

Evaluation of WGEP's *Our Sisters Read* Program

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Summary of Findings

This report presents the evaluation of Our Sisters Read program, which took place in the Fatick region of Senegal. A quantitative and qualitative analysis was made to examine the association between exposure to the program and three outcomes: EGRA test scores, students' time spent in reading for enjoyment, and parents' perspectives on literacy. Higher exposure to the program is associated with higher EGRA scores and is particularly relevant for oral reading skills and for students in the third grade. Also, students who were exposed to program longer spend, on average, more time reading for enjoyment. Parents seem to understand the importance of reading and make efforts to help their children improve their reading skills. The findings are only suggestive of the impact of the program, but there seems to be a statistically significant and positive association of being exposed to the program and better academic outcomes and more motivated students. These are outcomes that have been found in the literature as important for future academic and professional success, as well as for psychological outcomes.

1 Introduction

This report presents the evaluation of Women's Global Education Project's (WGEP) program *Our Sisters Read*. This program began in 2013 and was designed with the goal of improving the foundational reading skills of primary school children in the rural Fatick region of Senegal and create lifetime-learners among these students, especially girls. During this four year USAID funded program, WGEP worked with its local partner based in Sokone, Femmes Plus. The program activities included:

- The design and implementation of reading activities to supplement the elementary reading curriculum.
- The program opened two centers with libraries (with books in local language and in French) and computer labs that were open to the public and held extracurricular reading activities.
- Mobile labs travelled to rural village schools where participants could borrow books (in local language and in French) and solar lanterns and had extracurricular reading activities.
- Reading and writing contests.

- After school tutoring for students in need of additional assistance in strengthening reading skills.
- Partial scholarships for at risk students as well as top readers.
- Adult literacy classes.
- Community meetings open to the general public to promote the importance of literacy and education to parents and community leaders.

This evaluation aims at understanding the association between the program and three outcomes of interest:

1. Students' performance on the Early Grade Reading Assessment (EGRA).
2. Students' time spent in reading for enjoyment.
3. Parents' perspectives on literacy.

The first section of this report includes a brief summary of the relevant literature related to these outcomes of interest. It is followed by an assessment of the data collected by WGEP during the program (section 3). Section 4 describes the qualitative data that was collected by the author after the completion of the program to support the pre-existing data. Then, section 5 shows the results of the quantitative analysis and section 6 those of the qualitative data collected through focus groups. Each of these sections is divided into the three outcomes of interest. Finally, section 7 concludes.

2 Literature review

In recent years, there has been a growing interest in studying student engagement and the ways in which it can be increased. Student engagement is thought of as being *malleable* so that interventions can be tailored to positively affect it (Fredricks, Blumenfeld, and Paris, 2004; Lawson and Lawson, 2013; Kennedy, 2014). Research has found it to decrease dropout rates and improve academic achievement and behavioral and psychological outcomes of students (Finn, 1989; Fredricks and McColskey, 2011; Finn and Zimmer, 2012). However, defining and, consequently, measuring student engagement is not an easy task. One way to measure how engaged or motivated students are is through indicators of their *behavior*. One such indicator could be the amount of time spent doing certain tasks such as reading or doing homework (Lawson and Lawson, 2013). In the case of this evaluation, the relevant task is reading for enjoyment.

Several studies have found a positive correlation between reading for enjoyment and performance in reading (OECD, 2011; Sullivan and Brown, 2015; Anderson, Wilson, and Fielding, 1986; Taylor, Frye, and Maruyama, 1990). The path is easy to define: students who are more motivated to read spend more time reading, which results in improvements in reading skills (OECD, 2011). Reading for enjoyment has also been found to have positive effects in other areas such as vocabulary, writing, mathematics, and even communication skills (Clary, 2014; Whitten, Labby, and Sullivan, 2016).

Lee (2014) uses United States data to examine the relationship between student engagement and academic performance. He finds that behavioral engagement predicts reading performance. Also, Guthrie and Klauda (2014) find that instructional support in the classroom increases motivation and consequently text comprehension.

Two skills of particular interest to this evaluation are reading comprehension and oral literacy. There are several ways in which these skills can be tested, but one that has gained importance for primary school students in developing countries is the Early Grade Reading Assessment (EGRA). The EGRA was created as a means to systematically measure foundational literacy skills in primary school and to guide the efforts aimed at improving them. It has been used in more than 65 countries around the world, including Senegal (Dubeck and Gove, 2015; RTI International, 2009). The EGRA in Senegal has been implemented at least in French and in Wolof, one of the Senegalese native languages.

There are several studies that evaluate different reading interventions in Africa using the EGRA. One of those is that of the Ministry of Education in Liberia that evaluated an intervention that included reading lessons with teachers reading aloud and homework that required students to read aloud to their parents. The intervention had a statistically significant effect on EGRA scores of 0.82 standard deviations (SD) in reading comprehension and 0.8 in oral reading fluency. The report indicates that this effect size is equivalent to a two-year grade level growth in comprehension and 1.9 years in oral fluency. Other two examples are studies of randomized experiments in Kenya and Uganda (Lucas, McEwan, Ngware, and Oketch, 2014). A set of primary schools in poor districts were randomly assigned to receive the Reading to Learn intervention, which included a five-step reading instruction approach. The sample included students in grades 1 to 3. The authors found an effect of 0.20 SD in oral literacy in Uganda and 0.08 in Kenya.

Regarding broader educational interventions, an analysis of a number of studies in Sub-Saharan Africa (Conn, 2017) shows that the pedagogical interventions analyzed show an effect size of 0.918 standard deviations, on average. But, when including only "high quality studies" the effect size of these interventions is on average 0.228 standard deviations. Other studies that analyze the effect of programs that use information and communications technology in Kenya find average effect sizes between 0.2 and 0.5 standard deviations on several learning outcomes (Piper, Zuilkowski, Kwayumba, and Strigel, 2016).

The next section assesses the pre-existing data collected during the intervention that will be used to understand the association between the exposure to the program and each of the outcomes of interest.

3 Assessment of pre-existing data

3.1 Outcome 1: Students' performance on EGRA

The program operated in the Fatick region of Senegal and this implementation area was divided into eight geographic zones with between four and six schools in each geographic zone depending on the number of students enrolled in the schools. Three schools from each of the eight geographic zones in the program were randomly selected to take the Early Grade Reading Assessment (EGRA). All children in all levels in these schools were tested.

The assessment was written by a commission formed by Femmes Plus staff and directors of

some of the schools and it was implemented by the teachers in each of the schools. There were three rounds of testing in December 2015, June 2016, and June 2017. The tests in 2015 and 2016 included two sections: comprehension and oral reading. In 2017 one additional section was included: knowledge assessment. The test was taken in French by the students in the four highest levels (CE1, CE2, CM1, and CM2¹) and translated into Wolof for the younger students (CI and CP levels), orally at the moment of testing.

There are scores for each of the sections of the test, which makes it possible to analyze any possible changes not only in the overall total test score, but also in the specific skills measured in each of the sections of the test. Also, there is information on age, gender, language spoken at home, and whether the student repeated the year or not. These variables can be used to control for any differences between the treatment and comparison groups.

