

Improving children's foundational learning through community-school participation: Experimental evidence from rural India

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Abstract

Supporting all children to achieve a meaningful education requires not just teachers but multiple stakeholders working together to develop a shared understanding of children's learning and actions to improve them. Yet, many of these stakeholders remain excluded from collective action in education. In this context, we examine how community participation alone or in collaboration with schools can impact the foundational learning (i.e., literacy and numeracy skills) for children enrolled in government schools in rural Uttar Pradesh, India. We conducted an evaluation of an intervention aimed at improving community and school stakeholders' actions to support children's foundational skills. We randomly divided 400 villages into three groups – 100 villages where only community stakeholders supported children's learning (i.e., *PAHAL*), 200 villages where both community and school stakeholders supported children's learning (i.e., *PAHAL+*), and 100 villages were assigned as a control group. We find that both interventions significantly improved children's foundational literacy and numeracy skills as compared to the control group. Interestingly, the study reveals that the impact of *PAHAL+* is significantly greater when parents report visiting the school, highlighting the importance of parent-teacher interaction and shared responsibility for children's learning. We also discuss the mechanisms of *PAHAL* and *PAHAL+* that could be potentially driving the improvements in children's foundational learning. Our findings support the conclusion that the best way to help all learners develop strong foundations in their early years of schooling is not to leave this important task to schools alone, but rather to implement mechanisms to ensure that parents and community members also understand and support children's learning needs.

Keywords: Inclusive Education; Community-School Partnership; Social Accountability; Learning Outcomes; Primary Education; India

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1. Introduction

Many resource constrained countries face challenges in delivering high-quality public services, particularly in the field of education (World Development Report, 2004; Global Corruption Report, 2006; ASER Report, 2018, 2022). For instance, in the case of India, the focus of this study, the significant progress in achieving universal access to primary education has not been accompanied by substantial improvements in foundational literacy and numeracy skills. According to the ASER 2022 report, in rural India around 57% of fifth-grade students struggle to grasp the reading materials that are expected of a child attending primary grade 2, and 74% are unable to perform a basic division. These figures highlight considerable learning deficits for children enrolled in elementary education which will hamper their future educational and occupational outcomes.

Community participation has emerged as a potential approach for enhancing the quality of public service delivery in general (World Development Report, 2004), and its significance has been growing for improving the quality of public education (Mansuri and Rao, 2013). The theoretical foundations for such approaches lie within governance and accountability frameworks. According to Pritchett (2015), while school leaders should be accountable for improving learning for all children regardless of their background, this direct accountability is often overshadowed by the more bureaucratic processes which the school leaders have to fulfill within the public education system. As such, school leaders tend to be accountable for student enrollment, attendance, as well as the day-to-day operations, finances, and management of the school. Pritchett (2015) and Fox (2015) suggest that strong community participation and powerful oversight of educational budgets and activities could help schools to focus their attention into enhancement of student learning.

Numerous governments have attempted to engage communities into the provision of public education via decentralization initiatives, school management committees, and information campaigns, among others. Overall, results from these programs have been mixed (Patrinos et al., 2007; Banerjee et al., 2007; Banerjee and Duflo, 2008; Bruns et al., 2011; Westthorp et al., 2014). Reasons for such mixed results are varied, however, some general conclusions can be drawn. First, the information only campaigns are not enough to change the ways in which schools operate. This is because information only campaigns are unlikely to empower communities to make change. Information only campaigns do not offer resources, knowledge, skills or training which are required for communities to demand changes at school. Even when

communities may demand such change, usually their demands cannot alter power relations (Fox, 2015). Second, initiatives which require more control over the administration and strategic directions of schools, such as decentralization programs or school management committees, fail to provide clear guidance over the mandate given to these committees to manage state resources (Bardhan and Mukherjee, 2005; Banerjee et al., 2010). In addition, community groups working with schools in these kinds of programs tend to be represented by local elites (Platteau and Gaspart, 2003; Mansuri and Rao, 2013), preventing marginalized groups to voice their concerns and influence the allocation of public resources (Fox, 2015). Finally, the allocation of school resources beyond teacher salaries tends to be minimal for community led initiatives to make significant changes related to enhancing the quality of student learning (PAISA Report, 2014; Yuan and Evans, 2018).

The present study examines the impact of community participation on children's learning in government schools, implemented through a collaborative and participatory approach, which aims to overcome some of the previous challenges identified with the effectiveness of these programs. In particular, the approach focused on strengthening existing school activities which requires the support of the community, for example via parent-teacher meetings, school events showcasing learning progress at the community, or parental support with school work at home.

Methodologically, the study uses data from a randomized control trial design in which 400 villages/communities in Sitapur district, Uttar Pradesh, India, were divided into three groups: a control group consisting of 100 villages where no intervention took place. The *PAHAL* (which in English is "*Take Initiative*") intervention took place in 100 villages and focused exclusively on community involvement with children's learning led by Pratham (see Banerjee et al. (2010) for more information). The type of activities implemented involved supporting children's learning through volunteer-led classes, reading/studying groups in hamlet, discussing with households about learning levels in the children schools using village report cards, and organizing community events and rallies to celebrate learning.

The *PAHAL+* intervention took place in 200 villages. In addition to the community activities, Pratham staff focused on strengthening school activities which required the participation of parents. The type of activities involved organizing and moderating parent-teacher meetings, supporting parents to be involved in homework, and the organization of community events and rallies with the involvement of teachers. Overall, the aim of *PAHAL* was to develop a shared understanding of children's learning in the community, to facilitate the activities which require

the support of parents and teachers, and as the name of the intervention indicates, to take initiative. Ultimately, *PAHAL* conveyed the message that every individual shares the responsibility for a child's learning. By examining the effects of *PAHAL* and *PAHAL+*, we aim to understand the extent to which community participation alone or in collaboration with schools may play a role in improving foundational learning for children enrolled in government schools in rural India. In doing so, we also focus on the extent to which the interventions improve foundational learning, and whether improvement happens more for those with the lowest foundational skills. Also, whether there is a differential impact of the interventions by a child's gender and caste group, and the potential role played by parent-teacher involvement in improving children's learning.

2. Understanding the Intervention (contextual and empirical evidence)

2.1 Contextual Information

Our study was conducted in Uttar Pradesh (UP), which is considered the third-poorest state in India according to NITI Aayog (2021). In 2018, UP had a per-capita income of approximately Rs. 56,880 at current prices (equivalent to USD 811.53 per capita). The *PAHAL* intervention was implemented specifically in Sitapur district, which has an average literacy rate of around 61 percent. This rate is considerably lower than both the national average (74 percent) and the UP average (68 percent) according to the Census of India in 2011.

At the time of the intervention, in rural UP, around 95% of children aged 6 to 14 years were enrolled in schools in which 44.3% were in government schools while 50% were in private schools, as reported in the ASER 2018 report. Despite the higher enrollment in private schools, the issue of poor-quality education persists, especially in government schools where a significant number of children from disadvantaged backgrounds are enrolled. For example, in rural UP, only 36.2 percent of children enrolled in grade 5 in government schools were able to read a text meant for grade 2, compared to 68.8 percent in private schools (ASER Report, 2018). These statistics underscore the prevalent learning deficiencies in government schools and the urgent need to address the quality of education provided to children from disadvantaged backgrounds in UP.

2.2 PAHAL Interventions

Both arms of the *PAHAL* intervention were led by Pratham, the largest NGO focusing on education in India. Pratham's previous research evidence suggests that providing information only to the communities about the benefits of educating children or whether children enrolled in schools were performing at their expected academic level did not lead to action (Banerjee et al., 2010; Bano, 2022). Instead, in addition to awareness, communities must be empowered and realized that their actions could bring a positive change (Banerjee et al., 2010). For this reason, the interventions implemented by Pratham in these communities focused on concrete actions, either by the community themselves (*PAHAL*) or by the community and the schools working together (*PAHAL+*).

As part of this project, Pratham's interventions were conceptualized under education accountability frameworks (Pritchett, 2015; Hevia and Vergara-Lope, 2019). Initially, the short route to educational accountability developed by Pritchett (2015) helped to identify the community and school activities which focus on learning, as opposed to other aspects of school accountability, such as enrollment and attendance. It was acknowledged that school actors were not solely responsible for improving students' learning outcomes under a system of social accountability (Hevia and Vergara-Lope, 2019). Hence, it was important to consider parents and other community actors, and to clarify their roles and responsibilities, as this is a central aspect of a system of accountability (Fox, 2007; Hevia & Vergara-Lope, 2019).

In addition, even when the problem of poor learning outcomes may be apparent, productive community-school accountability relationships are often limited. The community-school relationships in context of India tend to be perfunctory and compliance-oriented, concentrating mainly on administrative aspects, and limiting discussions about learning processes and outcomes (Dyer et al., 2022a; Dyer et al., 2022b). Moreover, parents from disadvantaged backgrounds or those who are first-generation learners often feel incapable of effectively engaging with schools (Ramachandran, 2004; Banerjee and Duflo, 2006). There is often a significant social distance between teachers and students (Rawal and Kingdon, 2010), and when children struggle to make progress, teachers often attribute it to parental responsibility (Bhattacharjea et al., 2011; Sinha et al., 2016). In this context, the educational accountability by Hevia and Vergara-Lope (2019) indicated the importance of shared responsibility for learning, which has guided activities by Pratham to assist with the actions which parents and other community members can take to improve children's foundational learning.

