0.198	-0.00724	-0.0268	0.211
	(0.140)	(0.135)	(0.135)	(0.129)	(0.120)	(0.164)	(0.175)	(0.181)
Middle third	–0.0773	0.386***	0.411***	0.0933	0.208*	0.123	0.0945	0.177
	(0.129)	(0.129)	(0.147)	(0.151)	(0.120)	(0.170)	(0.173)	(0.160)
Top Third	–0.126	0.295*	0.177	–0.140	0.0705	-0.0658	-0.0275	0.235
	(0.161)	(0.173)	(0.139)	(0.186)	(0.156)	(0.138)	(0.159)	(0.251)

Notes: This table reports the regression coefficients α1 and α2 for each subject using Equation (1) for sub-samples of students in different ability groups, based on their baseline test scores. The top third includes those students who fall in the top 33% of the "ALL" baseline marks distribution, the bottom third those who are in the bottom 33% of the distribution. The regression includes child gender, parental and household characteristics, and teacher and school characteristics. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table 10: Heterogeneous effects: Grade 5 (endline)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Maths	English	Science	Bengali	All	GK	Reading	Writing
Panel A: Interactions with *household characteristics*								
Treatment school*covariate								
Age of head (above median)	0.333***	0.132	0.162	0.0157	0.146	0.430***	-0.0729	0.140
	(0.125)	(0.134)	(0.132)	(0.112)	(0.111)	(0.152)	(0.145)	(0.180)
Household size (above median)	–0.146	–0.0287	–0.137	0.0763	–0.0373	-0.103	0.171	-0.0224
	(0.157)	(0.171)	(0.139)	(0.145)	(0.127)	(0.155)	(0.216)	(0.183)
Student gender (female=1)	0.0192	0.0826	0.0678	–0.159	0.0142	-0.145	0.210	0.0907
	(0.143)	(0.121)	(0.0962)	(0.101)	(0.0954)	(0.118)	(0.127)	(0.164)
Both parents primary educated	0.171	0.0337	0.0672	0.156	0.0776	0.364***	0.132	0.0987
	(0.153)	(0.149)	(0.129)	(0.117)	(0.118)	(0.137)	(0.162)	(0.169)
Income above log median	–0.220*	–0.200	–0.138	–0.157	–0.173	-0.154	0.0121	-0.339*
	(0.129)	(0.134)	(0.126)	(0.102)	(0.107)	(0.130)	(0.152)	(0.171)
Panel B: Interactions with *school and teacher characteristics*								
Treatment school*covariate								
Student–teacher ratio	–0.0126	–0.0148	–0.00320	–0.00733	–0.0105	0.00326	0.00636	0.00475
	(0.0102)	(0.0142)	(0.00826)	(0.00726)	(0.00888)	(0.00905)	(0.0135)	(0.0113)
Years of teaching experience	0.0128	0.00972	0.0153	0.00250	0.0104	0.0107	0.00617	0.0270
	(0.0149)	(0.0131)	(0.0109)	(0.0138)	(0.0116)	(0.0158)	(0.0167)	(0.0179)
Number of classrooms	0.121	0.0353	0.0416	–0.00264	0.0590	0.0931	0.249**	-0.0201
	(0.0953)	(0.106)	(0.0986)	(0.0612)	(0.0791)	(0.119)	(0.0956)	(0.127)
School is brick built	0.387	0.0872	0.125	0.0839	0.177	0.191	-0.214	-0.210
	(0.257)	(0.305)	(0.290)	(0.192)	(0.231)	(0.300)	(0.346)	(0.458)
School has electricity	–0.171	0.00229	–0.00370	0.0433	0.0295	-0.283	0.349	0.0408
	(0.314)	(0.360)	(0.291)	(0.226)	(0.262)	(0.405)	(0.427)	(0.324)

Notes: Age, household size, education and income have been converted to binary variables for ease of interpretation and magnitude of the estimates. They are defined if the value is above the median in the overall sample. This table reports the regression coefficients for each subject using Equation (3). Standard errors are clustered at the school level and reported in parentheses. The top panel of the regression also includes child gender and parental and household characteristics, and the bottom panel includes teacher and school characteristics. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table 11: Evaluations by Parents, Students and Teachers

Parental self-report in 2014 (follow-up survey)	**Treat**	**Control**	**T-C**	**t-stat**
Father is helping to study at home most of the time	0.114	0.073	0.041	**6.33**
Mother is helping to study at home most of the time	0.136	0.106	0.031	**4.25**
Others (brother/sister) helping to study at home	0.136	0.091	0.045	**6.38**
Have private tutor	0.396	0.180	0.216	**5.18**
If child fail to progress to next grade	0.036	0.053	-0.017	**2.22**
Did child get scholarship in grade 5 PSC exam	0.080	0.052	0.027	0.63
Child spends more time on household work than study	0.013	0.030	-0.017	**4.15**
Child cannot go to school regularly for household or other work	0.022	0.054	-0.032	**6.06**
Child hangs out with naughty boys/girls	0.038	0.047	-0.009	1.57
Private tuition is very important to get good marks in exams	0.954	0.963	-0.009	1.54
Students' own evaluation in 2012 (at the end of the intervention)				
Eat breakfast before going to school everyday	0.525	0.475	0.050	**4.79**
Want to be a doctor/engineer	0.280	0.202	0.078	**8.76**
Number of hours studying at home daily	3.66	3.52	0.14	**1.99**
Weekly study at home (in hours)	20.14	19.00	1.14	**2.70**
Feel very confident before any exam	0.703	0.593	0.109	**3.19**
Behave well with friends	0.907	0.826	0.081	**3.23**
Do homework regularly	0.731	0.707	0.025	1.01
Teachers evaluation in 2012 (at the end of the intervention)				
School attendance is good/very good	0.923	0.884	0.040	**6.34**
Class performance is good	0.850	0.789	0.062	**7.61**
Does homework regularly	0.828	0.769	0.059	**6.93**
Happy about character, discipline and honesty	0.768	0.726	0.042	**4.60**

Notes: Panel A includes a sample of 5128 households that were surveyed in 2014 from both the treatment and control areas. Panel B includes all students who sat for the endline test. Panel C includes the opinions of class teachers about each student individually. This table reports the means and simple differences between the treatment and control groups. The fourth column shows the *t*-statistics of the difference. Statistically significant differences are in bold.