The main data limitations of the EGRA are:

1. There is no information on students who did not receive the program, but have similar characteristics as those receiving it that can be used as a *comparison* group.
2. There is no *baseline* test for students in all schools.
3. Students were not chosen so as to take the test for all of the rounds of testing. Only a few individual students can be *followed* through the duration of the program.

Additionally, there are some discrepancies in how the sections of some tests are scored in some of the schools for the years 2015 and 2016. These discrepancies arose from a lack of a scoring scale predetermined by the committee who wrote the tests. This was solved by checking the written records and converting all scores to the same scale (normalization). In some cases, it was not possible to normalize the scores, so only the total score was used for the analysis in those cases.

3.2 Outcome 2: Students' time spent in reading for enjoyment

A sample of students was surveyed biannually the last two years of the program: in the December 2015 and June 2016 (first round of surveys) and in December 2016 and May 2017 (second round of surveys). Eight schools were randomly selected each school year and students from one class at each of these eight schools were surveyed regarding their reading activities and habits. 247 students were surveyed in the first round and 180 in the second round.

The surveys included information on age and gender, as well, which can be used as control variables in the regression analysis. One of the questions on these surveys asked how much time they spend on reading for enjoyment. This outcome is usually a self-reported outcome (OECD, 2000), which presents limitations especially for younger children. One of the most important limitations for the younger students is the difficulty to understand the magnitude of time.

The implementation of the surveys was made by the teachers of each class. For some of the schools, this posed a problem as teachers answered some of the questions themselves instead of asking the students (for example, all of the students in certain classes had the exact same number of minutes spent in reading activities in school). One additional issue found with the data was that in some cases the people who transcribed the data from the paper surveys to the

¹Grade levels in Senegal are CI, CP, CE1, CE2, CM1, and CM2, which correspond to first, second, third, fourth, fifth, and sixth grade, respectively.

electronic spreadsheets changed the scale of the question asked. This was solved by converting all answers to the same scale.

Additionally, there are two important limitations to the analysis of this outcome:

1. Not all grade levels were surveyed in the second year of surveys. This is the case of students in the second and third grades (CP and CE1). Then, for those two grades the analysis could only be made for the first year as a six-month change.
2. The sample of students surveyed is small, so that it could be difficult to observe a statistically significant association between the program and the enjoyment of reading if the effect of the program is not big enough.

3.3 Outcome 3: Parents' perspectives on literacy

Information on parents' perspectives on literacy was obtained from a survey that took place in May 2017, close to the end of the program. Parents of students in eight schools were randomly selected to take the survey. Four of these schools were in the Toubacouta region (Medina Santhie, Medina Sangako, Toubacouta 2, and N.A.T.) and four in the Sokone region (Sokone 1, Ste. Therese, Bambougar Malick, and Ndrané Sadiabou). A total of 32 parents were interviewed, 16 in each of the two regions.

There is no baseline information on these parents nor a comparison group and, given the small sample size, the evaluation of this outcome can only include descriptive statistics of the self-reported measures included in the survey. There are four measures that give information on the parents' perspectives on literacy:

1. Percentage of parents who report that their opinion on the importance of reading has changed after the start of the program.
2. Ways in which the parent (or family members) encourage the child to read.
3. Parents' opinion on what the school and teachers should do to encourage the children to read.
4. Program activities in which they participated.

This information will be complemented with the qualitative data obtained through the focus groups.

It is important to note that the statistics and qualitative data used will only describe the opinions and reports of a small number of parents who do not necessarily represent the whole population of the program. These cannot be used as proof of the impact of the program on the perspectives of parents on literacy, but are able to show a general view of the perspectives on literacy of some parents.

4 Post-program qualitative data collection

To complement the pre-existing data, qualitative data was collected through focus groups of students, parents, and teachers of eighteen schools: Badoudou, Daga Babou, Diamaguene, Keur Yoro Diop, KGBX, Mbouloum, Medina Sangako, Nemanding, Santhie Berra, Sokone 1,

Sokone 2, Sokone 4, Sokone 5, Sokone 6, Santhie Berra, Soukouta, Toubacouta 1, Toubacouta 2. A total of 59 parents, 65 students, and 11 teachers were interviewed in these focus groups after the completion of the program in October 2017. The information collected from the focus groups was particularly useful for understanding participants' perception, behavior, and attitudes towards the program and literacy in general that cannot be measured through other instruments such as surveys.

Focus groups included between five and eight participants per group. There was one moderator in charge of facilitating the discussion and maintaining a free and permissive environment. This moderator translated the questions into the native language (Wolof or Serere), except for the case of teachers that were interviewed in French. The moderator took notes of the discussions and tape recorded them as a support for his/her notes.

The total duration of the discussion of each focus group was approximately one hour. Drinks and candies were available for participants at the end of the discussion to thank them for their participation (see Appendix for questionnaires for each group).

5 Findings of quantitative analysis

5.1 Outcome 1: Students' performance on EGRA

Due to the data limitations, it was not possible to perform an impact evaluation. However, it was possible to find the association between program exposure and students' performance on the EGRA. The analysis compares the scores of students at the end of the program (2017) who had a higher exposure to it and the scores of students in the first wave of testing in 2015 who had less exposure to the program and serve as a comparison group. This comparison is made for the total scores and for each of the sections of the test (whenever possible) in order to assess any change in the overall performance of students, as well as in specific reading skills. The analysis is made by grade levels, first by the total number of students who took the test and then divided by gender.

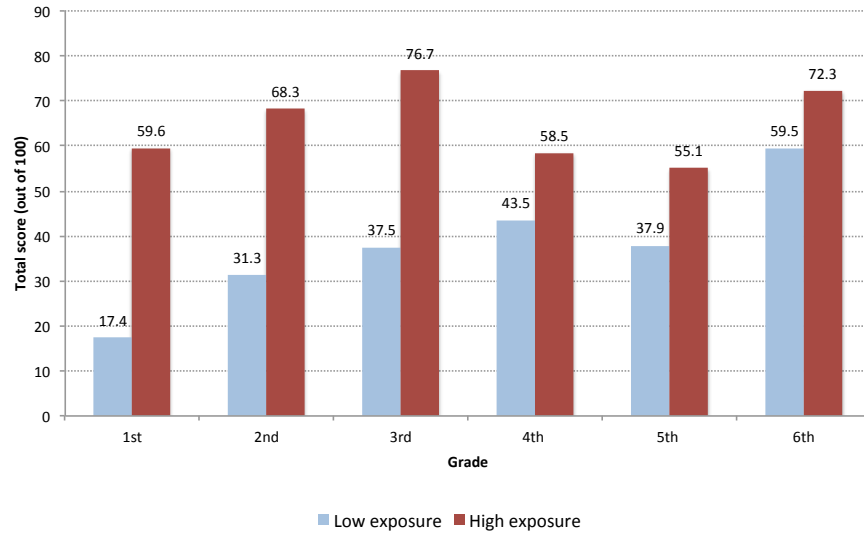
It is important to note that in the case of the first-grade students, the high exposure group was only exposed to the program activities at school for one academic year since they were just starting their primary education and the exam took place at the end of that academic year. But, they were exposed to the other extracurricular activities and had access to centers or mobile libraries since the beginning of the program.