Below we present the different activities implemented as part of the community and community-school interventions, and the research which guided the development of such interventions.

Community Intervention (PAHAL)

Banerjee and Duflo (2006) indicated that parents often lack the knowledge to effectively contribute to and assess their children's learning, especially for parents with limited formal education. A previous randomized evaluation conducted in Uttar Pradesh revealed that children's learning improved only in locations where community-based activities were demonstrated, and volunteers actively participated (Banerjee et al., 2010). For this reason, Pratham implemented after school classes and study groups led by volunteers from the community. Details of Pratham's activities are as follow:

1. Creating Awareness

As with previous interventions led by Pratham, *PAHAL* started with an assessment of the learning levels of children in the village/hamlet to create a "Village Report Card" (VRC)¹ or a "Jhat Pat Mohalla Report" (literally translates to *Quick Community Report*). The assessment tools utilized are simple to administer (see figures A1 and A2 in the appendix²). The process of assessing children helped to establish a rapport with the community. As pointed out by Banerjee et al. (2010), since many parents are unaware of what is meant to be taught in schools, the VRC enabled a better understanding on whether children were able to perform foundational reading and numeracy tasks and if these foundational skills would be expected for children attending different grades in school. The overall aim of the village assessment is to raise awareness and start the process of community mobilization.

2. Volunteer-Led Classes

While raising awareness is important, evidence suggests that providing information alone is insufficient to support children's learning (Kremer and Holla, 2009; Banerjee et al., 2010; Fox, 2015). Therefore, active participation from different stakeholders is central (Hevia and Vergara-Lope, 2019). To recruit volunteers, Pratham organized demonstrations to showcase

¹ Refer this PDF link for further details:

<https://img.asercentre.org/docs/Key%20Documents%20Page/diyasereng.pdf>

² Refer figure B1 and B2 in the appendix for English version of the ASER assessments.

how simple activities, including play-based learning, could significantly improve children's learning outcomes. Community members who attended these demonstrations and expressed interest in volunteering were trained and provided with learning materials. Although volunteers are not financially compensated, Pratham staff made regular visits to offer guidance and mentorship.

Following the initial assessment, children in school grades 2-5 were divided into two categories based on their reading skills: readers, who were able to read a simple text aimed at children in primary grade 1, and non-readers, who were unable to read such text. Non-readers participated in volunteer-led classes, which were approximately one hour long and held around six days a week. Classes consisted of about 15 students, and taught basic reading and math skills using the Teaching at the Right Level (TaRL) approach, a method developed by Pratham and widely implemented throughout India (Banerjee et al., 2010, 2016). In addition to serving as instructional sessions, these volunteer-led classes also fostered community engagement.

3. Children's Study/Reading Groups

Among children who could read, volunteers created community-based study groups³ which consisted of children who lived close to each other. Children are encouraged to meet daily and are guided by volunteers with activities which these children could do on their own in groups. Children are encouraged to learn from each other, and to instill a habit of studying beyond school hours. Learning materials were distributed periodically by Pratham, and children were encouraged to bring their own books to the groups to encourage a culture of sharing resources.

Volunteers encouraged the participation of parents and other siblings in children's study groups. For example, mothers were asked to assist the groups by providing a meeting space and ensuring that nearby children gathered when needed. Additionally, older siblings were encouraged to supervise the groups and offer support if necessary.

³ According to Banerji (2020), 'Just like groups who play together in their neighbourhoods, for a certain time in the day after school, groups also learn together. The idea is that children can help each other and that projects can be done together. Depending on the projects or tasks, others in the neighbourhood (like older siblings, parents, grandparents, or neighbours) help these groups.'

4. Community Events

While we did not have empirical evidence for the importance of community events in raising learning outcomes, Pratham's experience was central in organizing various community events with the intention to mobilize support, celebrate progress, and create an environment conducive to learning. Volunteers organized "Fun Days," where both children and their mothers participated in activities aimed at supporting caregivers with tasks they could do at home to support their children with reading and counting. In addition, volunteers organized education rallies to encourage the enrollment of children in schools. Finally, an event called "*Halla Bol*" (Make some noise), was organized to celebrate the contribution of the community in fostering children's learning. Through these visible actions in the village, *PAHAL* aimed at raising awareness and demonstrating actions which can contribute to improving children's learning in these communities.

Community-School Intervention (PAHAL+)

The community and school interventions replicated all the activities described above for the community intervention. In addition, it aimed to address the top-down nature of how the government education system works, which makes it difficult for the community to collaborate with schools. Taking this constraint into account, Pratham focused on supporting school activities which require the participation of parents, for example in organising and moderating a parent-teacher meeting. The specific activities under *PAHAL+* are described below:

1. Alignment of Teaching Practices

Previous studies, such as Djaker et al. (2022) and Wadmare et al. (2022), have highlighted a substantial discrepancy between teacher's perceptions of student's abilities, particularly whether students in rural areas have mastered foundational literacy and numeracy. Since Pratham teams introduced volunteer-led classes using TaRL methodology, in the school-community arm of the intervention, Pratham distributed TaRL materials and discussed with teachers the importance of this pedagogical approach. Pratham specifically provided simple teaching-learning materials designed for the TaRL approach. During discussions with teachers, Pratham focused on addressing the misalignment between curricular expectations and children's foundational skills. Teachers were encouraged to assess students regularly and to adjust their pedagogical practice to suit the diversity of learners in their classrooms.

2. Parent-Teacher Engagement

Pratham also established avenues for effective parent-teacher engagement, such as organizing and mediating parent-teacher meetings. Research suggests that these meetings could improve accountability, transparency, and the overall quality of school services (Kremer et al., 2013; Mbiti, 2016). A recent experimental study conducted by Islam (2019) in rural schools in Bangladesh found that the implementation of regular meetings between parents and teachers resulted in improved student test scores and encouraged parents to devote more time to monitor and assist their children with their schoolwork. In this context, Pratham facilitated parent-teacher meetings with the aim of fostering meaningful interactions. Parents and teachers were encouraged to discuss children's learning and for each to provide suggestions for supporting children with improving foundational skills. Teachers were encouraged to actively engage in community events, mentor volunteers, and participate in activities that aimed to bridge the gap between the school and the community. Parents were encouraged to send their children regularly to school and to check that homework was done.

3. Community-School Events

Teachers were encouraged to participate in community events which were supported as part of PAHAL. Events such as the "*Halla Bol*" (to make noise) recognized the contribution of teachers in supporting learning and showcase the work which students have been doing in schools. Under *PAHAL+* initiative, both community members and teachers were encouraged to organize the events. In doing so, they sought to create a sense of collaboration among all stakeholders, understanding that the active participation of teachers, parents, and the community at large is crucial for enhancing children's learning outcomes (Hevia and Vergara-Lope, 2019).

Challenges/Interruption during Intervention

There are two key aspects regarding the implementation of the intervention that are important to note. First, prior to the interventions, all government schools in UP received training on the Teaching at the Right Level (TaRL). The government trained two teachers from each school, who then trained all teachers in their respective schools. While this training may introduce some overlap with the activities conducted in PAHAL and *PAHAL+*, it is unlikely to bias our findings. If anything, we expect that this training could have attenuated any observed differences in learning outcomes between the treatment interventions and the control group.

Second, the implementation of the planned intervention activities, particularly school-based activities, faced various external disruptions during the project period. These disruptions included government elections that required teachers to take on additional duties, a teacher strike, extended vacation periods due to extreme weather conditions, and prolonged school closures caused by the COVID-19 pandemic. While these disruptions may have affected the intensity of the interventions, it is unlikely that they bias our findings. However, they may have attenuated the estimated effects in *PAHAL+* areas. Originally, we had planned to conduct an endline survey two years after the implementation of *PAHAL* and *PAHAL+* to assess the long-term effects. However, due to the outbreak of the COVID-19 pandemic in March 2020, this plan was interrupted. As a result, this paper focuses exclusively on the evaluation of the short-term impact of the interventions using the data collected between October 2018 and March 2020.

3. Study Design and Data

3.1 Sampling, Data Collection and Randomization

The sample villages were randomly assigned to three groups: 100 villages received a community-level intervention (*PAHAL*), 200 villages received a community-school level intervention (*PAHAL+*), and the remaining 100 villages were assigned to a control group. The study included all the government primary schools in each sampled village, resulting in a total sample of approximately 848 schools. From each of these schools, we selected 30 children for the baseline survey, with 10 students each from grades 2, 3, and 4, using a targeted approach. To do this, we randomly selected 20 children from the school's enrollment register for each of the target grades and administered the ASER test to each child (more information about this test is provided below). The first 10 students from each grade who were unable to read a story were included in the study sample, specifically targeting lower-achieving students.

The baseline survey took place between October 2018 and January 2019. During this period, we collected information on each sampled student and their household. We also gathered data on households' perceptions and attitudes regarding their children's learning levels and their views on teachers and schools. Additionally, we collected data from the teachers teaching in the sample schools, including their characteristics, perceptions of student learning, and the role of parents.