Table 12: Spillover Effects (Grade 4 Students in 2012)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Maths	English	Science	Bengali	ALL	GK/IQ	Reading	Writing
Treatment effect	0.0407	0.245**	0.147	0.0694	0.110	0.0708	0.101	0.351*
	(0.0587)	(0.120)	(0.123)	(0.116)	(0.0945)	(0.148)	(0.136)	(0.198)
N	1280	1280	1280	1280	1280	1141	1144	1144
adj. R^2	0.072	0.082	0.111	0.132	0.168	0.062	0.051	0.055

Notes: This table reports spillover effects using Equation (1), but considers children in grade 4 in 2012 at treatment schools, who were not part of the intervention. The tests were conducted at the end of the intervention at the same time that we conducted tests for grade 5 and grade 3 students (intervention groups). Standard errors are clustered at the school level and reported in parentheses. The regression includes the child's gender, parental and household characteristics, and teacher and school characteristics. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

APPENDIX

Table A1: Attrition by Treatment Status and Grades

	Grade 4		Grade 5		Grade 3		All students	
	Treat	Control	Treat	Control	Treat	Control	Treat	Control
Attrition by midline	0.074	0.046	0.000	0.000			0.074	0.046
Attrition by endline			0.058	0.069	0.116	0.118	0.096	0.094
Total number of attritors	57		199		472			

Table A2: Baseline Raw Test Score Results by Attrition in the Midline (2011) and Endline (2012)

Maths	**Treat**	**Control**	**Diff**	***p*-value (diff)**
Grade 5 (2012)	6.73	6.81	–0.086	0.856
Grade 3 (2012)	7.41	7.52	–0.112	0.782
Grade 4 (2011)	10.24	9.54	0.701	0.468
English				
Grade 5 (2012)	6.35	6.91	–0.567	0.308
Grade 3 (2012)	7.60	7.33	0.268	0.491
Grade 4 (2011)	8.54	6.69	1.851	0.103
Science				
Grade 5 (2012)	5.75	5.50	0.255	0.429
Grade 3 (2012)	5.60	5.55	0.047	0.847
Grade 4 (2011)	6.93	6.38	0.550	0.297
Bengali				
Grade 5 (2012)	6.01	6.36	–0.354	0.182
Grade 3 (2012)	5.72	5.39	0.336	0.141
Grade 4 (2011)	7.09	6.62	0.472	0.537
GK/IQ				
Grade 5 (2012)	4.38	4.14	0.239	0.463
Grade 3 (2012)	4.49	4.35	0.141	0.558
Grade 4 (2011)	6.89	6.31	0.584	0.322

Table A3: Lee Bounds: Robustness to Attrition

		Grade 5 (2012)				Grade 3 (2012)			
		Coef.	s.e	CI low	CI high	Coef.	s.e	CI low	CI high
Maths	lower bound	0.374	0.057	0.262	0.487	–0.073	0.062	–0.195	0.050
	upper bound	0.374	0.053	0.271	0.478	–0.073	0.059	–0.189	0.043
English	lower bound	0.322	0.061	0.203	0.441	0.341	0.064	0.216	0.466
	upper bound	0.697	0.056	0.588	0.806	0.346	0.067	0.215	0.478
Science	lower bound	0.284	0.056	0.174	0.393	0.376	0.066	0.247	0.505
	upper bound	0.295	0.050	0.197	0.394	0.378	0.064	0.252	0.504
Bengali	lower bound	0.202	0.050	0.104	0.300	0.047	0.063	–0.077	0.172
	upper bound	0.276	0.046	0.185	0.367	0.050	0.060	–0.067	0.166
ALL	lower bound	0.299	0.048	0.204	0.393	0.171	0.060	0.054	0.288
	upper bound	0.335	0.044	0.248	0.421	0.174	0.059	0.059	0.289
GK/IQ	lower bound	0.254	0.065	0.127	0.381	-0.151	0.073	-0.293	-0.008
	upper bound	0.404	0.067	0.273	0.535	0.065	0.089	-0.108	0.239
Reading	lower bound	0.142	0.070	0.004	0.279	0.081	0.083	-0.082	0.245
	upper bound	0.275	0.069	0.140	0.409	0.088	0.072	-0.054	0.230
Writing	lower bound	0.247	0.066	0.118	0.376	0.226	0.118	-0.005	0.457
	upper bound	0.336	0.075	0.189	0.484	0.246	0.067	0.115	0.376

Table A4: Mean Difference in Test Scores: Midterm Results, 2011

			Grade 4			Grade 5
ALL	**Maths**	**English**	**Science**	**Bengali**	**ALL**	**PSC Results (CGPA)**
Difference	0.2899	0.3987	0.1736	0.3601	0.3459	0.1767
t-stat	7.395	4.254	4.254	9.062	8.600	4.1958
N			2624			1999
Male						
Difference	0.2905	0.2543	0.1458	0.3667	0.3596	0.3132
t-stat	5.243	7.597	3.227	6.605	6.360	5.6614
N			1371			1106
Female						
Difference	0.2870	0.3624	0.1608	0.3521	0.3289	0.0076
t-stat	5.2556	6.2203	2.7588	6.1942	5.79	0.1189
N			1253			893

Notes: This table gives the mean difference in normalized midline (after year 1 of the intervention) test scores between the treatment and control schools, conducted at the end of the academic year. 'ALL' represents the average of the test scores for all subjects (maths, English, science and Bengali). *t*-statistics are presented in the second row. The test scores are normalized, meaning that the baseline mean and standard deviation of the control group are 0 and 1, respectively.

