

How much time family members spend reading with young children at home? Evidence from Zambia

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Abstract

In this study we use data collected on a sample of 2nd and 3rd graders in Zambia to analyze the amount of time they spend reading with their relatives. We find that sisters are the type of relative that spends the most time reading with young children. We also find that there are no major differences by gender of the child in how much time family members spend reading with him or her. The exception are grandfathers, who spend more time reading with their grandsons than with their granddaughters. We also estimate the correlation between the time family members spend reading with their children and their reading skills. Although we find a positive and significant correlation between time spent reading and EGRA scores, the documented slopes are relatively small.

1. Introduction

Joint reading is widely held as a powerful strategy for parents to help their children learn how to read. In developing countries the extent to which joint reading can affect children's reading skills is restricted by two conditions that, on average, are less binding in developed countries: availability of reading materials and parental reading skills. On the other hand, families in developing countries are bigger than in developed countries, so children may have more joint reading time just because there are more people at home. Along these lines, documenting who reads with young children in developing countries, and how often, constitutes an important policy question if we want to understand how to improve the design of programs aimed at enhancing home literacy environments; what spillover effects can be expected from different reading programs, including adult reading programs; and if there are any gender-driven differences that affect how often family members read with children that can have implications in terms of gender inequality. In this study we use data collected on a sample of 2nd and 3rd graders in Zambia's Eastern province to document the amount of time family members spend reading with children.

To conduct this analysis, we use baseline data collected for the impact evaluation of *Makhalidwe Athu* (MA), a program aimed at improving the reading skills of a sample of students in Zambia's Eastern province. For nine months MA provided short stories for 2nd and 3rd graders at low (zero) cost, by sending participant households three text messages on their mobile phones each week. These three messages comprise a short story for children to read with their families. By

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providing students with these stories it is expected that their interest in reading will increase, as well as the time they spend reading on their own and with other family members. As reading time increases, so their reading skills will improve.

To evaluate this program we collected baseline data on a sample of 2nd and 3rd graders Zambia's E province. We surveyed these children using a version of the Early Grade Reading Assessment (EGRA). We also surveyed each child's caregiver. The caregivers' survey included questions on socio-demographic characteristics of the household members, as well as some information on household assets. Importantly for the present study, we also asked the caregiver how much time each household member spends reading with the 2nd and 3rd grader of the family (henceforth called the MA child), how much time the MA child reads on her/his own and other reading habits of the MA child.

We find that sisters are the type of relative that spends the most time reading with the MA child. According to our estimates, sisters spend 47 minutes per week, on average, reading with the MA child, while brothers spend 37 minutes per week. It is possible that boys spend more time in other activities that ultimately also benefit their younger siblings, like working outside the house (affecting household income) or simply playing with their younger sibling more often than older sisters do. However, if through spending more time reading with children older sisters have a greater impact on their younger siblings human capital, considering only private returns of educating girls constitutes an underestimation of the true impact of such type of investment (Qureshi, 2015).

We also find that there are no major differences by gender of the MA child in how much time family members spend reading with him or her. The exception are grandfathers, who spend more time reading with their grandsons than with their granddaughters. This suggests that, while older generations may tend to favor boys in their human capital investments, that is not occurring when we look at family members younger than the MA child's grandparents (i.e. parents, uncles, aunts, and older siblings and cousins). Previous research has documented gender-biased investments in developing countries in favor of boys (recent contributions include Jayachandran and Kuziemko, 2011; and Barcellos et al., 2014). In this study we find that, while such bias is apparent in older generations, the same cannot be said when we look at younger family members. This is in line with studies that show consistent reductions in gender gaps in terms of education attainment among other human capital indicators (World Bank, 2012).

Finally, we estimate the correlation between how often family members spend reading with MA child on his or her EGRA scores. Previous research has found positive and significant correlations between joint reading and reading skills (Bus et al., 1995 and Sénéchal and Young, 2008 review this literature). It is important to keep in mind that these correlations have no causal interpretation, as other factors can be explaining both test scores and time reading. That being said, although we find a positive and significant correlation between time spent reading and EGRA scores, the documented slopes are relatively small. However, it is worth highlighting that joint reading can impact not only reading achievement but also language comprehension and other language skills (Gest, Freeman, Domitrovich & Welsh, 2004), and attitudes towards

reading and attentiveness in the classroom (Rowe, 1991), so reducing the impact of joint reading to the analysis of reading test scores provides an incomplete account of its effects.