One limitation of this pre-post analysis is that any observed change in students' performance on the test cannot be fully attributed to the program. During the time period under analysis other programs or situations such as health, sanitation or other relevant policies may have been in place. These could affect the performance of students on the test as students with better health are expected to be, for example, more focused in class or have more energy to attend extracurricular reading activities than those with poorer health. Also, there could have been changes in individual unobserved characteristics such as changes in attitudes not related to the program that could have affected the outcome of interest. Then, the results shown here are suggestive of the effects of the program.

5.1.1 Total sample of students

Figure 1 shows the average total score of the high (red bars) and low (blue bars) exposure groups by grade level. As can be seen, the average score is higher for the higher exposure group than for the lower exposure group for all grade levels. The difference between these two groups is particularly high in the lower levels of education: first, second, and third grade.

Figure 1. EGRA average total score by level of exposure to program and grade



To understand how much of that difference is directly associated to higher exposure to the program, a regression analysis was done (see Appendix for description of methodology and complete tables of results by grade). Table 1 below shows a summary of the results of that analysis by grade level. These results are presented as percentage points.

Table 1. Change in EGRA scores associated to high program exposure by grade for total sample of students (percentage points)

Grade	Total score	Comprehension	Oralization
1st grade	42.2	—	—
2nd grade	31.3	—	—
3rd grade	40.7	22.2	53.0
4th grade	13.6	17.9	10.1
5th grade	23.3	19.5	25.9
6th grade	18.5	15.2	27.4

Higher exposure to the program is associated to higher test scores. This is true for the total score and for the scores of each of the sections of the test. It can be seen that higher exposure to the program is associated to higher *total scores* that range from 13.6 to 42.2 percentage points. The highest change in total test scores happened for the first-grade students: a higher exposure to the program is associated to 42.2 percentage points higher scores.

In terms of the *specific reading skills* tested, the positive change in test scores is higher for oralization than for comprehension for all grades, except the fourth grade. One difference that stands out is that of students in the fourth grade: those who were exposed to the program longer had 53.0 percentage points higher scores than those with less exposure.

Although these changes cannot be completely attributed to the program, they can be represented in terms of standard deviations and compared to the effect sizes of other studies to understand their magnitude. As seen in the Appendix, the results in standard deviations range from 0.71 to 2.93. The literature review in section 2 showed that there are several literacy interventions in African countries such as Liberia, Kenya, and Uganda, among others, with effect sizes that range from no effect to up to one SD. Then, it is worth noting that **the smallest change in total test scores associated to Our Sisters Read program is about three times larger than that found on those studies**, while the highest change in total test scores associated to the program is over 10 times higher.

Analysis by gender

The analysis by gender shows that a higher exposure to the program is associated to higher *total test scores* for both girls and boys. This can be seen in table 2 below. Columns 2 and 3 show the results for the total test scores, while columns 3 and 4 show results for the comprehension section and columns 5 and 6 estimates for the oralization section.

Table 2. Change in EGRA scores associated to high program exposure by grade and gender (percentage points)

Grade	Total		Comprehension		Oralization	
	Girls	Boys	Girls	Boys	Girls	Boys
1st grade	39.6	45.9	—	—	—	—
2nd grade	29.7	32.9	—	—	—	—
3rd grade	39.9	41.5	19.1	24.4	53.5	52.8
4th grade	19.1	8.4	22.1	43.0	15.2	6.1
5th grade	26.3	19.5	22.6	16.7	29.0	21.4
6th grade	17.0	21.1	14.8	17.2	25.1	30.6

The positive association between program exposure and total scores is higher for girls than for boys in the fourth and fifth grades (see columns 1 and 2 of table 2). Girls in the fourth grade that were exposed to the program longer had 19.1 percentage points higher test scores, while boys with higher exposure have 8.4 percentage points higher scores; in fifth grade, the scores of girls with high exposure is 26.3 percentage points than those with low exposure, while for boys they are 19.5 percentage points higher. For the rest of the grades, boys had a higher change in scores than girls.

Regarding the *comprehension* skills, being in the program for a longer period of time is associated to higher scores of boys and girls. This positive association is larger for girls than for boys in the fifth grade only (22.6 percentage points for girls and 16.7 percentage points for boys). For the rest of the grades the association is larger for boys.

One possible explanation of the differences in gender could be differences in observed and unobserved baseline characteristics of boys and girls. For example, during the focus group discussions several teachers argued that, even before the introduction of the program, girls tend to be more engaged and enthusiastic about reading activities (see section 6). This could mean that girls are already highly motivated to the degree that the program affected them less than boys who were not as motivated. It could be seen as a sort of ceiling effect for the girls (for example, as in Yeung, Lau, and Nie (2011) for 5th grade students in Singapore).

In the case of *oralization* skills (see columns 5 and 6 of table 2), the change in scores is very similar for boys and girls of all grades. The high association for third grade students is particularly noteworthy: girls who were exposed to the program longer have, on average, 53.5 percentage points higher scores than those with less exposure; for the boys the scores were 52.8 percentage points higher.

5.2 Outcome 2: Students' time spent in reading for enjoyment

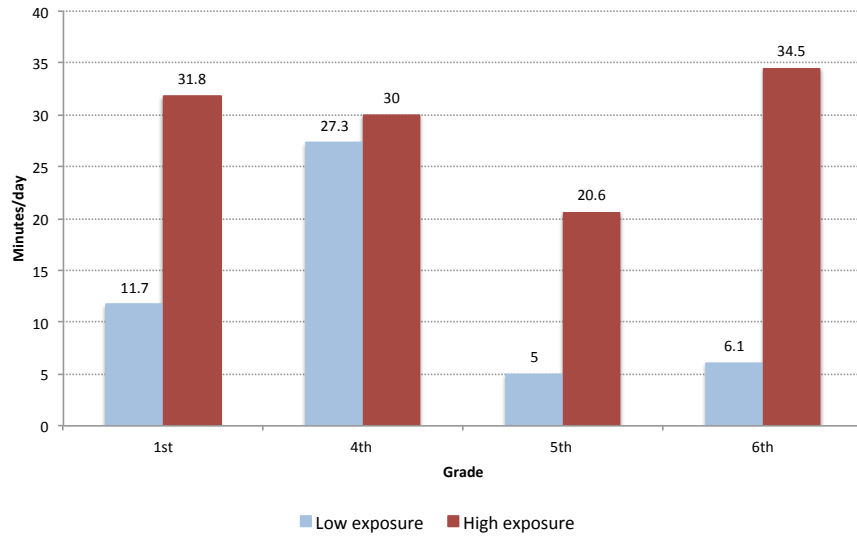
As mentioned in section 2, the literature suggests that there is an association between reading enjoyment and performance in assessments as enjoying reading increases the total time spent reading (OECD, 2011; Sullivan and Brown, 2015; Anderson, Wilson, and Fielding, 1986; Taylor, Frye, and Maruyama, 1990). The idea behind this is that through practice, students increase their reading skills and, therefore, improve their performance in reading tests. Then, given the positive results in the section above we could expect to see a positive association between the program and the time students spend reading for enjoyment.