The first follow-up (midline) survey was conducted from December 2019 to March 2020, approximately one year after the baseline survey. We were able to track 92 percent of the baseline children during the midline survey, with no differential attrition observed between the control and T1 groups. However, the *PAHAL+* group had a slightly higher attrition rate (3.9%) compared to the control group (refer to Table A1). Therefore, we calculate our impact estimates by including Inverse Probability Weights (IPW) in all the regression analyses to account for sample attrition at the midline. Nevertheless, we found no evidence of selective attrition bias in the tracked study sample, as indicated by balanced characteristics such as baseline literacy and numeracy skills, as well as child and household characteristics (refer to Table A2).

3.2 Measuring Foundational Learning

We utilized the ASER test, developed by Pratham, to assess children's foundational literacy and numeracy skills (see figure A1 and A2 in the appendix to refer to the ASER tool). The reading assessment categorizes each student into one of five levels based on their reading proficiency: beginner (unable to read simple alphabets), letter level (able to read alphabets/letters), word level (able to read commonly used two-syllable words), paragraph level (able to read a four-line text consisting of words typically found in grade 1 textbooks in India), and story level (able to read a story consisting of words typically found in grade 2 textbooks in India). The reading score ranges from zero to four, with each level assigned a score in increments of one point, starting with zero points for being at the beginner level. Numeracy skills are measured using the ASER numeracy testing tool, which also consists of five levels: beginner (unable to recognize even single-digit numbers), one-digit number recognition level (able to recognize single-digit numbers), two-digit number recognition level (able to recognize two-digit numbers), subtraction level (able to perform subtraction involving two-digit numbers), and division level (able to perform division involving three-digit numbers). Both literacy and numeracy skills are ordinal in nature, with a higher level indicating a higher level of foundational literacy and numeracy skills for a child. In this study, we analyse changes both on the intensive margin, which refers to changes in the absolute score, and on the extensive margin, which refers to the probability of achieving a high score on the assessments.

3.3 Summary Statistics and Balance of Covariates at Baseline

Table 1 presents the summary statistics for our study sample and provides a comparison between the control and intervention groups. The sample consists of roughly equal numbers of boys and girls, and on average, the children have completed three years of schooling at the baseline. The majority (90 percent) of the sample belongs to disadvantaged caste groups, including OBC/SC/ST⁴. Nearly 60 percent of mothers and 37 percent of fathers of the sampled students are illiterate or have less than five years of education, indicating low levels of education within the sample. Moreover, more than one-third of the sample students are first-generation learners. Most households have non-concrete (kaccha) houses, and only about a third have access to a toilet and electricity connection, highlighting a low socioeconomic status among many families.

A significant proportion of the sample children did not meet the curriculum expectations for their respective grade levels. Among the children below the story level, approximately 8% were able to read a paragraph, and only 3 percent could perform two-digit subtraction. The survey also collected information from parents and teachers regarding their perceptions of the children's learning levels. However, there is a significant disparity between their perceptions and the actual abilities of the children. Both teachers and parents tend to overestimate the children's learning levels significantly. For example, around 40 percent of the interviewed teachers incorrectly identified specific children as fluent readers at the grade 2 level, despite a large proportion of them struggling to read beyond individual letters, and none of them being able to read at a grade 2 level (Wadmare et al., 2022).

The t-test of mean differences in Table 1 demonstrates that the control and treatment groups are balanced. None of the 25 covariates tested show significant differences (at the five percent level) between the *PAHAL* and *PAHAL+* and control groups. This balance across various characteristics enhances the credibility of the randomization process. These findings indicate that any differences in outcomes observed at the midline could be attributed to the interventions rather than differences in these observed characteristics.

⁴The caste/social group variable contains four different categories as defined according to the Indian, “legal”, caste system. The National Sample Survey Office (NSSO) collects and provides information along similar lines by dividing it into four categories) which are as follows: *Scheduled Castes (SCs)*, *Scheduled Tribes (STs)*, *Other Backward Classes (OBCs)*, and *other castes*.

4. Participation in PAHAL and PAHAL+ Activities

Table 2 provides information on the participation of different stakeholders (households, teachers, and head teachers) in the various *PAHAL* and *PAHAL+* activities. We would expect most households to be aware of the different community-based learning activities conducted in their village. In *PAHAL+*, we would anticipate higher participation of teachers and head teachers in the activities organized in these communities relative to those where *PAHAL* took place.

Table 2, Panel A, presents self-reported knowledge or participation of households regarding various aspects of the interventions. During the intervention period, approximately one-third of households in *PAHAL* reported observing volunteers conducting free classes/lessons, and about a quarter reported observing play-based activities in their village or hamlet. Interestingly, the proportion of households reporting such observations is statistically significantly higher (4-5 percentage points) in the *PAHAL+* communities. In terms of studying in groups, 40 percent and 46 percent of households reported witnessing their children studying in groups in *PAHAL* and *PAHAL+* respectively (a statistically significant difference of 6 percentage points). Furthermore, 42 percent and 53 percent of households reported receiving learning materials from the volunteers in *PAHAL* and *PAHAL+* respectively (a statistically significant higher proportion of 11 percentage points). Overall, we find that approximately 71 percent and 76 percent of participants have either witnessed or have knowledge of at least one of these community-based intervention activities in *PAHAL* and *PAHAL+* respectively. These findings indicate that the community-level interventions were implemented with high fidelity.

Table 2, Panels B and C provide the teacher's and head teacher's self-reported measure of participation in (or knowledge of) various intervention activities. In *PAHAL+*, more than half of the teachers (55%) and around one-third of head teachers reported that a Pratham representative visited the school in last six months. Among these school actors, around 60 percent of teachers reported Pratham representative doing activities with children, 53 percent of teachers reported that the Pratham representative demonstrated teaching-learning activities. In terms of head teachers, 58 and 65 percent reported Pratham representative doing activities with children and demonstrated teaching-learning activities, respectively. In total, around one-third (35%) of all teachers in *PAHAL+* reported doing any of the above activities with the children. This level of participation indicates a medium implementation fidelity in schools, potentially due to the disruptions indicated above.

Table 2, Panels B and C also show that teachers and head teachers in *PAHAL+* reported significantly higher participation in community-based activities in the village. In *PAHAL*, about a quarter of teachers, and 22% of head teachers, reported observing activities related to children's learning organized in the village. These proportions were 16 and 21 percentage points higher in *PAHAL+*. Among these, approximately 65 percent of teachers and 77 percent of head teachers in *PAHAL* helped in organizing these events/activities about learning. The participation in *PAHAL+* was 70 percent for teachers and 75 percent for head teachers. Overall, more than three-quarters of the teachers, and 71 percent of head teachers, have seen or have knowledge of any of the community-based activities happening in *PAHAL* villages, while this proportion is 6 percentage points higher for teachers and 16 percentage points higher for head teachers in *PAHAL+*. The higher participation of school actors in *PAHAL+* was expected as the intervention focused on increasing avenues for community-school engagement.

Overall, results on participation demonstrate a relatively high level of knowledge about the intervention activities across stakeholders, particularly among parents. As expected, participation in community-based activities was higher in *PAHAL+* relative to *PAHAL*, as by design there were additional activities to engage parents and schools. This information provides the background on the participation of different stakeholders which we can use in the empirical models to capture the extent to which parent and teacher engagement resulted in differential impacts on children's learning outcomes.

5. Empirical Strategy

We estimate the impact of being part of our *PAHAL* or *PAHAL+* using the following equation which is estimated by ordinary least squares regression:

$$Y_{isj} = \beta_0 + \beta_1 * T1_j + \beta_2 * T2_j + \delta * Y^0_{isj} + \alpha * Z + \varepsilon_{isj} \quad (1)$$

where Y_{isj} is the outcome of interest at the follow-up (or midline) survey for child i in village j . $T1_j$ (*PAHAL*) and $T2_j$ (*PAHAL+*) indicate the treatment status of the village. The parameters of interest are β_1 and β_2 – they provide the impact on the outcome of interest (test scores) of being in *PAHAL* or *PAHAL+*, relative to the control group. Y^0_{isj} is the outcome of interest from the baseline survey. The random assignment of the intervention ensures that our estimates are unbiased and consistent. Z is a set of control variables for the child and household level baseline characteristics as mentioned in Panel B of Table 1. In this specification, we cluster the standard

errors at the village level to reflect the fact that the intervention took place at the level of the village.

6. Findings

Results are shown in five sections. First, we demonstrate the impact of the interventions on children's foundational literacy and numeracy skills. Second, we analyse the heterogeneity of the impact based on children's learning ability prior to the interventions. Third, we analyse the heterogeneous impact of the interventions based on the child's gender and caste. Fourth, we examine the differential impact of the interventions based on parental involvement at school (i.e., visited to school). Finally, we discuss the possible mechanism which may explain the impact of the interventions.

6.1 Impact on Children's Foundational Literacy and Numeracy

Table 3, Panels A and B, show the impact of *PAHAL* and *PAHAL+* on children's foundational literacy and numeracy skills, six months after the implementation of the intervention activities. Results reveal that both interventions resulted in significant improvements in children's foundational literacy and numeracy skills compared to the control group ($p\text{-value} < 0.01$). In *PAHAL*, children improved literacy skills by 0.07 standard deviations (S.D.) and numeracy skills by 0.08 S.D. as compared to the control group (see Columns 1 and 5 of Panels A and B). In *PAHAL+*, children also improved foundational literacy (by 0.09 S.D.) and numeracy skills (by 0.09 S.D.) compared to the control group (see Columns 1 and 5 of Panels A and B). All these effects are statistically significant at the one percent level.