Table A5: Mean difference in Test Scores: Endline

	Maths	English	Science	Bengali	ALL	GK/IQ	Reading	Writing
Grade 5: ALL (*N* = 2289)								
Difference	0.423	0.456	0.370	0.336	0.486	0.238	0.217	0.247
t-stat	11.02	10.87	9.72	9.37	12.11	5.680	3.786	3.876
Male (*N* = 1160)								
Difference	0.403	0.437	0.190	0.384	0.491	0.008	0.081	0.241
t-stat	7.502	7.349	6.779	7.339	8.529	0.146	1.422	3.991
Female (*N* = 1129)								
Difference	0.443	0.475	0.365	0.287	0.480	0.242	0.297	0.237
t-stat	8.114	8.046	6.976	5.868	8.606	2.913	3.531	3.271
Grade 3: ALL (*N* = 3138)								
Difference	–0.036	0.335	0.359	0.039	0.127	0.092	0.000	0.308
t-stat	–1.027	9.168	10.010	1.144	4.430	1.147	0.001	3.674
Male (*N* = 1599)								
Difference	–0.037	0.294	0.346	0.007	0.110	0.077	0.082	0.728
t-stat	–1.041	5.647	6.873	0.150	2.719	0.550	0.379	4.380
Female (*N* = 1539)								
Difference	–0.038	0.376	0.369	0.070	0.143	-0.081	0.169	0.170
t-stat	–0.775	7.321	7.225	1.403	3.505	-0.982	2.029	1.940

Notes: This table gives the mean difference in normalized endline test scores between the treatment and control schools, conducted at the end of the intervention in year 2 (2012). 'ALL' represents the average of the test scores for all subjects (maths, English, science and Bengali). *t*-statistics are presented in the second row. The test scores are normalized, so that the baseline mean and standard deviation of the control group are 0 and 1, respectively. Missing test scores at the baseline are imputed using school-administered tests from before the beginning of the intervention.

Table A6: Number of Meetings and Gains in Test Scores in Endline (treatment schools only)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Maths	**English**	**Science**	**Bengali**	**ALL**	**GK/IQ**	**Reading**	**Writing**
Grade 5	0.102***	0.165***	0.0943***	0.109***	0.130***	0.0452	0.0346	0.100*
	(0.0261)	(0.0375)	(0.0295)	(0.0221)	(0.0268)	(0.0374)	(0.0298)	(0.0513)
Grade 3	0.114***	0.155***	0.154***	0.130***	0.114***	0.0756	0.143***	0.0675
	(0.0259)	(0.0338)	(0.0304)	(0.0413)	(0.0259)	(0.0523)	(0.0280)	(0.0522)

Note: Sample includes all students from treatment schools only. Standard errors are clustered at the school level and reported in parentheses. The regression includes child gender, parental/household characteristics, as well as teacher and school characteristics. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table A7: Heterogeneous Effects: Grade 3, 2012 (Endline)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Maths	**English**	**Science**	**Bengali**	**All**	**GK/IQ**	**Reading**	**Writing**
Panel A: Interactions with *household characteristics*								
Treatment school*covariate								
Age of head (above median)	–0.0120	0.168	0.143	0.0942	0.0764	0.00907	0.112	-0.167
	(0.150)	(0.170)	(0.124)	(0.155)	(0.140)	(0.147)	(0.134)	(0.169)
Household size (above median)	0.0757	0.0488	–0.132	0.0514	0.00474	-0.185	-0.134	0.226
	(0.173)	(0.211)	(0.203)	(0.168)	(0.169)	(0.194)	(0.214)	(0.241)
Student gender (female=1)	–0.0319	–0.0157	–0.0468	0.0846	–0.000409	-0.141	0.230	-0.196
	(0.113)	(0.129)	(0.115)	(0.102)	(0.0994)	(0.146)	(0.141)	(0.139)
Both parents primary educated	–0.0569	–0.0187	–0.169	–0.104	–0.0844	-0.107	0.0368	0.187
	(0.107)	(0.121)	(0.116)	(0.103)	(0.0929)	(0.121)	(0.143)	(0.150)
Income above log median	–0.000713	–0.0705	–0.0937	–0.0638	–0.0399	-0.0466	-0.111	0.00706
	(0.152)	(0.167)	(0.170)	(0.148)	(0.138)	(0.139)	(0.167)	(0.199)
Panel B: Interactions with *school and teacher characteristics*								
Treatment school*covariate								
Student–teacher ratio	–0.000657	0.00463	–0.000574	0.00469	0.00165	-0.00319	0.00262	-0.00891
	(0.00758)	(0.00736)	(0.00888)	(0.00919)	(0.00773)	(0.0106)	(0.0104)	(0.0120)
Years of teaching experience	–0.00855	–0.00973	–0.0142	–0.0172	–0.0155	-0.00852	-0.00691	0.0118
	(0.00949)	(0.0123)	(0.0128)	(0.0115)	(0.0113)	(0.0114)	(0.0122)	(0.0164)
Number of classrooms	0.159**	0.147**	0.139*	0.0959	0.175**	0.00586	0.107	-0.0254
	(0.0635)	(0.0718)	(0.0710)	(0.0783)	(0.0726)	(0.0741)	(0.0986)	(0.111)
School is brick built	–0.119	0.174	–0.162	–0.169	0.0101	-0.0369	-0.135	0.467
	(0.214)	(0.251)	(0.236)	(0.289)	(0.217)	(0.239)	(0.288)	(0.495)
School has electricity	–0.0686	–0.127	–0.296	–0.319	–0.189	-0.251	0.00305	0.242
	(0.171)	(0.196)	(0.215)	(0.213)	(0.177)	(0.234)	(0.274)	(0.323)

Note: Age, household size, education and income have been converted to binary variables for ease of interpretation and magnitude of the estimates. They are defined if the value is above the median in the overall sample. Standard errors are clustered at the school level and reported in parentheses. The top panel of the regression also includes child gender, parental and household characteristics, and the bottom panel includes teacher and school characteristics. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table A8: Heterogeneous Treatment Effects, Grades 4 and 5, 2011 (Midline)