Measuring enjoyment for reading is a difficult task. One measure widely used in the literature is a self-reported measure of the time spent in reading for enjoyment. Then, to understand the association between being in the program and reading for enjoyment, the outcome of time spent in reading for enjoyment is used along with the same methodology as that of the assessment scores outcome in which students are compared according to their exposure to the program (see Appendix for methodology). Note, as in the case of the EGRA performance, high exposure to the program of first graders refers to only one academic year as they are just starting elementary school. Also, as mentioned in section 3, students in the second and third grades were not surveyed in the last year of the program, so the analysis for those grades compares students in December 2015 to students in June 2016. As in the case of the EGRA scores, this pre-post analysis poses the limitation of not being able to isolate the effect of the program on the time students spend reading for enjoyment. But, it is suggestive of that effect.

Figure 2 shows the average minutes that students in the first, fourth, fifth, and sixth grade spend reading for enjoyment. It compares students with low and high exposure to the program, where low exposure refers to students in December 2015 and high exposure to students in May 2017. As can be seen, for all grades, students with a high exposure to the program reported spending more time reading for enjoyment than those with a low exposure. The biggest difference between these two groups can be seen for the sixth grade and the smallest difference is between the groups in fourth grade.

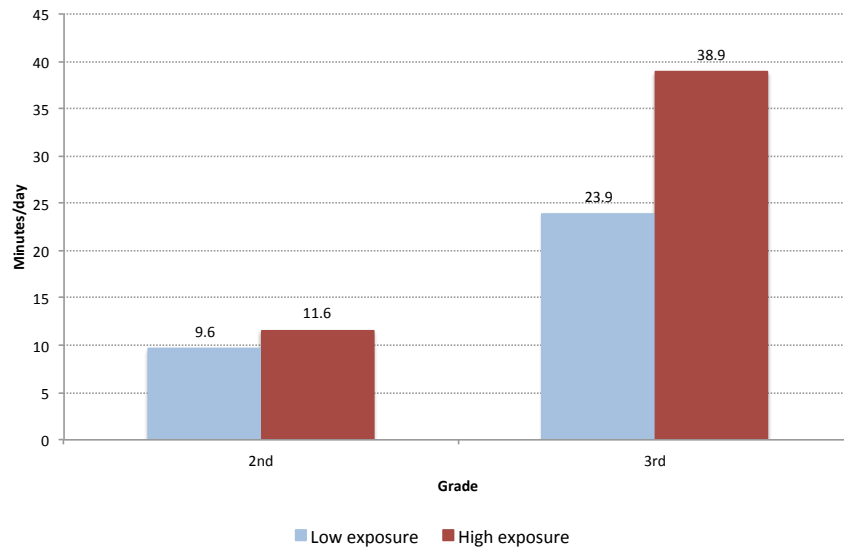
In the case of grades two and three, the low exposure students are those surveyed in December 2015 and the high exposure students are those surveyed in June 2016. Figure 3 below shows the average time that these two groups spend reading for enjoyment. In this case too, students who were exposed more time to the program spend more time reading for enjoyment, on average, than those with less exposure. The difference between these groups is larger for the

Figure 2. Average time spent reading for enjoyment (minutes per day) of students in grades 1 and 4-6



third grade than for the second grade.

Figure 3. Average time spent reading for enjoyment (minutes per day) of students in grades 2 and 3



The results of the estimation described in the Appendix are shown in table 3. The table shows that **higher exposure to the program is associated to more time spent reading for enjoyment** for students in the first, fifth, and sixth grades. For first grade students, a high exposure to the program is associated to 19.9 more minutes per day of reading for enjoyment; for fifth grade students, high program exposure is associated to 14.5 more minutes per day. Finally, it stands out that for the sixth grade being in the program for a longer period of time is associated to 31.2 more minutes of reading for enjoyment per day.

For the rest of the grades, there was no statistically significant association between the program and this outcome. It is important to mention that the latter could be a consequence of having information only on a small sample of students.

Table 3. Change in time spent reading for enjoyment associated to high program exposure by grade (minutes per day)

Grade	Change in time reading enjoyment
1st grade	19.9
2nd grade	N.S.
3rd grade	N.S.
4th grade	N.S.
5th grade	14.5
6th grade	31.2

Notes: For grades 1 and 4-6 the low exposure group is formed by the students surveyed in December 2015 and the high exposure group by those surveyed in May 2017. For grades 2 and 3, the low exposure group is also formed by students surveyed in December 2015, but the high exposure group refers to those students surveyed in June 2016. "N.S." means not statistically significant association between exposure to the program and time spent reading for enjoyment.

To support these findings, we can also observe the increase in student engagement through the number of students in the program that borrow books from the library, use the computer rooms at the ICT centers, and participate in extracurricular reading activities organized by the program, as well as indirectly through the number of children reached by mobile labs and the reports of teachers and tutors².

Figure 4 shows three indicators of student engagement. From 2016 to 2017, the number of students in the program that checked out materials from the library increased 38% from 7,002 students to 9,663. The number of students that visited the computer rooms at the Toubacouta and Sokone ICT centers increased 69% from 1,443 in 2016 to 2,439 in 2017. Also, there was an increase of 211% in the number of students in the program who participated in extracurricular reading activities: 1,182 students attended in 2016 and 3,674 in 2017.

The students who do not live close to the Toubacouta or Sokone centers were reached through mobile labs. Figure 5 shows the number of students reached by these labs divided by gender from 2014 to 2017. This number increased every year with a total increase of 257% from 2014 to 2017 going from a total of 2,641 students to 9,416. Also, every year more girls than boys were reached by the mobile labs.

Perceptions of teachers and tutors can also shed some light on changes in students' engagement in reading. From 2015 to 2017, the percentage of teachers who reported increased student engagement in reading went from 80% to 89% (see figure 6). The percentage of tutors who reported an increase in student engagement in reading in after school tutoring increased every year from 67% in 2015 to 99% in 2017 (figure 6).

²Data for 2017 includes preliminary data for the fourth quarter, so these numbers are expected to be higher.