We note that the impact on test scores is marginally higher in *PAHAL+* than in *PAHAL*, indicating the potential for school and community collaboration. However, the difference in the estimated impact is not statistically significant. It is possible that the intervention period was too short and larger differences might emerge had the intervention continued for two years (as initially planned). It is also possible that indeed larger differences were not achieved as the school intervention was severely disrupted by events such as elections, teacher strikes and climate shocks. In addition, the study was designed to detect small treatment effects, but not adequately powered to detect such slight differences between *PAHAL* and *PAHAL+*. The potential differences between *PAHAL* and *PAHAL+* are further explored in the next subsections.

The ASER test captures varying levels of foundational skills: beginner, basic, intermediate, and advanced levels. Using this information, we generated categorical variables indicating whether a child was able to complete the foundational tasks at different levels of difficulty. For example, using literacy, we generated separate categories for children who were able to recognize letters (basic), those who were able to recognize words (intermediate), and those who were able to read at least a paragraph (advanced) level. Similar differentiation was done for numeracy skills, where children were classified according to their ability to recognize one-digit numbers (basic), two-digit numbers (intermediate) or perform a subtraction (advance).

Table 3 shows consistent evidence that both *PAHAL* and *PAHAL+* significantly improved literacy and numeracy skills at basic and intermediate levels (Columns 2 and 3 in Panel A, and Columns 6 and 7 in Panel B). In addition, both interventions significantly improved the probability of completing advanced level literacy skills, but we find improvements at the advanced level of foundational numeracy skills only in *PAHAL+*. For instance, compared to the control group, the probability of reading at the advanced 'Paragraph' level increased by around 3 percentage points in both *PAHAL* and *PAHAL+*, but the probability of performing subtraction only increased by 2 percentage points in *PAHAL+*. These improvements constitute a large effect, representing around 10-11 percent for literacy (in *PAHAL* and *PAHAL+*) and 12 percent for numeracy (in *PAHAL+*) relative to the control group. We conclude that both interventions seem to be effective at improving foundational skills, particularly for those with the lowest foundational.

6.2 Heterogeneity by children's prior foundational skills

We conducted a disaggregated analysis of the intervention's impact based on children's learning levels measured prior to the intervention also using the ASER tool. Our aim was to determine if the interventions had differential effects or gains on improving children's literacy and numeracy skills based on their initial foundational skills. To do this, we incorporated interaction terms between the treatment and prior foundational skill variables in our regression equation (1). For example, we examined the probability of being able to recognize letters (or recognize one-digit numbers) after the intervention for those who were unable to recognize letters (or unable to recognize one-digit numbers) prior to the intervention. We then examined the probability to be able to read words (or to recognize two-digit numbers) after the intervention for those who were at most able to read letters (or at most able to recognize one-digit numbers) prior to the intervention. Finally, we examined the probability of being able to

read a paragraph (or do two-digit subtraction) after the intervention for those who were at most able to read words (or at most able to recognize two-digit numbers) prior to the intervention. This approach allowed us to determine whether the interventions had a greater impact on children with the greatest needs in terms of acquisition of foundational literacy and numeracy. This empirical approach is important as the intervention took place in a short period of time, and it is expected to have differential impacts depending on the foundational skills already acquired (or not) prior to the intervention.

Table 4 presents the differential impact of the intervention on children's literacy and numeracy skills, respectively, based on their foundational skills prior to the intervention. Results reveal significant heterogeneity in the impact based on children's initial foundational skills. We found the greatest gains in achieving basic level literacy and numeracy skills among children who were at the beginner level (no foundational skills) prior to the intervention in both *PAHAL* and *PAHAL+*. For example, children at the beginner level were 5 percentage points (p.p.) and 6 p.p. more likely to be able to read letters in *PAHAL* and *PAHAL+*, respectively, as compared to the control group, and around 7 p.p. more likely to recognize one-digit numbers in both *PAHAL* and *PAHAL+* (see Columns 1 and 4 of Table 4). We did not find evidence that the intervention supported higher level of foundational skills relative to the control group for either literacy or numeracy.

Overall, results suggest that both interventions seemed to achieve the greatest impact in improving foundational skills for those with the no prior foundational skills. There is limited evidence that the school-community intervention provided additional benefits to the community only intervention. The interventions might have led to larger differences if they had been implemented for an extended period and could have enabled more time for children to acquire higher levels of foundational skills.

6.3 Heterogeneous impact by gender and caste

While our intervention program is not specifically designed to differentially impact children's learning based on gender and caste groups, it is important to acknowledge the pervasive presence of gender and caste discrimination in Indian society, which can significantly affect the lives of those belonging to disadvantaged groups (Mrudula et al., 2013). Children from historically disadvantaged groups such as SCs/STs often face discrimination in various social and educational settings (Prakash et al., 2017; Shah, 2020). Existing evidence indicates that children from SC/ST households have significantly lower reading and math levels compared to their upper-caste counterparts (Desai et al., 2010; Das, 2019; Kumar et al., 2022). Moreover, girls in India tend to have lower results in mathematics compared to boys (White et al., 2016; Das and Singhal, 2023; Reardon et al., 2019; Kumar et al., 2021). This disparity is recognized in India's National Education Policy 2020, which highlights the issue of low foundational skills among socio-economically disadvantaged groups such as SCs/STs, and female children. Given these factors, it is relevant to explore whether our interventions had a differential impact on these groups.

Tables 5 and 6 present the analysis of the intervention's impact on children's literacy and numeracy skills, focusing on their gender and caste, respectively. We incorporated interaction terms between treatment groups and gender/caste groups in equation (1). We did not find any significant differential impact of the interventions based on a child's gender, except for a marginal improvement in letter level literacy skills for female children in the *PAHAL* group (Column 2 in Table 5). Similarly, we did not observe any significant differential impact of the interventions based on children's caste group, except for a marginal improvement in basic (letter level) literacy skills for OBC children and basic (NR 1-Digit level) numeracy skills for SC/ST children also in the *PAHAL* group (Column 2 and 6 in Table 6).

Overall, results suggest that the community and community-school level interventions did not have differential effects on children studying in government schools based on their gender and caste group. It is worth noting that our study sample at baseline consisted only of children enrolled in government schools who were unable to read a story based on primary grade 2. This means that our sample may have an underrepresentation of children from the upper caste and hence results have to be interpreted with care.

6.4 Heterogeneity by Parental Involvement at School

PAHAL+ focused on enhancing effective interaction between parents and teachers regarding children's education and learning. It is possible that *PAHAL+* could have benefitted children more whose parents visited the school or engaged with teachers. We explore here the differential impacts of the interventions on children's learning based on parental interaction with teachers, captured through parental/household visits to the school during the time of the intervention.

Table 7 presents results on the differential impact of the interventions on children's literacy and numeracy skills based on parental visits to the school obtained from estimating equation (1) with the inclusion of an interaction term between treatment groups and parental visits to the school. Results show that *PAHAL+* had a significantly higher impact on both literacy and numeracy skills for children whose parents were involved through visiting the school, compared to those children whose parents were not involved. While the point estimate for children in the *PAHAL* villages shows to be positive, it is not statistically significant compared to children in control areas (Column 1 and 5 in Table 7). The estimated impact for children in *PAHAL+* whose parents visited the school is equivalent to 0.07 standard deviations on literacy and numeracy skills relative to parents who did not visit the school.

These results are also represented in Figure 1. The gap in literacy and numeracy scores between children whose parents visited the schools and those who did not is the highest for those in the *PAHAL+* group. Furthermore, we found evidence for the potential impact of *PAHAL+* on improving advanced literacy skills (4 percentage points) and advanced numeracy skills (2 percentage points) skills based on parental involvement at school (Columns 4 and 8 in Table 7). In the next sub-section, we discuss the potential mechanism of parental involvement at school in the additional improvement of children's learning through *PAHAL* and *PAHAL+*.

6.4 Mechanisms

To probe the mechanisms that might be driving the improvements in children's foundational learning we investigate the impact of the treatments on intermediate outcomes, which could subsequently have an effect on learning outcomes. The estimations were done separately for activities related to parent-teacher engagement and those directed at children. These results are presented in Table 8.

Parent-Teacher engagement: We conducted an analysis to examine whether parent-teacher engagement changed as a result of the interventions, particularly considering that it was a crucial component of *PAHAL+*. We observed an increase in the interaction between parents and teachers. Specifically, we found that parents in *PAHAL+* were more likely to report being invited to the school by the teachers, whereas this was not the case in *PAHAL*. The difference between the *PAHAL* and *PAHAL+* was statistically significant, with a 7.3 percentage point gap. This finding aligns with our expectations, as the *PAHAL+* specifically emphasized cooperation and interaction between the community and the school. Interestingly, despite the invitations from teachers, there was no significant increase in the number of parental visits to the school in either group. This suggests that the overall quantity of parental interaction with the school remained relatively unchanged. Nonetheless, when parents did visit the school, they were significantly more likely to engage in discussions with teachers about their children's learning (a difference of 5.6 percentage points in those who were in *PAHAL+*). This could have meant that the quality of the interactions between parents and teachers increased as a result of the intervention. We did not find any significant effects of the interventions on parental perceptions of teachers and teachers' job performance. This lack of effect is likely because the intervention program was implemented for a relatively short period of time (six months), and changing perceptions and attitudes may require a longer time.