	(1)	(2)	(3)	(4)	(5)	(6)
	Maths	English	Science	Bengali	All	CGPA (grade 5)
Panel A: Interactions with *household characteristics*						
Treatment school*covariate						
Age of head (above median)	0.00502	0.135	0.151	0.132	0.115	0.0164
	(0.126)	(0.112)	(0.116)	(0.121)	(0.103)	(0.117)
Household size (above median)	–0.0802	–0.0586	–0.0696	0.0610	–0.00206	0.0527
	(0.153)	(0.151)	(0.160)	(0.159)	(0.135)	(0.148)
Student gender (female=1)	–0.0254	–0.0507	–0.0485	–0.0396	0.00179	–0.401***
	(0.111)	(0.116)	(0.114)	(0.112)	(0.0926)	(0.101)
Both parents primary educated	0.0273	–0.138	–0.176	–0.170	–0.119	–0.0432
	(0.105)	(0.102)	(0.105)	(0.0944)	(0.0897)	(0.129)
Income above log median	0.102	0.155	0.119	0.117	0.175	0.124
	(0.112)	(0.118)	(0.122)	(0.106)	(0.0987)	(0.117)
Panel B: Interactions with *school and teacher characteristics*						
Treatment school*covariate						
Student–teacher ratio	–0.00838	–0.00586	–0.00155	0.00732	0.00293	0.00694
	(0.00863)	(0.00930)	(0.00701)	(0.00846)	(0.00731)	(0.00715)
Years of teaching experience	–0.0124	–0.0180	–0.00830	–0.0158	–0.00872	–0.00746
	(0.0162)	(0.0151)	(0.0167)	(0.0154)	(0.0148)	(0.0127)
Number of classrooms	–0.00230	0.0192	0.0483	–0.0254	–0.0147	–0.0997
	(0.100)	(0.0873)	(0.0816)	(0.0826)	(0.0813)	(0.0606)
School is brick built	0.398	1.096**	0.535	0.373	0.689	0.446
	(0.441)	(0.463)	(0.372)	(0.408)	(0.473)	(0.296)
School has electricity	–0.352	–0.331	–0.563**	–0.360	–0.412	0.0234
	(0.309)	(0.317)	(0.268)	(0.228)	(0.287)	(0.184)
N	1586	1590	1589	1591	1591	1393
adj. R^2	0.171	0.194	0.174	0.051	0.246	0.045

Note: Age, household size, education and income have been converted to binary variables for ease of interpretation and magnitude of the estimates. They are defined if the value is above the median in the overall sample. Standard errors are clustered at the school level and reported in parentheses. The top panel of the regression also includes child gender, parental and household characteristics, and the bottom panel includes teacher and school characteristics. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table A9: Student Absences from classes in 2011 and 2012

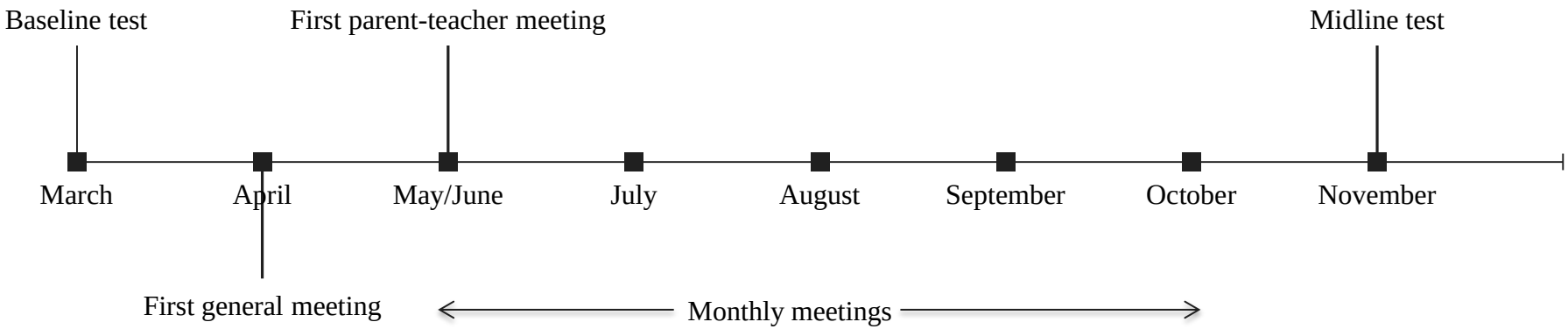
	Treat	Control	Diff (T – C)	*t*-stat
Student Absences in 2011				
June	2.12	1.66	0.46	4.61
July	1.65	1.68	–0.03	–0.39
August	0.77	1.37	–0.60	–11.63
September	0.82	1.35	–0.53	–9.30
Total number of days absent in all these months				
Male	5.65	7.40	–1.75	–4.88
Female	5.98	7.13	–1.16	–3.13
Grade 4	7.92	7.88	0.03	0.09
Grade 5	3.30	6.27	–2.97	–10.97
Student Absences in 2012				
March	1.00	1.26	–0.26	–5.87
April	1.01	1.25	–0.23	–4.97
May	0.87	1.01	–0.13	–3.82
June	1.14	1.35	–0.21	–4.40
July	1.46	1.43	0.03	0.59
August	0.63	0.60	0.03	1.10
September	1.32	1.38	–0.06	–1.59
October	1.08	1.07	0.01	0.35
November	1.16	1.12	0.03	1.00
Total number of days absent in all these months				
Male	13.48	13.02	0.46	1.34
Female	13.01	12.45	0.56	1.71
Grade 3	13.42	12.64	0.78	2.44
Grade 5	13.04	12.90	0.14	0.39

Table A10: Teacher Absences in unannounced (random) visit in 2011 and 2012

	Treat	Control	Diff (T – C)	*t*-stat
Teacher Absences in 2011 (Year 1)				
April	0.12	0.09	0.03	1.03
May	0.07	0.08	–0.01	0.43
June	0.09	0.05	0.04	1.48
August	0.11	0.20	–0.09	2.74
Absence in all visits in 2011	0.39	0.42	–0.03	0.47
Teacher Absences in 2012 (Year 2)				
Feb	0.32	0.27	0.05	1.18
March	0.32	0.34	–0.02	0.39
April	0.21	0.23	–0.02	0.54
May	0.23	0.19	0.04	0.93
June	0.17	0.18	–0.01	0.22
July	0.13	0.18	–0.04	1.30
August	0.25	0.24	0.01	0.23
Sept	0.23	0.32	–0.09	2.13
Oct	0.19	0.33	–0.14	3.31
Absence in all visits in 2012	2.31	2.56	–0.25	1.70