Figure 4. Indicators of student engagement in 2016 and 2017 (number of students)

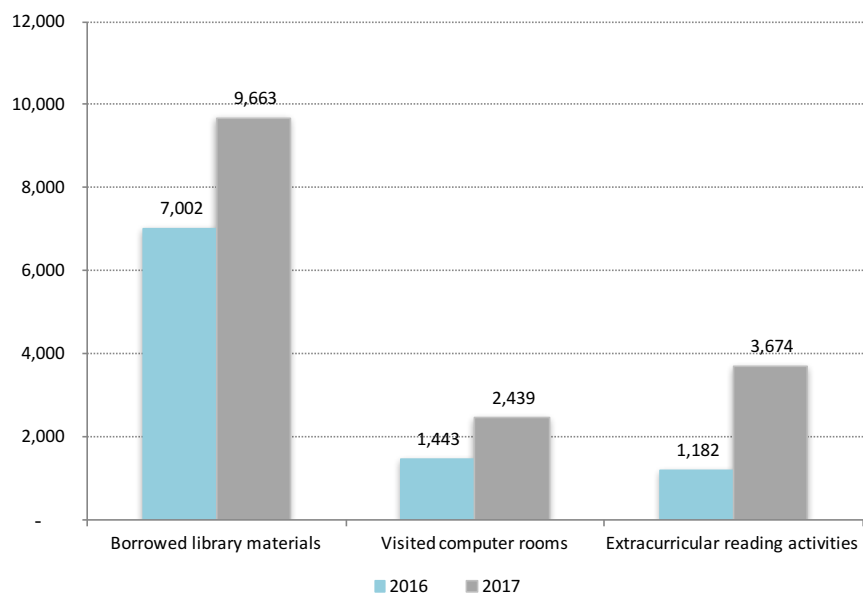


Figure 5. Number of students reached by mobile labs by gender (2014-2017)

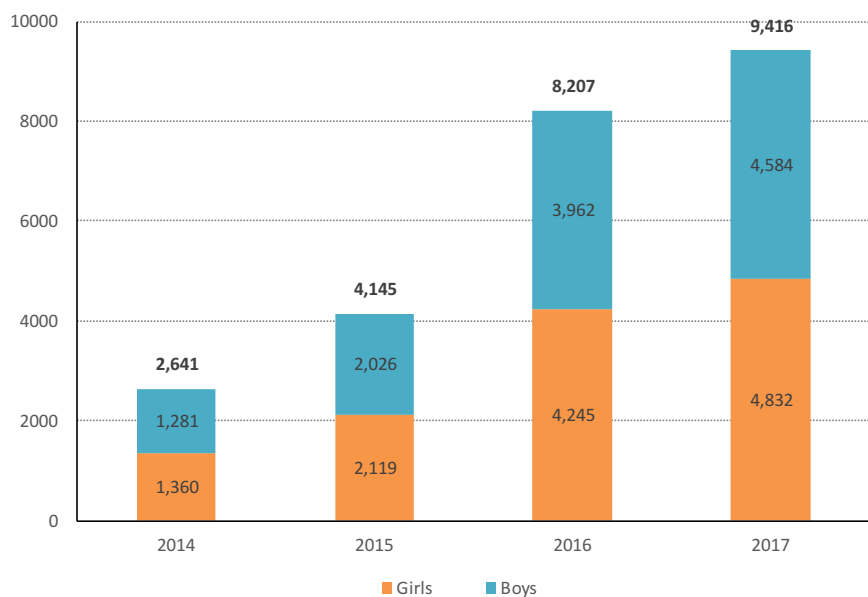
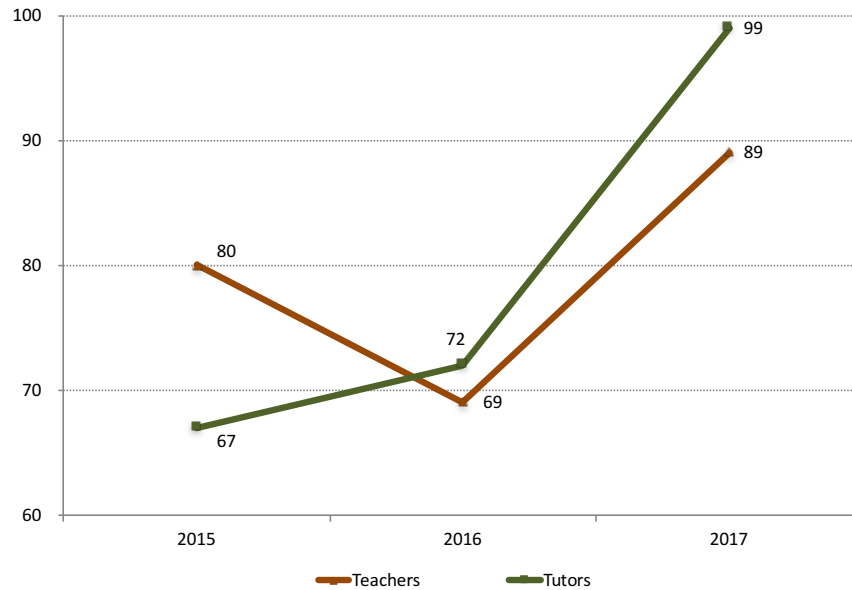


Figure 6. Percentage of teachers and tutors who report increased student engagement, 2015-2017



5.3 Outcome 3: Parents' perspectives on literacy

As mentioned in section 3, to better understand the parents' perspectives on literacy, I will show basic statistics of measures obtained from the data collected in the survey and in the focus groups (section 6) of parents of students in the program.

Of the 32 parents surveyed, 53% were women and 47% were men. 31 of these parents had more than one child in total; six of them had the same number of girls and boys, while ten had more girls than boys and 15 more boys than girls. Also, 53% of these parents were illiterate. All of them reported that their children read at home between one and three times per day.

Almost all of the parents (31) reported that their opinion on the importance of reading changed after the start of the program. Among the reasons they mention for that change in opinion, they include:

- They find that their children's reading skills were improved.
- They see that the program's activities and resources encouraged their children to read more and enjoy reading.

Parents were also asked in which ways they or other family members encourage their child to read. Their responses are summarized as follows:

- They tell their children of the importance of reading and how reading will help them succeed in school and in life.
- Parents encourage their children to borrow books from a library.
- They supervise their reading and ask them to read out loud in front of them.
- They buy them books.

- Parents or older siblings read to them.
- They tell them that they can be an example to their siblings and friends.
- They ask them to read with other classmates and friends.
- Parents reward them when they read.

Parents also gave their opinion on what the school and teachers should do to encourage the children to read. Many of them mentioned that the schools should continually explain, to both parents and students, the importance of reading in general and of reading at home. They also suggested that parents and teachers work together to find ways in which the children can be more motivated to read. Several parents talked about the need for more access to reading materials, which include enough books for all students and having libraries wherever there aren't any, as well as having extracurricular classes. Finally, many of them mentioned that it is important for teachers to have innovative pedagogical skills and not to be aggressive in their teaching approach so that children are not afraid of learning and are more motivated to read.

To understand how engaged parents were in the program activities, parents were asked in which activities they participated. Around 63% of the parents said they participated in community meetings where they learned more about the program and the importance of reading. Also, 6% took part of the literacy courses. Two of the parents participated in the teacher training. About 31% of them reported not having participated in any activities. Parents who have more girls than boys seemed to be more engaged in program activities than those with more boy than girls. Of the ten parents whose total number of children includes more girls than boys, 80% reported having participated in community meetings and one of them in literacy classes, while only 20% said they hadn't participated in any activities. In the case of parents who have more boys than girls, 60% of them reported participating in community meetings and 27% said they did not participate in any of the program activities.