Activities related to children's learning: In this analysis, we focus on intermediate outcomes such as school attendance and studying in groups, as these factors have been found to have a positive association with students' learning outcomes (White et al., 2016; Das, 2019; Kumar et al., 2021). We find a significant positive effect on the likelihood of children attending schools and studying in groups with other children in *PAHAL+*, compared to the control and *PAHAL* groups (refer to rows 6 and 7 in Table 8). For example, the probability of a child being present in school on the day of a random check by the research team is significantly higher by 4.1

percentage points in the *PAHAL+* group, while there are no significant differences between the *PAHAL+* group and the control group.

We also examine the differences between the *PAHAL* and *PAHAL+* groups and find that attendance is 6.7 percentage points higher in the *PAHAL+* group compared to *PAHAL*. Additionally, the probability of a child studying in groups (or attending reading groups) has significantly increased by 12.9 percentage points and 18.3 percentage points in the *PAHAL* and *PAHAL+* groups, respectively, compared to the control group. In addition, children in *PAHAL+* group show a 5.5 percentage point higher improvement compared to those in *PAHAL*.

The results follow a similar pattern when examining other outcomes in this category, such as children studying (or not studying) at home and seeking private tuition. Notably, the effect on private tuition is noteworthy as the probability of seeking private tuition decreases in both treatment groups. This suggests that parents and households may view private tuition services as substitutes for other learning inputs. As students receive more educational inputs through volunteer-led classes, they may choose to reduce spending on private tuition. Taken together, these findings suggest that students who received support from both school and the community were more likely to spend time studying, both independently and with peers. However, they reduced their reliance on other educational inputs, such as private tuition.

6. Discussion and conclusion

Community and parental participation in schools is often viewed as central in supporting the learning process which takes place in schools. Yet, evidence shows that many community members and parents in rural India fail to have meaningful interactions with schools, particularly with government schools. The concept of social accountability in education developed by Hevia and Lope-Vega (2019) as well as the short route of accountability developed by Pritchett (2015), suggests the importance of these stakeholders and guided many of the activities undertaken by Pratham to raise foundational learning and enhance the relationships between schools and communities. From this perspective, it is expected that the school and community intervention to have benefits on children's learning beyond the benefits obtained by community initiatives only.

This study investigated the impact of the community and community-school interventions on raising foundational learning for children in rural areas of UP. In doing so, we moved beyond the average impact and focused on whether the intervention was advantageous for those with

the greatest educational needs, whether there were differential impacts by children's sex and caste group, whether the impact of the intervention was greatest for those whose parents participated in the interventions through interacting with teachers and the possible mechanisms which may explain our findings.

Overall, we find that the community and community-school level interventions improved foundational learning among children. While the magnitude of the impact was slightly higher for children in the community and school intervention, but this additional effect was not statistically significant. It is possible that we are starting to see the potential for school and community participation on raising foundational learning. Yet, the intervention only took place during six-months as it was disrupted by the Covid-19 pandemic. Therefore, it is possible that there was not enough time to build strong community-school relationships, and disrupt the typical compliance oriented and administrative meetings between parents and teachers (see Dyer et al., 2022a; Dyer et al., 2022b).

Interestingly, we estimated improvements in children's foundational learning in community-school intervention which may be explained by enhanced parent-teacher engagement and a focus on children's learning. Similar to other community interventions by Pratham and evaluated by Banerjee et al. (2010), we also found that both community and community-school interventions were effective at raising foundational learning for children without any literacy or numeracy skills. Consistent with Banerjee et al. (2010), we also find significant heterogeneity in the impact of the interventions based on children's learning level prior to the intervention. Yet, our study indicates that it is only in situations where the intervention helped to mediate parent and teacher activities where improvements on higher level foundational skills were obtained.

A study by Dyer et al. (2022a) highlights that the interactions between teachers and parents through School Management Committees (SMCs) or other parent-teacher engagement channels prominently represent the bureaucratic-style/oriented accountability dynamics, emphasizing the fulfillment of formal obligations and adherence to regulations rather than nurturing authentic community-school relationships. Also, the communication between schools and families is predominantly centred around administrative elements such as attendance tracking, fee payment, and event organization, often overshadowing discussions and collaborations on learning processes and outcomes (Dyer et al., 2022a). In this context, we find that our community-school intervention enhanced parent-teacher engagement related to

discussions about their children's education and learning. We even found a significant positive change in children's attendance in the community-school intervention group compared to the community group. It also indicates that the additional improvement in learning outcomes observed through the community-school intervention may be attributed to increased efforts and participation by teachers in community-based activities as observed. This suggests that community-school partnerships could have increased awareness and facilitated effective parent-teacher interactions regarding children's learning. In compliance with Dyer et al. (2022a; 2022b), our study also highlights the need to re-evaluate and refine educational accountability structures to foster holistic learning and effective partnerships among schools, families, and communities.

The findings of this study make several contributions to the existing literature on community participation and the quality of public education. Firstly, our study adds to the discourse on the decentralization of governance to local entities. In the field of education, this has been achieved through the establishment of School Management Committees (SMCs), which are designed to encourage active community engagement and provide avenues for communities to exert pressure on district and local government officials (Bano, 2022). However, experimental studies have demonstrated that simply informing communities and SMCs does not lead to improvement in students' learning (Kremer and Holla, 2009; Banerjee et al., 2010). Collective action, as well as increased awareness of roles and responsibilities for what SMC can or cannot achieve, is likely to lead to changes in student and teacher behavior (see Pandey et al., 2009). Yet, our study adds that meaningful interactions between parents and schools are needed for results on learning outcomes to be sustained, as parents often lack the power to influence the actions or behavior of teachers and principals (Bano, 2022).

Previous research suggests that while the tactical approach of information dissemination alone has produced mixed results, strategic approaches that foster environments conducive to collective action hold greater promise (Fox, 2015). Pratham's practical experience and previous research has fed into this important area of research and has demonstrated that simply providing information about the benefits of education, government operations, or grievance mechanisms does not necessarily motivate communities to actively engage (Banerjee et al., 2010). Instead, communities need to be made aware of the low standards in government schools and be convinced that their actions can bring about dynamic and positive changes. In our study, we provide evidence that community participation, facilitated through a collaborative and

participatory approach that encourages collective action, can significantly improve children's foundational learning. Therefore, policymakers can derive valuable insights not only from measuring the extent to which interventions enhance learning outcomes among children but also from identifying the types of support that can genuinely empower local actors to work more effectively towards improving children's foundational skills, particularly those who completely lack literacy or numeracy.

Furthermore, this study focused on the effectiveness of reinforcing accountability relationships between various stakeholders both within and outside the school, and its impact on enhancing children's learning potential. Existing research indicates that parents from disadvantaged backgrounds often feel ill-equipped to engage with schools (Ramachandran, 2004), and there is often a significant social distance between teachers and students/parents (Rawal & Kingdon, 2010). When children fail to make progress, teachers frequently attribute it to parental responsibility (Bhattacharjea et al., 2011; Sinha et al., 2016). Therefore, our study also contributes to the understanding of effective parent-teacher engagement by examining how involving schools/teachers in conjunction with community interventions can strengthen community-school partnerships and, consequently, enhance children's learning potential through improved parent-teacher interactions and increased community participation. It is important to note that successful on-ground implementation of community-based interventions aimed at improving the quality of education in government schools is more closely linked to increased engagement and cooperation rather than increased monitoring.

This study's findings also highlight the importance of stakeholder involvement in collective action for the success and impact of programs (Hevia and Vergara-Lope, 2019). Here, we found that community-school intervention has a significantly higher impact on both literacy and numeracy skills for children whose parents interacted with teachers during the intervention, compared to those whose parents didn't. Our findings align with the experimental evidence from Islam's (2019) study in rural Bangladesh, where they also found that creating opportunities for effective interaction between parents and teachers improves children's test scores as it is possible that this could foster a sense of mutual responsibility and trust. Moreover, parent-teacher interaction promotes mutual accountability by facilitating better monitoring of both the school and home environments (Mbiti, 2016). By establishing avenues for parental-teacher engagement, such as organizing parent-teacher meetings within schools, accountability and transparency can be improved, leading to the enhancement of school services (Kremer et

al., 2013; Mbiti, 2016). The previous evidence and our findings indicate that providing avenues for effective parent-teacher engagement can foster community-school relationships by sharing responsibility for children's education and learning. Therefore, this study also contributes in the area of parent-teacher engagement and children's learning.

Finally, our study sheds light on the types and nature of community-based intervention programs that can effectively enhance the quality of public education and improve learning outcomes for disadvantaged children in government schools. An experimental study by Pradhan et al. (2014) found that institutional reforms, such as conducting elections for School Management Committee (SMC) members and linking them with village councils, are cost-effective and significantly improve children's learning outcomes. Another study conducted in India found that private schools successfully improved student performance by providing better information about school quality through the distribution of student performance report cards to both parents and schools (Afridi et al., 2018). However, this approach did not yield similar results for government schools, which cater to the majority of underprivileged children in India. In contrast, our study provides evidence that creating an enabling environment for collective action can effectively enhance foundational learning for children in government schools. This highlights the importance of tailoring strategies to specific contexts, as different contexts require different approaches to achieve desired outcomes.