Figure 1: Timeline of the Project

Grades 4 and 5 in 2011



Grades 3 and 5 in 2012

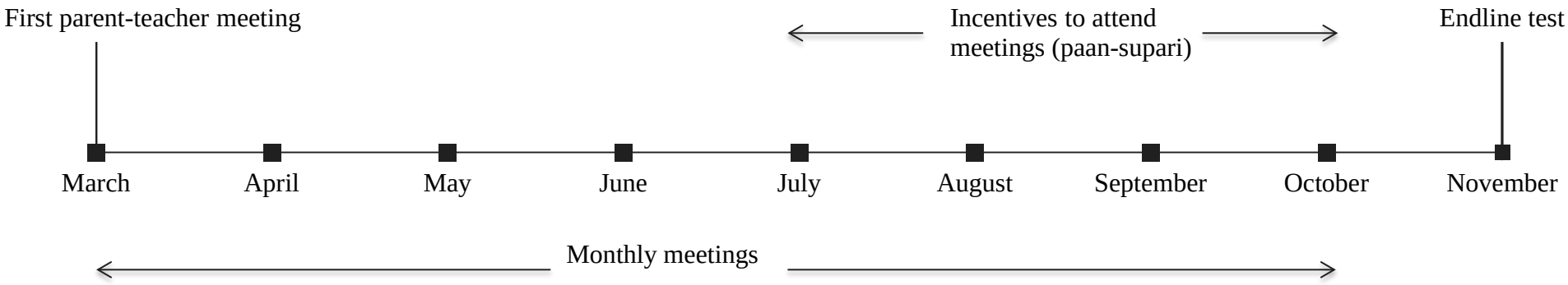


Figure 2A: Parental Precsence in Monthly Meeting in Year 1 (2011) [% of parents]

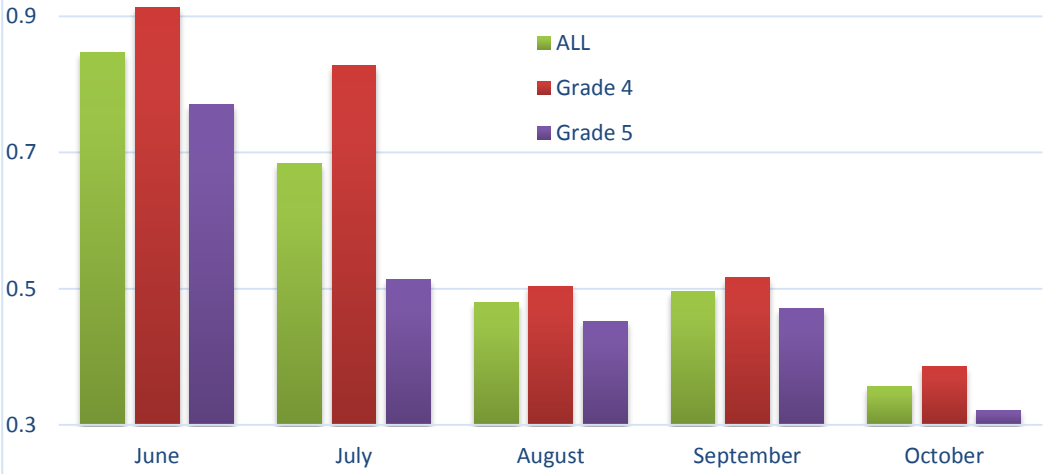


Figure 2B: Parental Presence in meeting in Year 2 (2012) [% of Parents]

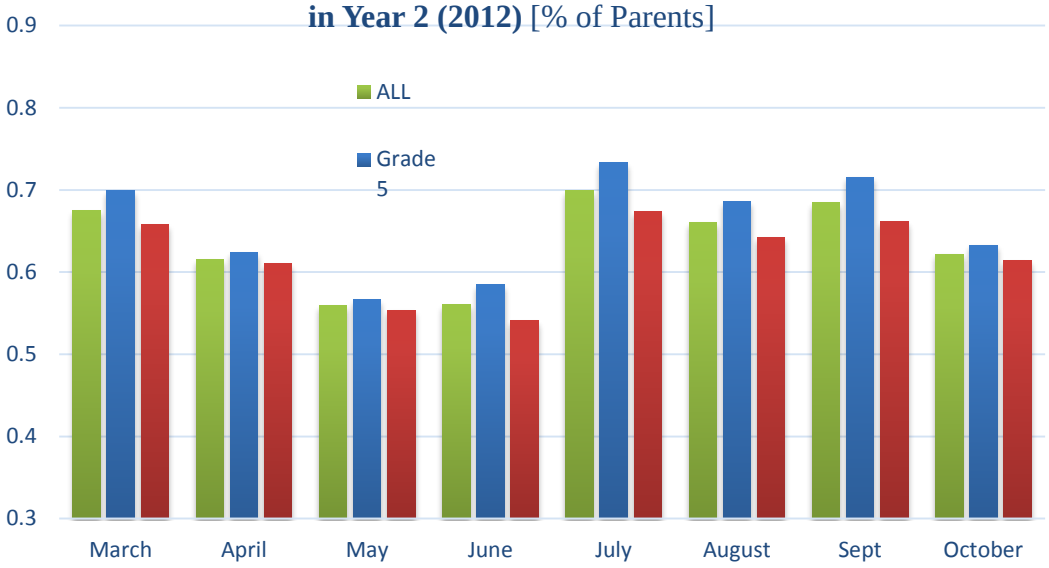


Figure 3A: Number of Meetings Attended in 2011, by Gender of the Children (in %)

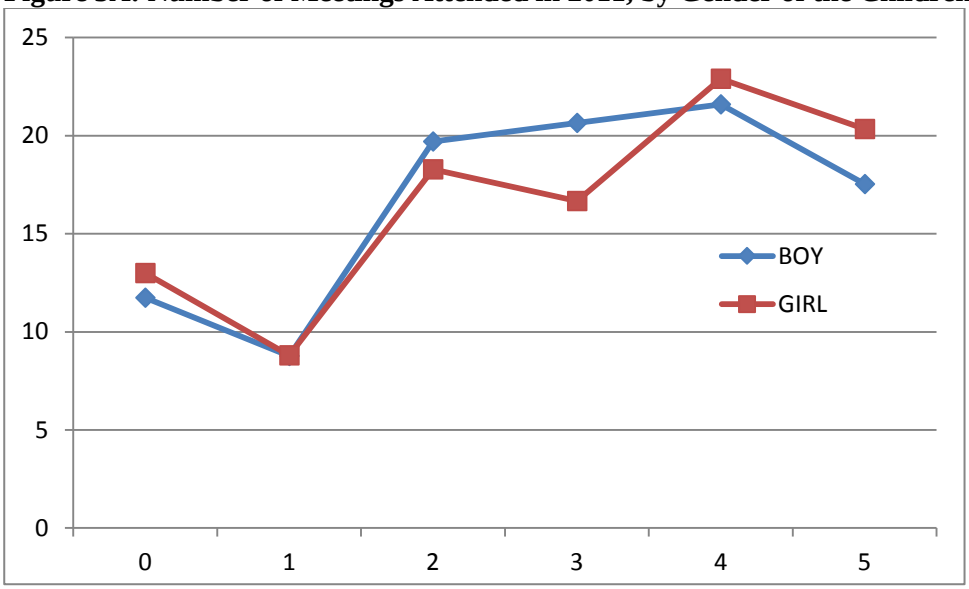


Figure 3B: Number of Meetings Attended in 2012, by Gender of the Children (in %)