6 Findings of qualitative analysis (focus groups data)

The data collected through focus groups of teachers, students, and parents helps understand their beliefs and opinions about the program and about reading. This information also serves as support for the findings of the quantitative analysis. In this respect, it was important to examine whether there were other elements not related to the program that could have affected the outcomes of interest. Also, through the focus groups it was possible to understand if the program activities tackled the obstacles faced by parents, students, and teachers and their report on the frequency with which they used the program resources available to them.

Given that the quantitative analysis included a before-after identification strategy, there might be doubts as to whether other factors could have affected the outcomes of interest so that the results shown in the previous section may not be fully attributed to the program. Then, it is important to understand how much of this association can be attributed to the program by learning what other factors could have been at play. One of these could be another educational program or practices by teachers. Teachers were asked whether they included in their classes reading activities that were not part of the program nor the curriculum of the Ministry of Education. They all responded that they did not, especially since they already have limited

time to dedicate to reading. Although other programs or unobserved characteristics could have affected the outcomes of interest, knowing that these teachers did not introduce any other educational practices other than the activities of the program helps make a case that the program could be associated to the changes observed in the outcomes of interest. The only other educational program mentioned by teachers was WGEP's Our Sisters to School program, which they said could have affected the motivation of girls and boys differently as boys did not have access to the program.

The program tackles the main obstacles to reading mentioned by parents and teachers. Some of these obstacles include: not having access to enough resources (books and materials at school and at home), not having enough time to dedicate to reading (due to time spent in other home responsibilities or school tasks), not having lighting at home, and not having extracurricular reading activities, especially for students who are lagged behind. Through the program, students had access to culturally relevant books that were appealing to their interests. Teachers mentioned that it was important not only to have enough books, but to have books that included pictures and images that the children could relate to (culturally and age appropriate) so that they could be more motivated to read.

The following subsections show what was found through the focus groups that was related to each of the three outcomes of interest.

6.1 Outcome 1: Students' performance on EGRA

As was mentioned in section 2 student motivation can affect performance on tests. More motivated students will read more and, therefore, increase their scores due to practice. All of the teachers reported that since the beginning of the program students were more motivated to read. They indicated that for the children living close to the Sokone and Toubacouta centers, the activities and resources available were the source of that motivation. Also, they mentioned that for those living in the villages that do not have electricity, having access to solar lanterns and books motivated them to read more at home. Reading competitions were mentioned as an additional way in which children were more motivated to read. Also, the parent literacy classes were also mentioned as a source of increased motivation as parents were then able to read with their children. Finally, many of the teachers mentioned that the way in which the reading activities were set up as a sort of game, both at school and at the centers or mobile labs, was a very important element to increase the motivation for reading.

With an increase in motivation, we could expect an increase in time spent reading. To that respect, parents reported that their children read in front of them. They mentioned that their children read between one and two times per day when they are home. Additionally, many of the parents mentioned that their children's reading skills were noticeably improved. For example, they said that after the program started their children obtained better grades and could read by themselves without any help.

Regarding any differences between girls and boys, some of the teachers mentioned that both the girls and boys were equally motivated to read and participate in school activities after the beginning of the program. However, most of them reported that it is the girls that are more motivated than the boys, even before the beginning of the program. One of the factors that can explain the higher motivation of girls prior to the program is their participation in WGEP's other program, Our Sisters to School, that was in place before Our Sisters Read. The teachers explained that given that Sisters to School was aimed at girls exclusively, girls were

more motivated than boys before Ours Sisters Read started. Then, this higher motivation of girls before the beginning of the program could explain part of the stronger association between exposure to the program and EGRA scores for boys than for girls in most of the grade levels. That is, the program could have affected the boys more because they were prone to a bigger variation than girls.

6.2 Outcome 2: Students' time spent in reading for enjoyment

The quantitative analysis suggests that, on average, higher exposure to the program is associated with more time spent in reading for enjoyment. The qualitative data supports this claim as all students report liking the reading activities at school and they all reported borrowing books from the libraries (centers and mobile libraries). Additionally, all of the children mentioned that they think it is important to read frequently. One of the most common reasons they mentioned as to why reading frequently is important was to succeed academically. They mentioned that reading frequently can help them learn more easily, strengthen their knowledge, and understand difficult words and concepts. Many of them mentioned that reading frequently could help them pursue higher degrees. Another reason was to help other family members read or teach them how to read.

Both teachers and parents indicated that they believe children were more motivated to read after the program started operating. Some of the parents reported that their children did not want to go to school or were never seen with a book previous to the program. However, after the program they were more enthusiastic about going to school and borrowing books from the library and using the tablets and computers in centers. Also, parents mentioned that they see their children go to the centers in the afternoon and with their books and solar lanterns (in the case of rural villages). Although they all indicated that their children borrow books from the library, most of them were not aware of how many times per month their children borrow books. Those who did know reported their children borrowed books between one and three times per month. In the case of parents that live in Sokone and Toubacouta, close to the ICT centers, all of them mentioned that their children visited the centers every week. Most of them indicated that their children visited the centers 1-3 times per week.

6.3 Outcome 3: Parents' perspectives on literacy

As was found from the surveys, several parents (around 30%) in the focus groups indicated that access to more resources could help their children improve their reading skills. They listed having enough books for all of the students, a library, lamps to read at night, and after-school classes as the resources needed. Some of them mentioned the importance of alphabetizing parents and teaching them about the importance of reading, which are interventions provided by Our Sisters Read.

Also, parents talked about the positive consequences of reading frequently. Many of them indicated that it can increase their children's knowledge and advance them academically, as well as help them understand new knowledge better. Similarly, they mentioned that one consequence of reading often is an increase in the children's performance in tests. Several parents believe reading is the base of all knowledge, so that it is essential to advance academically and professionally in the future. In their opinion, reading frequently will help their children succeed

in life and will benefit their families and country. Additionally, some of the parents mentioned that reading frequently will help their children discover new things.

One way to understand how engaged parents or other family members are in reading activities with their children was to ask students who reads with them at home. Only two of the students answered that no one reads with them, while the rest mentioned at least one other family member. Most of the children reported that they read with a sibling and the rest with their parents or other family members.

To understand what parents believe is their role in encouraging their children to read, they were asked who they thought was responsible for that encouragement. All of the parents who gave an answer (37 parents) said it is the parents who are responsible. About 22% of them mentioned it is a shared responsibility between the parents and the teachers and 32% said that all the community should be involved. One of the reasons mentioned by many of the parents as to why they should be the ones encouraging their children was that they are the ones who are closer to the children and spend more time with them. Those who said it is a shared responsibility with the teachers explained that the teachers are responsible when the children are in school and then it is the parents who should encourage them once they are home. Finally, many of the parents mentioned that the success of the children is the success of the community as motivating them will translate into educated citizens that will benefit all of them in the future.

Although the parents seem to understand the importance of their role in motivating their children to read, they mentioned three main obstacles that they encounter in helping their children to read:

1. Being illiterate or not having enough education (including not speaking French).
2. Not having enough time to spend reading with their children.
3. Not having enough money to buy them books or other materials needed for reading.

Teachers as well mentioned that one of the obstacles that children encounter to improve their reading skills is not having enough time to read at home and not having the support of their parents when they are illiterate.