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Table 1. Summary statistics and balance of covariates at baseline survey

	Control (C)	PAHAL (T1)	PAHAL+ (T2)	P-Value from F-Test of Equality (C = T1 = T2)
Panel A: Child level outcome variables				
<i>Literacy Levels</i>				
Literacy Level/Score	1.92	1.90	1.87	0.25
Can read Letters	0.66	0.63	0.63	0.23
Can read Words	0.18	0.18	0.16	0.23
Can read Paragraph	0.08	0.09	0.08	0.43
<i>Numeracy Levels</i>				
Numeracy Level/Score	2.08	2.08	2.07	0.90
Can recognize One-Digit Numbers	0.87	0.85	0.86	0.55
Can recognize Two-Digit Numbers	0.18	0.19	0.18	0.82
Can do a Two-Digit Subtraction	0.03	0.03	0.03	0.55
Observations	6,043	6,033	11,948	24,024
Panel B: Child/HH level characteristics				
Female	0.54	0.52	0.53	0.30
Grade Enrolled	2.98	2.99	2.98	0.44
Private Tuition	0.09	0.07	0.08	0.65

Father Education (Years of Schooling)	4.62	4.37	4.52	0.35
Mother Education (Years of Schooling)	2.04	1.91	1.91	0.37
Caste/Social Group				
Upper Caste/ General	0.10	0.08	0.09	0.59
Other Backward Classes	0.42	0.45	0.42	0.50
Scheduled Castes/Tribes	0.48	0.47	0.48	0.80
House Type				
Kacha (Mud) House	0.31	0.34	0.32	0.37
Semi-Pakka (Half Concrete) House	0.32	0.32	0.33	0.81
Pakka (Concrete) House	0.37	0.34	0.35	0.25
Other Household Indicators				
Electricity in HH	0.38	0.36	0.35	0.23
Toilet in HH	0.33	0.33	0.34	0.63
Motor Cycle	0.19	0.17	0.17	0.24
Mobile Phone	0.86	0.84	0.84	0.16
Television in HH	0.07	0.07	0.06	0.35
Electric Fan in HH	0.18	0.17	0.16	0.36
Observations	5,873	5,879	11,685	23,437

Note: Columns 2–4 present the raw means of the control and treatments group. Column 5 presents the P-values of the F-test for equality of mean across the control and treatment groups. P-values are estimated using standard errors clustered at the Village level. *** p<0.01, ** p<0.05, * p<0.1

Table 2. Different stakeholder's participation in various intervention activities

	PAHAL (T1)	PAHAL+ (T2)	Mean Difference (T2-T1)
Panel A: Household			
Community-level Activities			
Received learning material from volunteers	0.426 [0.495]	0.540 [0.498]	0.114*** (0.0221)
Volunteers leading classes	0.346 [0.476]	0.392 [0.488]	0.046** (0.0220)
Children study in groups	0.400 [0.490]	0.460 [0.498]	0.060*** (0.0195)
Play-Based activities taking place	0.256 [0.437]	0.294 [0.456]	0.038** (0.0184)
Learning Rally in village (<i>Halla Bol</i>)	0.284 [0.451]	0.287 [0.452]	0.003 (0.0185)
Seen any of the above activities in village	0.714 [0.451]	0.762 [0.452]	0.047** (0.0199)
Observations	5,185	10,044	15,229
Panel B: Teacher			
Community-level Activities			
Organised event on child learning	0.246 [0.431]	0.403 [0.491]	0.156*** (0.0324)
Seen volunteer leading classes at homes	0.292 [0.455]	0.392 [0.488]	0.100*** (0.0313)
Seen children study in groups at homes	0.323 [0.468]	0.400 [0.490]	0.078** (0.0302)
Learning Rally in village	0.634	0.667	0.032

Seen any of the above activities in village	[0.482] 0.785 [0.411]	[0.472] 0.844 [0.363]	(0.0304) 0.058** (0.0231)
School-level Activities			
Pratham representative visited school	---	0.555 [0.497]	---
If school visit, discuss children's learning	---	0.354 [0.479]	---
If school visit, did activities with children	---	0.601 [0.490]	---
If school visit, demonstrated TaRL	---	0.531 [0.500]	---
If school visit, discussed parents' participation	---	0.204 [0.404]	---
Observations	556	1,033	1,589
Panel C: Head Teacher (HT)			
Community Activities			
Organised event on child learning	0.220 [0.418]	0.430 [0.497]	0.209*** (0.0662)
Seen volunteer leading classes at homes	0.203 [0.406]	0.347 [0.478]	0.144** (0.0659)
Seen children study in groups at homes	0.237 [0.429]	0.339 [0.475]	0.102 (0.0717)
Learning Rally in village	0.560 [0.501]	0.686 [0.466]	0.127 (0.0777)
Seen any of the above activities in village	0.712 [0.457]	0.876 [0.331]	0.164** (0.0647)
School-level Activities			
Pratham representative visited school	---	0.320	---

If school visit, discuss children's learning	---	[0.467] 0.333	---
If school visit, did activities with children	---	[0.476] 0.579	---
If school visit, demonstrated TaRL	---	[0.498] 0.649	---
If school visit, discussed parents' participation	---	[0.482] 0.193	---
		[0.398]	
Observations	59	121	180

Notes: Columns 2–3 present raw means and standard deviations (in square brackets) of the indicated participation measure in each group. Column 4 presents regression-adjusted differences and standard errors (in parentheses) between the mean in the community-school treatment and the community treatment for households (Panel A), teachers (Panel B), and head teacher (Panel C). Standard errors are clustered at the village level. *** p<0.01, ** p<0.05, * p<0.1

Table 3: Impact of PAHAL and PAHAL+ on improving children's foundational literacy and numeracy skills

	Panel A: Impact on Literacy Level				Panel B: Impact on Numeracy Level			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Literacy Score	Letter Level (Basic)	Word Level (Intermediate)	Paragraph Level (Advanced)	Numeracy Score	NR 1-Digit Level (Basic)	NR 2-Digit Level (Intermediate)	Subtraction Level (Advanced)
IG (Ref.- Control)								
PAHAL (T1)	0.075*** (0.026)	0.024* (0.013)	0.025* (0.013)	0.030** (0.013)	0.079*** (0.027)	0.024*** (0.005)	0.032** (0.014)	0.010 (0.010)
PAHAL+ (T2)	0.094*** (0.022)	0.036*** (0.010)	0.034*** (0.012)	0.026** (0.011)	0.087*** (0.024)	0.022*** (0.005)	0.032*** (0.012)	0.017* (0.009)
Difference (T2-T1)	0.019 (0.023)	0.012 (0.010)	0.009 (0.012)	-0.003 (0.011)	0.008 (0.024)	-0.002 (0.004)	0.001 (0.012)	0.007 (0.009)
Control Mean at ML	-0.008	0.773	0.365	0.287	0.005	0.942	0.397	0.142
Observations	21,472	21,472	21,472	21,472	21,472	21,472	21,472	21,472

Notes: Columns 1-4 in Panel A and 5-8 in Panel B display estimated coefficients of treatment group dummies for literacy and numeracy skills, respectively. All the regressions include inverse probability weight (IPW) to account for the sample attrition at midline, and standard errors (in parentheses) are clustered at the village level. Also, we have controlled for the baseline outcome, and child and household level characteristics given in Table 1. Literacy and numeracy scores are normalized based on the control group means and standard deviations for each category of the score and in each round of testing. Row 4 provides the difference in impact between *PAHAL+* and *PAHAL* to see whether *PAHAL+* has an additional significant impact over *PAHAL*. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

Table 4: Heterogeneity Analysis: Impact of PAHAL and PAHAL+ on improving learning levels by children's skills at baseline

	Panel A: Impact on Literacy Skills			Panel B: Impact on Numeracy Skills		
	(1)	(2)	(3)	(4)	(5)	(6)
	Letter Level (Beginner level at BL)	Word Level (Letter level at BL)	Paragraph Level (Word level at BL)	NR 1-Digit Level (Beginner level at BL)	NR 2-Digit Level (NR 1-Digit level at BL)	Subtraction Level (NR 1-Digit level at BL)
IG (Ref.- Control)						
PAHAL (T1)	0.006 (0.010)	-0.006 (0.025)	-0.027 (0.024)	0.015*** (0.004)	0.016 (0.025)	-0.019 (0.065)
PAHAL+ (T2)	0.014* (0.007)	0.020 (0.021)	-0.005 (0.019)	0.013*** (0.003)	0.025 (0.022)	0.057 (0.054)
Baseline Skill Level (BL)	-0.385*** (0.017)	-0.495*** (0.019)	-0.615*** (0.018)	-0.204*** (0.016)	-0.444*** (0.020)	-0.544*** (0.045)
PAHAL (T1)# BL	0.051** (0.025)	0.038 (0.029)	0.062** (0.028)	0.068*** (0.023)	0.020 (0.027)	0.031 (0.065)
PAHAL+ (T2) # BL	0.063*** (0.022)	0.017 (0.024)	0.034 (0.022)	0.067*** (0.020)	0.009 (0.023)	-0.041 (0.054)
Observations	21,472	21,472	21,472	21,472	21,378	21,378