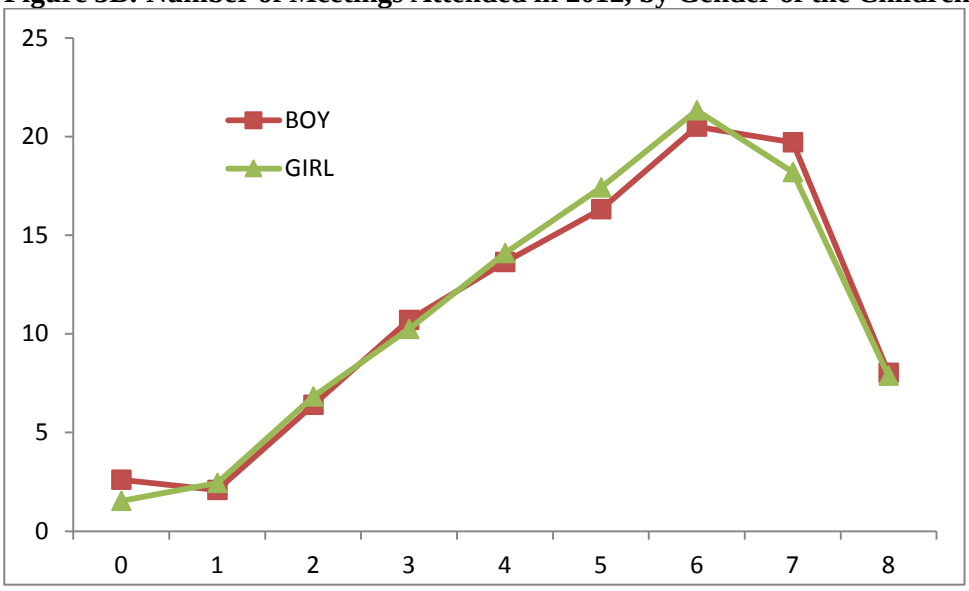


Figure 4A: Attendance at Meetings by Mothers or Fathers (others) in 2011 (in %)