7 Conclusions

This evaluation aimed at understanding the association between exposure to Our Sisters Read program and three main outcomes of interest: EGRA scores, time spent reading for enjoyment, and parents' perspectives on literacy. It was found that higher exposure to the program is associated with higher EGRA scores and more time spent reading for enjoyment. Also, parents seem to understand the importance of reading. The quantitative analysis is only suggestive of the impact of the program, but there seems to be a statistically significant and positive association of being exposed to the program and outcomes that have been found in the literature as important for academic and professional success, as well as for psychological outcomes.

Regarding the EGRA scores, the program seems to be particularly relevant for oral reading skills and for students in the third grade. The association between higher exposure and test scores was higher for boys than for girls for all grades except the fourth and fifth. In the focus groups several teachers mentioned girls were more motivated to read before the beginning of

the program, which could explain this difference. Several parents and teachers indicated that the students made academic improvements: they learned to read or read better and got better grades after the introduction of the program.

Indicators of student engagement show that at the end of the program more students borrowed library materials, visited the computer rooms, and participated in extracurricular reading activities. Also, by the end of the program almost all teachers and tutors surveyed reported an increase in student engagement. The regression analysis showed that, on average, higher exposure to the program was associated with more time spent reading for enjoyment for years one, five, and six. The effect was not statistically significant for the rest of the years, which could be due to the small sample size. Direct indicators of usage and also indirect qualitative measures showed that students were more motivated and enjoyed reading more after the start of the program.

Parents' perspectives on literacy were measured through statistics from survey data and data collected through focus groups. Parents explained the positive effects reading frequently and mentioned the ways in which they encourage their children to read. They face obstacles of illiteracy and access to reading materials, but all mentioned it is their responsibility to encourage their children to read. Children mentioned their parents or siblings help them to read at home and more than half of the parents mentioned they participated in program activities, which are indicators of parent engagement. It is important to note that there was no baseline data and the number of parents interviewed was small, so it is unknown whether these perspectives were affected by the program or not.

Additional data is necessary for evaluating the impact of the program on the three outcomes of interest. Nonetheless, the results of the quantitative and qualitative analyses suggest exposure to the program is associated with better academic outcomes and more motivated students. By the end of the program parents who were surveyed understand the importance of reading and have found ways to support their children's education.

Appendix

A Questions focus groups

A.1 Questions for Teachers

1. In your opinion, what could help your students to read more?
2. In your opinion, what is the greatest obstacle or obstacles faced by your students to improve their reading skills?

Regarding the activities developed by Femmes Plus and its program Our Sisters Read:

3. Which activity/activities do you think your students liked the most?
4. What obstacles did you encounter in teaching the activities?
5. Do you have any ideas to improve the different activities? If yes, could you share those ideas with us?
6. Other than the activities of Our Sisters Read and those of the Ministry of Education, do you have any other reading activities?
7. Will you continue doing the activities developed by Femmes Plus? Why?
8. Will you have any obstacle(s) in continuing doing those activities?
9. After the beginning of the program, do you think your students are more motivated to read? Why?
10. After the beginning of the program, who do you think is more motivated to read, the girls or the boys? Why?
11. Is there any difference between the participation in the activities of boys and girls after the beginning of the program? Why do you think that happens?
12. In your opinion, who should encourage the children to read, the teachers, the parents or everyone? Why?
13. Do you have any other observations?

A.2 Questions for Students

1. Do you like the reading activities you do at school?
2. Is there an activity in particular that you like to do the most? Which one?
3. Who reads with you at home?
4. Do you think it is important that your parents read with you? Why?
5. Do you prefer reading by yourself or with someone else? For example, with your friends, parents, teachers? Why?

6. When you are not in school, where do you normally read?
7. Do you like borrowing books from the library/mobile library?
 - (a) Could you tell us the title of the books you borrowed?
8. If you go to the Center, what do you like doing the most? [Sokone and Toubacouta]
 - (a) What do you do in the computer lab/library?
9. Do you think it is important to read frequently? Why?
10. Do you have any other observations?

A.3 Questions for Parents

1. Do your children read in front of you?
2. How much time do you think your children read at home?
3. In your opinion, what can be done at school or home to help your children improve their reading skills?
4. What obstacle(s) do you have to help your children read?
5. Do your children visit the Center? If they do, how many times per week? [Sokone et Toubacouta]
6. Have your children borrowed books from the library/mobile library? If they have, how many times per month?
7. Do you think your children are more motivated to read after the beginning of the program Our Sisters Read? Why?
8. What do you think is the importance of reading frequently for your children's future? ["Reading frequently is different than learning to read"]
9. In your opinion, who should encourage the children to read, the teachers, the parents or everyone? Why?
10. Do you have any other observations?

B Methodology (Identification strategy) and complete regression table results for EGRA scores

I estimate the following equation to understand the association between program exposure and EGRA test scores (estimates in section 5) and time spent reading for enjoyment:

$$y_i = \alpha_0 + \delta T_i + \alpha X_i + \gamma_s + \varepsilon_i \quad (1)$$

where y is the outcome variable; T is a dummy variable that indicates whether the student was tested at the end of the program in 2017 (high exposure- treatment) or in 2015 (low exposure-comparison); X includes a series of control variables; γ_s are school fixed effects; and, δ is the parameter of interest.

The estimates from this regression are shown in the tables below for each of the grades.

Table 4. Results of regression analysis of EGRA total scores and program exposure of first grade students (2015 vs. 2017)

	Total Score		
	Total	Girls	Boys
Change 2015-2017	0.422*** (0.074)	0.396*** (0.082)	0.459*** (0.064)
Intercept	-0.137 (0.220)	-0.0001 (0.271)	-0.266 (0.179)
SD 2015	0.145	0.146	0.145
Change in SD	2.903	2.711	3.158
No. of students	1,078	590	488

Notes: Significance levels: * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. Clustered robust standard errors in parentheses. Results include school fixed effects and control for dummies of language spoken at home, age, and a dummy variable of whether the student repeated the school year or not. Columns 1 for the total sample also includes a control for gender. SD 2015 refers to the standard deviation of scores of students in sixth grade in 2015 (comparison group). The change in standard deviations is calculated as the ratio of the coefficient of the group of students in 2017 ("treatment" group) and the SD of the group of students in 2015 (comparison group). Dependent variable is EGRA total scores on a scale of 0-1.

Table 5. Results of regression analysis of EGRA total scores and program exposure of second grade students (2015 vs. 2017)

	Total Score		
	Total	Girls	Boys
Change 2015-2017	0.313*** (0.061)	0.297*** (0.075)	0.329*** (0.054)
Intercept	0.185 (0.125)	0.324* (0.172)	0.102 (0.145)
SD 2015	0.171	0.171	0.171
Change in SD	1.829	1.744	1.917
No. of students	1,054	533	521

Notes: Significance levels: * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. Clustered robust standard errors in parentheses. Results include school fixed effects and control for dummies of language spoken at home, age, and a dummy variable of whether the student repeated the school year or not. Columns 1 for the total sample also includes a control for gender. SD 2015 refers to the standard deviation of scores of students in sixth grade in 2015 (comparison group). The change in standard deviations is calculated as the ratio of the coefficient of the group of students in 2017 ("treatment" group) and the SD of the group of students in 2015 (comparison group). Dependent variable is EGRA total scores on a scale of 0-1.