Notes: All the regressions include inverse probability weight (IPW) to account for the sample attrition at midline, standard errors (in parentheses) are clustered at the village level, and we have controlled for the baseline outcome, and child and household level characteristics. *** p<0.01, ** p<0.05, * p<0.1

Table 5: Heterogeneity Analysis: Impact of PAHAL and PAHAL+ on improving children's foundational learning by child gender

	Panel A: Impact on Literacy Level				Panel B: Impact on Numeracy Level			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Literacy Score	Letter Level (Basic)	Word Level (Intermediate)	Paragraph Level (Advanced)	Numeracy Score	NR 1-Digit Level (Basic)	NR 2-Digit Level (Intermediate)	Subtraction Level (Advanced)
IG (Ref.-Control)								
PAHAL (T1)	0.057* (0.030)	0.010 (0.014)	0.019 (0.015)	0.032** (0.015)	0.072** (0.035)	0.019*** (0.006)	0.036** (0.017)	0.010 (0.013)
PAHAL+ (T2)	0.090*** (0.027)	0.035*** (0.012)	0.031** (0.014)	0.031** (0.014)	0.099*** (0.030)	0.019*** (0.005)	0.040*** (0.014)	0.022* (0.012)
Female	-0.038 (0.024)	-0.015 (0.009)	-0.019 (0.014)	-0.015 (0.013)	-0.193*** (0.024)	-0.020*** (0.006)	-0.112*** (0.012)	-0.047*** (0.009)
IG # Female								
T1 # Female	0.033 (0.035)	0.027* (0.014)	0.012 (0.019)	-0.005 (0.018)	0.014 (0.035)	0.009 (0.008)	-0.009 (0.017)	0.000 (0.013)
T2 # Female	0.006 (0.030)	0.002 (0.012)	0.006 (0.017)	-0.008 (0.016)	-0.022 (0.030)	0.005 (0.007)	-0.015 (0.015)	-0.011 (0.012)
Control Mean at ML	-0.008	0.773	0.365	0.287	0.005	0.942	0.397	0.142
Observations	21,472	21,472	21,472	21,472	21,472	21,472	21,472	21,472

Notes: All the regressions include inverse probability weight (IPW) to account for the sample attrition at midline, standard errors (in parentheses) are clustered at the village level, and we have controlled for the baseline outcome, and child and household level characteristics given in Table 1. We have added an additional interaction between the treatment group and child gender (i.e., female) in all the regressions. *** p<0.01, ** p<0.05, * p<0.1

Table 6: Heterogeneity Analysis: Impact of PAHAL and PAHAL+ on improving children’s foundational learning by child caste

[illegible]

Notes: All the regressions include inverse probability weight (IPW) to account for the sample attrition at midline, standard errors (in parentheses) are clustered at the village level, and we have controlled for the baseline outcome, and child and household level characteristics given in Table 1. We have added an additional interaction between the treatment group and child caste groups in all the regressions. *** p<0.01, ** p<0.05, * p<0.1

Table 7: Heterogeneity Analysis: Impact of PAHAL and PAHAL+ on improving children's learning by parental involvement at school

	Panel A: Impact on Literacy Level				Panel B: Impact on Numeracy Level			
	(1) Literacy Score	(2) Letter Level (Basic)	(3) Word Level (Intermediate)	(4) Paragraph Level (Advanced)	(5) Numeracy Score	(6) NR 1-Digit Level (Basic)	(7) NR 2-Digit Level (Intermediate)	(8) Subtraction Level (Advanced)
IG (Ref.- Control)								
PAHAL (T1)	0.060** (0.028)	0.020 (0.015)	0.021 (0.014)	0.022 (0.014)	0.059** (0.028)	0.025*** (0.006)	0.015 (0.015)	0.008 (0.010)
PAHAL+ (T2)	0.076*** (0.024)	0.031** (0.012)	0.030** (0.013)	0.014 (0.012)	0.063** (0.026)	0.022*** (0.005)	0.021 (0.013)	0.009 (0.009)
Visited School (VS)	0.058*** (0.022)	0.021* (0.011)	0.039*** (0.012)	0.023* (0.012)	0.044 (0.028)	0.006 (0.007)	0.018 (0.014)	0.018* (0.011)
IG # VS								
T1 # VS	0.043 (0.032)	0.009 (0.015)	0.013 (0.018)	0.023 (0.017)	0.050 (0.035)	-0.006 (0.009)	0.044** (0.018)	0.007 (0.015)
T2 # VS	0.066** (0.030)	0.021 (0.013)	0.019 (0.017)	0.039** (0.016)	0.075** (0.034)	-0.001 (0.008)	0.036** (0.017)	0.023* (0.014)
Control (Mean at ML)	-0.008	0.773	0.365	0.287	0.005	0.942	0.397	0.142
Observations	21,038	21,038	21,038	21,038	21,038	21,038	21,038	21,038

Notes: All the regressions include inverse probability weight (IPW) to account for the sample attrition at midline, standard errors (in parentheses) are clustered at the village level, and we have controlled for the baseline outcome, and child and household level characteristics given in Table 1. We have added an additional interaction between the treatment group and parental visit to school between baseline and midline in all the regressions. *** p<0.01, ** p<0.05, * p<0.1

Table 8. Impact of PAHAL and PAHAL+ on children's learning related activities and parental-teacher engagement

	Control (Mean)	Relative to Control		Relative to T1	T1=T2 (P-Value)	Observations
		PAHAL+ (T1)	PAHAL+ (T2)	PAHAL+ (T2)		
Panel A: Parent-Teacher Engagement						
Teachers regularly invite parents to discuss child studies (1)	0.47 (0.0067)	-0.022 (0.0191)	0.051*** (0.0183)	0.073*** (0.0164)	0.000	21,498
Parents Visited School (2)	0.36 (0.0064)	-0.013 (0.0165)	-0.023 (0.0156)	-0.011 (0.0141)	0.456	21,996
Parent-Teacher Discussed Learning (3) (If parents visited school)	0.34 (0.0104)	-0.010 (0.0339)	0.056** (0.0286)	0.065** (0.0299)	0.030	3,324
Meeting the teacher is a waste of time (4)	0.97 (0.0021)	0.000 (0.0045)	-0.006 (0.0044)	-0.006 (0.0038)	0.118	21,383
Teachers do everything to ensure learning (5)	0.35 (0.0071)	-0.027 (0.0209)	-0.003 (0.0185)	0.025 (0.0197)	0.209	21,778
Panel B: Child Learning Activities						
Child school observed Attendance (6)	0.43 (0.0065)	-0.026 (0.0211)	0.041** (0.0173)	0.067*** (0.0239)	0.000	22,925
Child study in group with other children (7)	0.22 (0.0056)	0.129*** (0.0166)	0.183*** (0.0142)	0.055*** (0.0239)	0.002	21,694
Never study at home after school (8)	0.16 (0.0048)	0.004 (0.0106)	-0.019** (0.0091)	-0.023*** (0.0091)	0.012	21,993
Taking Private Tuition (9)	0.09 (0.0039)	-0.017* (0.0090)	-0.019** (0.0079)	-0.002 (0.0073)	0.830	22,202

Notes: Standard errors (Clustered at Village level) in parentheses; *** p<0.01, ** p<0.05, * p<0.1. Columns 2 and 3 display estimated coefficients of an OLS regression of the outcome in each row on treatment group dummies, controlling for the baseline outcome. Similarly, column 4 displays estimated coefficients of an OLS regression of the outcome in each row on the T2 group relative to the T1 group, controlling for the baseline outcome variable. Column 5 displays the p-value of the F-test that the impacts of T1 and T2 are equal.