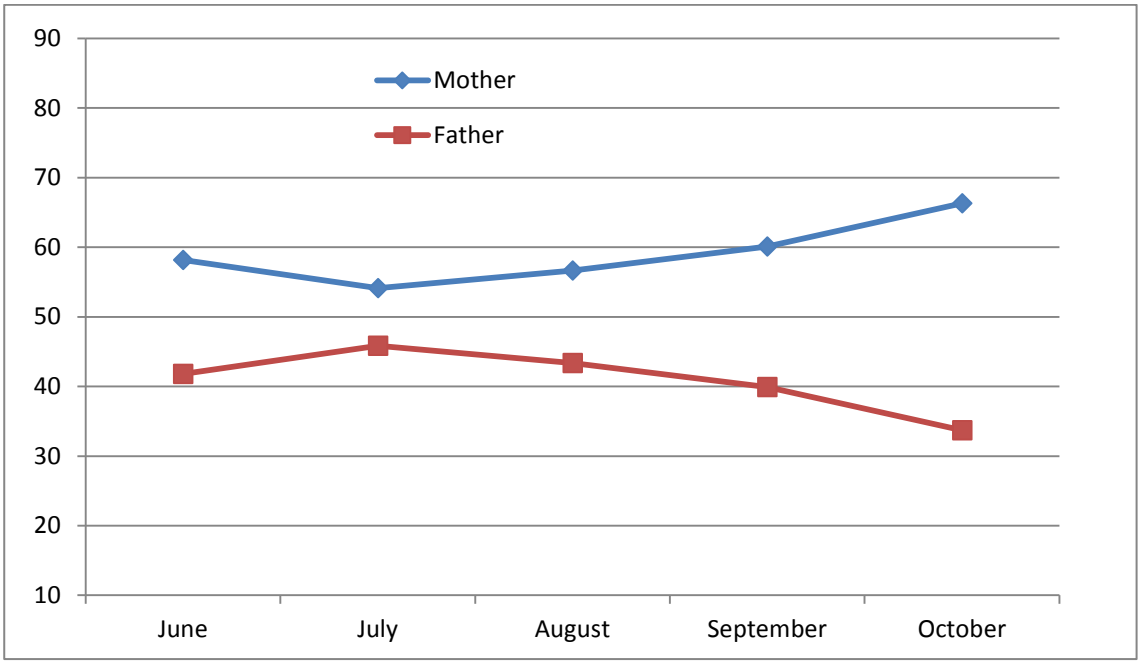
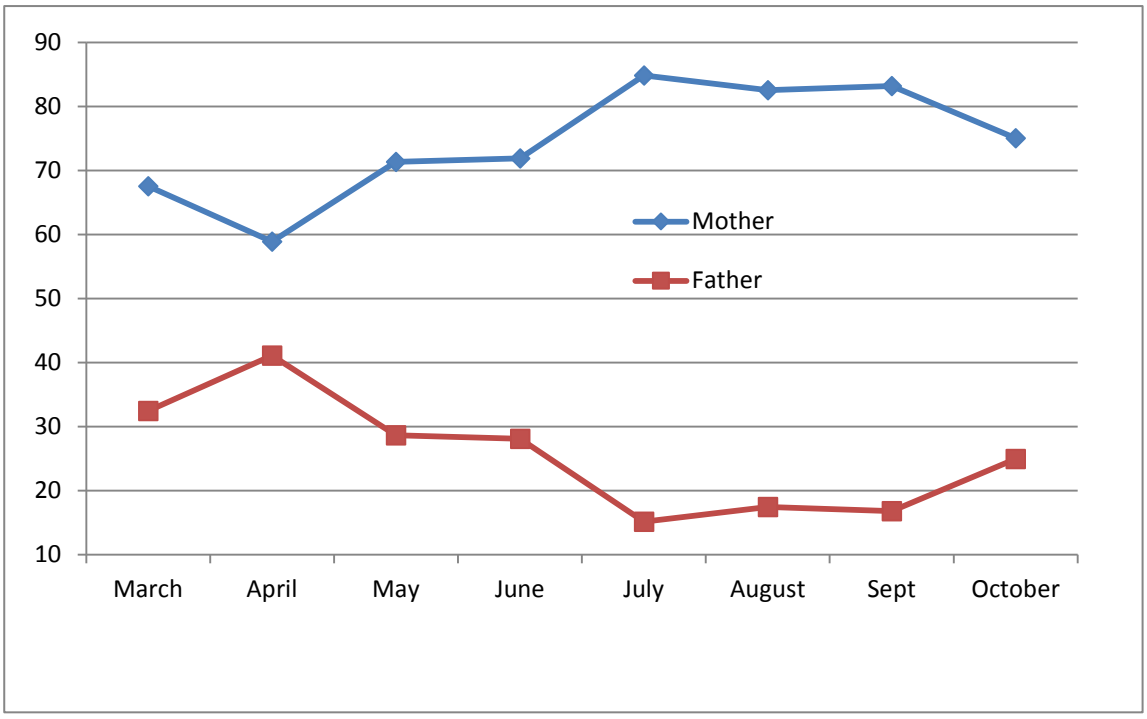
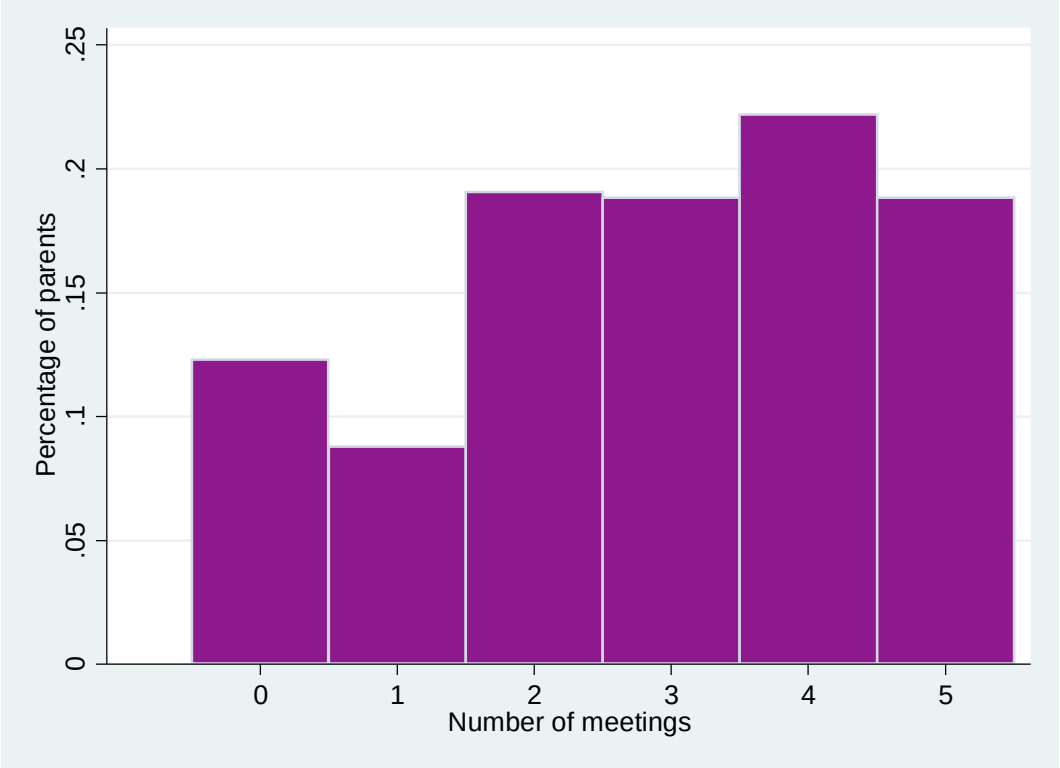


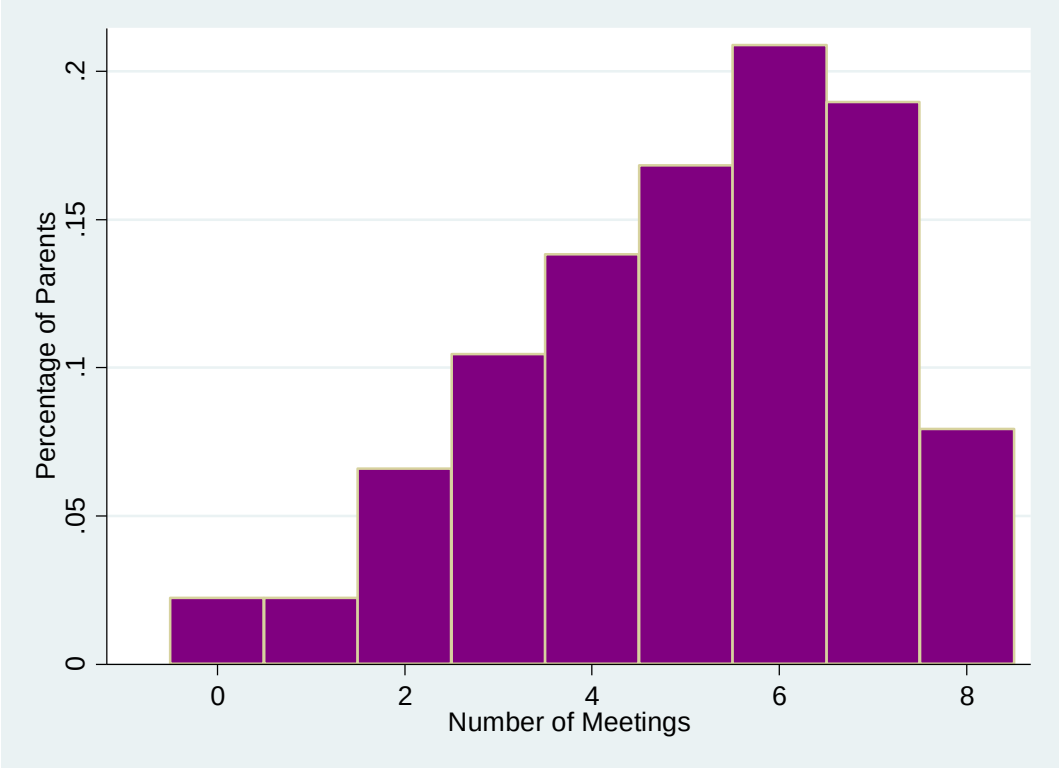
Figure 4B: Attendance at Meetings by Mothers or Fathers (others) in 2012 (in %)