Table 6. Results of regression analysis of EGRA scores and program exposure of third grade students (2015 vs. 2017)

	Total			Comprehension			Oralization		
	Total	Girls	Boys	Total	Girls	Boys	Total	Girls	Boys
Change 2015-2017	0.407*** (0.065)	0.399*** (0.072)	0.415*** (0.071)	0.222*** (0.052)	0.191*** (0.041)	0.244*** (0.073)	0.530*** (0.100)	0.535*** (0.115)	0.528*** (0.099)
Intercept	0.327** (0.136)	0.485** (0.196)	0.204* (0.106)	0.252* (0.141)	0.417** (0.187)	0.115 (0.135)	0.379** (0.157)	0.533** (0.241)	0.264** (0.122)
SD 2015	0.193	0.191	0.196	0.303	0.303	0.303	0.205	0.196	0.213
Change in SD	2.106	2.084	2.121	0.732	0.630	0.805	2.586	2.725	2.483
No. of students	1,022	506	516	1,022	506	516	1,022	506	516

Notes: Significance levels: * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. Clustered robust standard errors in parentheses. Results of total sample (columns 1, 4, and 7) include school fixed effects and control for gender, language spoken at home, age, and a dummy variable of whether the student repeated the school year or not. Columns 2, 5, and 8 show results for the sample of girls and columns 3, 6, and 9 for the sample of boys controlling for dummies of language spoken at home, age, and a dummy of repeated school year. SD 2015 refers to the standard deviation of scores of students in sixth grade in 2015 (comparison group). The change in standard deviations is calculated as the ratio of the coefficient of the group of students in 2017 ("treatment" group) and the SD of the group of students in 2015 (comparison group). Dependent variable is EGRA scores on a scale of 0-1.

Table 7. Results of regression analysis of EGRA scores and program exposure of fourth grade students (2015 vs. 2017)

	Total			Comprehension			Oralization		
	Total	Girls	Boys	Total	Girls	Boys	Total	Girls	Boys
Change 2015-2017	0.136*** (0.023)	0.191*** (0.020)	0.084*** (0.071)	0.179*** (0.045)	0.221*** (0.036)	0.430* (0.061)	0.101*** (0.028)	0.152*** (0.032)	0.061** (0.028)
Intercept	0.055 (0.221)	0.085 (0.246)	0.101 (0.220)	0.014 (0.257)	0.020 (0.283)	0.033 (0.294)	0.119 (0.210)	0.200 (0.245)	0.146 (0.208)
SD 2015	0.193	0.186	0.200	0.256	0.246	0.265	0.232	0.228	0.236
Change in SD	0.705	1.023	0.420	0.700	0.902	0.461	0.438	0.667	0.259
No. of students	865	435	430	865	435	430	865	435	430

Notes: Significance levels: * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. Clustered robust standard errors in parentheses. Results of total sample (columns 1, 4, and 7) include school fixed effects and control for gender, language spoken at home, age, and a dummy variable of whether the student repeated the school year or not. Columns 2, 5, and 8 show results for the sample of girls and columns 3, 6, and 9 for the sample of boys controlling for dummies of language spoken at home, age, and a dummy of repeated school year. SD 2015 refers to the standard deviation of scores of students in sixth grade in 2015 (comparison group). The change in standard deviations is calculated as the ratio of the coefficient of the group of students in 2017 ("treatment" group) and the SD of the group of students in 2015 (comparison group). Dependent variable is EGRA scores on a scale of 0-1.

Table 8. Results of regression analysis of EGRA scores and program exposure of fifth grade students (2015 vs. 2017)

	Total			Comprehension			Oralization		
	Total	Girls	Boys	Total	Girls	Boys	Total	Girls	Boys
Change 2015-2017	0.233*** (0.062)	0.263*** (0.058)	0.195*** (0.070)	0.195** (0.071)	0.226*** (0.069)	0.167* (0.083)	0.259*** (0.071)	0.290*** (0.073)	0.214*** (0.074)
Intercept	0.428*** (0.080)	0.443*** (0.077)	0.396*** (0.133)	0.354*** (0.114)	0.355*** (0.099)	0.310* (0.170)	0.470*** (0.105)	0.492*** (0.119)	0.448** (0.174)
SD 2015	0.190	0.190	0.190	0.252	0.251	0.252	0.239	0.240	0.239
Change in SD	1.227	1.384	1.027	0.776	0.899	0.661	1.085	1.209	0.897
No. of students	972	508	464	972	508	464	972	508	464

Notes: Significance levels: * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. Clustered robust standard errors in parentheses. Results of total sample (columns 1, 4, and 7) include school fixed effects and control for gender, language spoken at home, age, and a dummy variable of whether the student repeated the school year or not. Columns 2, 5, and 8 show results for the sample of girls and columns 3, 6, and 9 for the sample of boys controlling for dummies of language spoken at home, age, and a dummy of repeated school year. SD 2015 refers to the standard deviation of scores of students in sixth grade in 2015 (comparison group). The change in standard deviations is calculated as the ratio of the coefficient of the group of students in 2017 ("treatment" group) and the SD of the group of students in 2015 (comparison group). Dependent variable is EGRA scores on a scale of 0-1.

Table 9. Results of regression analysis of EGRA scores and program exposure of sixth grade students (2015 vs. 2017)

	Total			Comprehension			Oralization		
	Total	Girls	Boys	Total	Girls	Boys	Total	Girls	Boys
Change 2015-2017	0.185*** (0.021)	0.170*** (0.028)	0.211*** (0.020)	0.152*** (0.032)	0.148*** (0.040)	0.172*** (0.032)	0.274*** (0.037)	0.251*** (0.034)	0.306*** (0.041)
Intercept	0.711*** (0.068)	0.796*** (0.082)	0.670*** (0.084)	0.729*** (0.127)	0.826*** (0.202)	0.667*** (0.088)	0.671*** (0.100)	0.769*** (0.138)	0.616*** (0.109)
SD 2015	0.191	0.207	0.174	0.232	0.245	0.219	0.234	0.248	0.219
Change in SD	0.965	0.822	1.212	0.653	0.602	0.785	1.170	1.011	1.393
No. of students	853	444	409	853	444	409	853	444	409

Notes: Significance levels: * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. Clustered robust standard errors in parentheses. Results of total sample (columns 1, 4, and 7) include school fixed effects and control for gender, language spoken at home, age, and a dummy variable of whether the student repeated the school year or not. Columns 2, 5, and 8 show results for the sample of girls and columns 3, 6, and 9 for the sample of boys controlling for dummies of language spoken at home, age, and a dummy of repeated school year. SD 2015 refers to the standard deviation of scores of students in sixth grade in 2015 (comparison group). The change in standard deviations is calculated as the ratio of the coefficient of the group of students in 2017 ("treatment" group) and the SD of the group of students in 2015 (comparison group). Dependent variable is EGRA scores on a scale of 0-1.

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