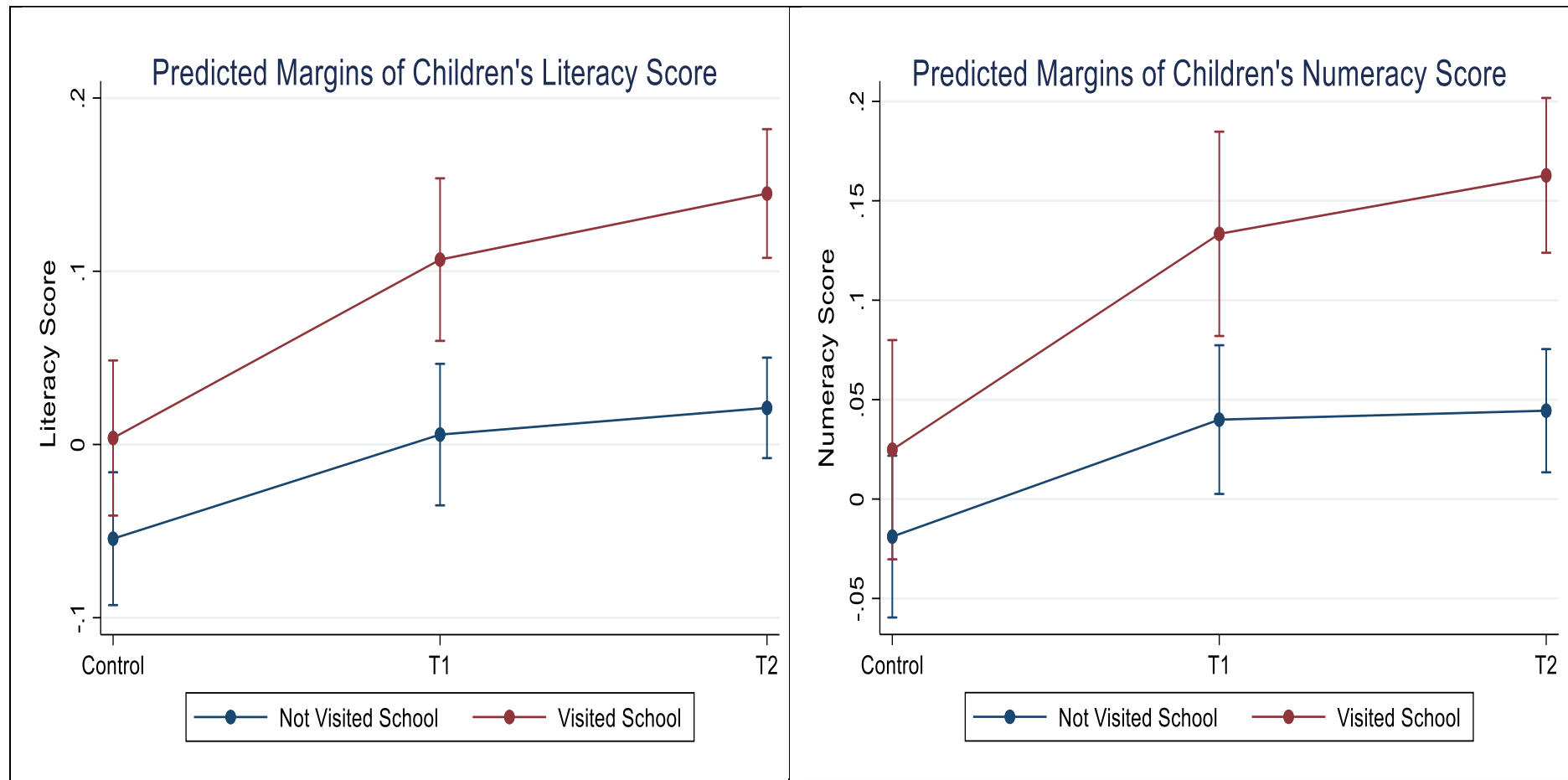


Figure 1. Predicted margins of literacy and numeracy score for children whose parents visited and not visited school during the intervention across control and treatment groups

Appendix

Table A1. Checking for differential attrition of sample at midline survey

	Attrition (Control Mean)	Relative to Control		Obs.
		PAHAL+ (T1)	PAHAL+ (T2)	
Child Attrition at ML	0.061 (0.0031)	0.001 (0.0056)	0.039*** (0.0055)	24,024

Notes: Columns 2 and 3 display the differences in means between each treatment group and the control group. Differences in means are computed by OLS regression with child attrition at midline survey as the dependent variable. Standard errors (in parentheses) are clustered at the village level.

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

Table A2. Checking for selective attrition of sample at midline survey

	Control	PAHAL+ (T1)	PAHAL+ (T2)	Obs.
Baseline Covariates	(Coefficient)	(Interaction coefficients)		
Child Literacy Level	0.005 (0.0036)	-0.004 (0.0052)	-0.006 (0.0050)	24,024
Child Numeracy Level	0.001 (0.0036)	0.001 (0.0067)	0.000 (0.0063)	24,024
Female Child	0.012 (0.0067)	0.000 (0.0097)	-0.013 (0.0088)	24,024
Grade Enrolled	0.012 (0.0067)	-0.001 (0.0057)	-0.006 (0.0054)	24,024
Upper Caste Group Children	-0.008 (0.0065)	-0.006 (0.0092)	-0.002 (0.0087)	23,813
OBC Group Children	-0.008 (0.0065)	-0.006 (0.0092)	-0.002 (0.0087)	23,813
SC/ST Group Children	0.007 (0.0067)	0.007 (0.0091)	-0.006 (0.0090)	23,813
Child takes Private Tuition	0.007 (0.0124)	0.011 (0.0195)	-0.019 (0.0156)	23,339
HH has Concrete House	0.002 (0.0066)	-0.004 (0.0098)	0.004 (0.0091)	23,428
HH has Semi-Concrete House	-0.010 (0.0063)	0.001 (0.0088)	0.005 (0.0089)	23,428
HH has Mud House	0.012 (0.0074)	0.002 (0.0105)	-0.009 (0.0095)	23,428
HH has Toilet	-0.016** (0.0071)	0.016* (0.0097)	0.012 (0.0092)	23,428
HH has Toilet	-0.004 (0.0064)	0.010 (0.0096)	0.008 (0.0091)	23,428
Mobile Phone	-0.002 (0.0093)	-0.002 (0.0132)	-0.016 (0.0125)	23,426
Television in HH	0.003 (0.0138)	0.012 (0.0210)	0.001 (0.0188)	23,426
Electric Fan in HH	-0.008 (0.0076)	0.011 (0.0107)	0.008 (0.0108)	23,426

Notes: Study sample selective attrition is computed by doing separate OLS regressions with child attrition at midline survey as the dependent variable, and adding an interaction of the treatment dummy with the baseline covariates. Columns 2 and 3 display the interaction term coefficients of the T1 and T2 groups with all the covariates computed through separate regressions. Standard errors (in parentheses) are clustered at the village level. *** p<0.01, ** p<0.05, * p<0

संम्यल

असर के बुनियादी पढ़ने की जाँच सामग्री: हिन्दी

कक्षा II स्तर का पाठ

कक्षा II स्तर का पाठ

कक्षा I स्तर का पाठ

अक्षर

सामान्य आसान शब्द

यह बुनियादी पढ़ने की जाँच का एक संम्यल है।

सावन का महीना था। आसमान में बहुत काले-काले बादल छाए थे। ठंडी-ठंडी हवा चल रही थी। मुझे झूला झूलने का मन किया। बड़े भैया एक मोटी सी रस्सी लेकर बाहर आए। भैया ने रस्सी को पेड़ से लटकाकर झूला बनाया। सब ने मिलकर खूब झूला झूला। बाकी बच्चे भी आकर मजे से झूलने लगे। झूलते-झूलते रात हो गई।

नोट: यह पाठ भारत में सारी कक्षा I और II की पाठ्य पुस्तकों का विश्लेषण करके तैयार किया गया है।
पढ़ने की जाँच की सामग्री सभी भारतीय भाषाओं में उपलब्ध है।
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तोते का रंग हरा है।
वह लाल टमाटर खाता है।

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लाल दूध
पैर
तेल किला
मोर
जूता मौका

अक्षर/शब्द के लिए: बच्चे से कोई 5 पढ़ने को कहें, कम से कम 4 सही होने चाहिए।

Figure A1: ASER Reading Assessment (In Hindi)

अंक पहचान 1-9	संख्या पहचान 10-99	घटाव	भाग
5 7	74 23	$\begin{array}{r} 63 \\ - 44 \\ \hline \end{array}$ $\begin{array}{r} 51 \\ - 35 \\ \hline \end{array}$	$7 \overline{) 898}$
8 4	91 86	$\begin{array}{r} 92 \\ - 48 \\ \hline \end{array}$ $\begin{array}{r} 71 \\ - 35 \\ \hline \end{array}$	$4 \overline{) 659}$
2 9	24 79	$\begin{array}{r} 45 \\ - 27 \\ \hline \end{array}$ $\begin{array}{r} 34 \\ - 19 \\ \hline \end{array}$	$8 \overline{) 946}$
3 1	37 61	$\begin{array}{r} 43 \\ - 29 \\ \hline \end{array}$ $\begin{array}{r} 46 \\ - 17 \\ \hline \end{array}$	$6 \overline{) 757}$
	58 14		

Figure A2: ASER Math Assessment (In Hindi)

**A big tree stood in a garden.
It was alone and lonely. One
day a bird came and sat on it.
The bird held a seed in its
beak. It dropped the seed
near the tree. A small plant
grew there. Soon there was
another tree. The big tree
was happy.**

**Rani likes her school.
Her class is in a big room.
Rani has a bag and a book.
She also has a pen.**

e d w

s c

g h z

i q

hand star

bus
cat book
day few

old
sing bold

Figure B1: ASER Reading Assessment (In English)

Number recognition 1 & 9	Number recognition 10 & 99	Subtraction		Division
<div>1</div> <div>4</div>	<div>51</div> <div>83</div>	<div>46</div> <div>- 29</div>	<div>63</div> <div>- 39</div>	<div>7)879(</div>
<div>7</div> <div>3</div>	<div>37</div> <div>65</div>	<div>47</div> <div>- 28</div>	<div>45</div> <div>- 17</div>	<div>6)824(</div>
<div>6</div> <div>9</div>	<div>55</div> <div>26</div>	<div>92</div> <div>- 76</div>	<div>84</div> <div>- 57</div>	<div>8)985(</div>
<div>5</div> <div>2</div>	<div>91</div> <div>43</div>	<div>52</div> <div>- 14</div>	<div>66</div> <div>- 48</div>	<div>4)517(</div>
	<div>36</div> <div>27</div>			

Figure B2: ASER Math Assessment (In English)