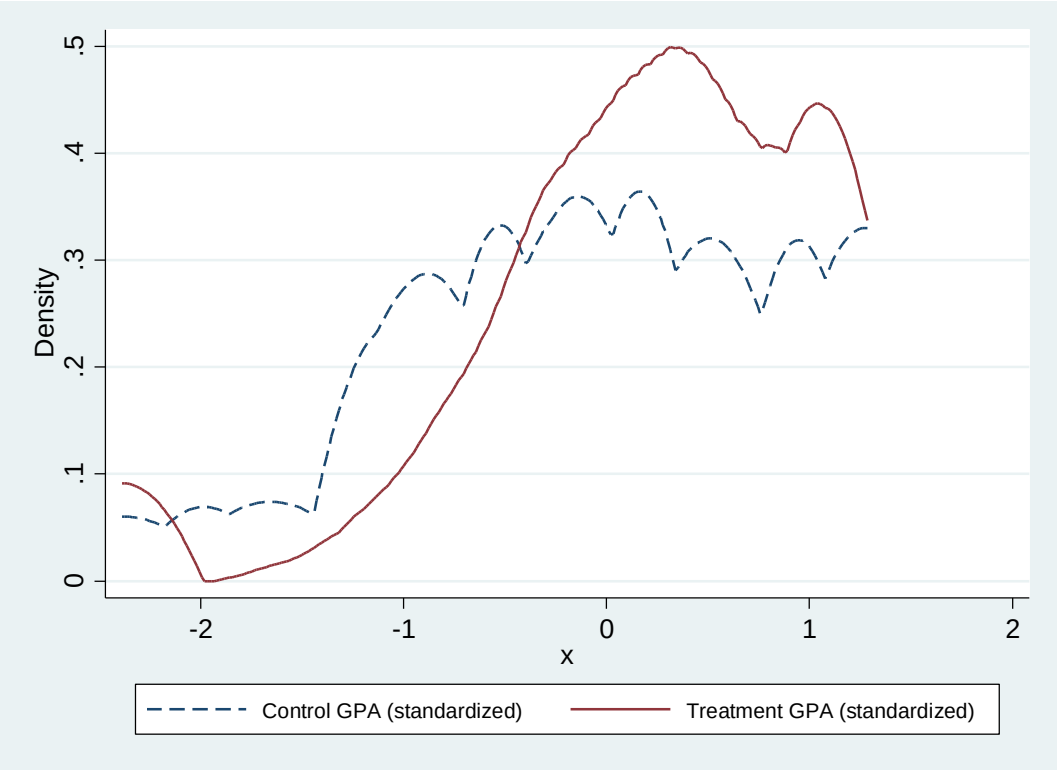
Appendix Figure A1A: Numbers of Meetings Attended by Parents in 2011



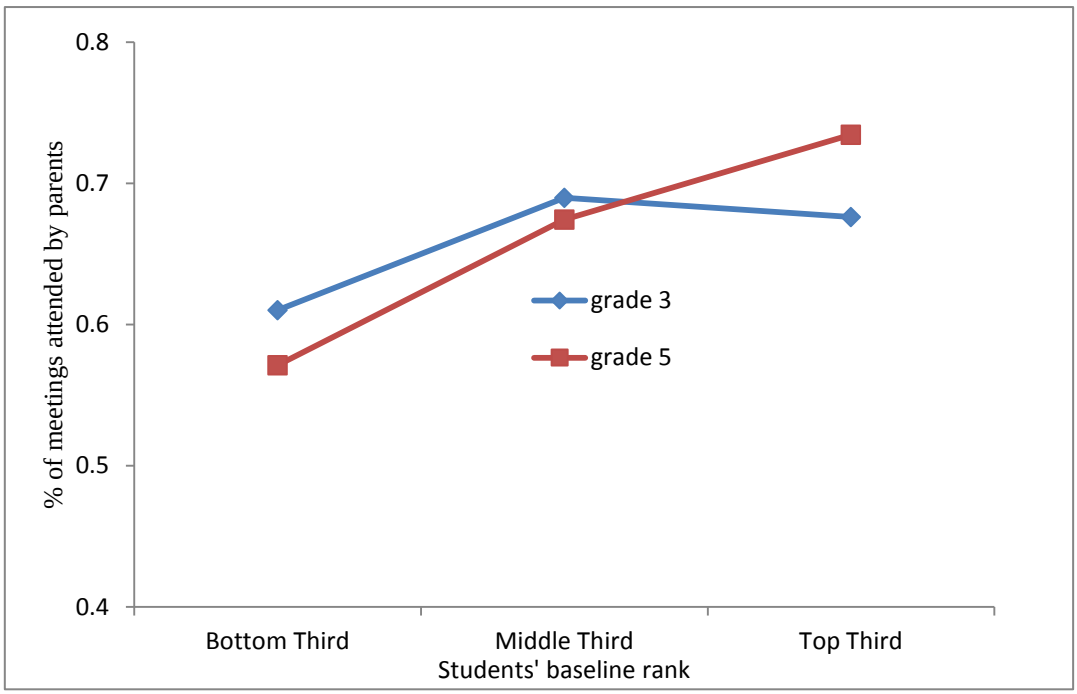
Appendix Figure A1B: Numbers of Meetings Attended by Parents in 2012



Appendix Figure A2: Distribution of Cumulative GPA Test Scores in 2011



Appendix Figure A3: Parental Presence at Meetings by the Distribution of Students' Baseline Test Scores



Note: Figure represents percentage of meetings attended by parents based on their children's baseline test score distribution.