This paper is divided in five sections including this introduction. In the second section we describe the data used. In section 3 we present our estimates of the time households members spend reading with the MA child, and discuss differences by gender and type of household member. In section 4 we show our estimates for the correlations between time reading in reading skills. Section 5 concludes.

2. Data

We use data on the frequency at which each household member spends time reading with the MA focal child, as reported by the survey respondent. Specifically, in the MA caregiver baseline survey, we asked the respondent to report, for each household member, whether they read with the MA child four days a week or more, two or three days a week, one day a week, once or twice a month, less than once a month or never. The survey also asked how many minutes, on average, family members spent reading with the child each time.

To analyze the determinants of time spent reading with children, we focus on basic sociodemographics of each household member, including whether they know how to read and their type (grandparents, siblings, etc.), as well as sex of the focal child.

Table 1 shows descriptive statistics for all members of the surveyed households, specifically mean age, the fraction that knows how to read, the fraction that reads with the MA child at least once a week and the number of minutes they spend reading on average each time. Fathers are on average older than mothers, and grandfathers are also older than grandmothers, but for the other types of family members there seem to be no major age differences by gender, within comparable types of family members (uncles and aunts, brothers and sisters, etc.).

It is worth noting that the gender reading gap is greatest between grandparents than household members of younger age profiles. In effect, 86 percent of grandfathers know how to read, while only 53 percent of grandmothers know how to read, according to the survey respondent. This gender gap is smaller when we look at fathers and mothers (79 and 57 percent, respectively), or uncles and aunts (80 and 70 percent, respectively), and is negligible when we consider brothers and sisters (74 and 75 percent, respectively), or male vs female cousins (67 percent in both cases). While we have to keep in mind that the surveyed sample is not representative of grandparents (or any type of family member for that matter), these figures do suggest that the gender reading gap has been reducing over time in this area.

Fathers and sisters are the two types of family members most likely to read with the child at least once a week (53 and 52 percent, respectively). On the other hand, male cousins and uncles spend the most time reading in each session.

3. Time reading

To analyze more systematically the determinants of spending time reading with children, we run a regression on the frequency with which family members read with the child. To accommodate

the censored nature of the outcome of interest (responses for the question on the number of times family members read with the MA child were collected in terms of interval options rather than a continuous number of times), we run an interval type of model.¹

Table 2 presents the results of this exercise. In column (1) we include only the type of family member as covariates in the regression. The omitted category is ‘father’, so the coefficients should be considered as a comparison to fathers. The coefficient for mothers is negative but not significant, indicating that mothers’ spend roughly as many times a week reading with the child as fathers do.² The only family member with a positive and significant coefficient are the sisters. The rest of the household members observe negative correlations, implying that on average they read with the child less than fathers do, although the coefficients are not significant in all cases.

In column (2) we include an indicator variable for whether or not each family member knows how to read, as well as the gender of the respondent. Not surprisingly, the parameter on literacy is positive and significant. The main change observed is what happens to the parameter on grandmothers. While in column (1) the coefficient is negative and significant, in column (2) is positive but small and not significant, implying that once literacy is controlled for (and grandmothers are the type of family member least likely to know how to read), grandmothers read as much with the MA as fathers do (the excluded category), and more than the grandfathers. A similar effect is observed for other females.

In order to evaluate whether these results are sensitive to the socioeconomic conditions of the households, in column (3) we include as control variables the first two principal components of a set of indicator variables on having 11 household assets³, a categorical variable on the material of the floors and a dummy variable for whether the dwelling is connected to the electric grid. The coefficients on family members observe very little changes, suggesting that the correlations between family member types and reading frequency are not sensitive to the socioeconomic level of households in this sample.

This regression analysis models the frequency at which family members read with the MA child. As has already been mentioned, the caregiver survey also recorded data on the number of minutes family members read with the MA child. To approximate the total amount of time household members read with the MA child, we use the interval regression results to predict a continuous number of times each family member reads with the child, and multiply this estimated continuous number of times by the number of minutes respondents said each family members reads with the child each time.⁴

¹ For an introduction to censored models see Section 16.2 of Cameron, A. Colin and Pravin K. Trivedi (2005).

² Throughout this study we associate the number of days family members read with the child (as reported by the respondent) as the number of times, assuming implicitly that when family members read with child, they do it only once in each day.

³ Namely chair, bed, clock, radio, television, computer, bicycle motorcycle, car, fridge and stove.

⁴ The model used to predict the number of times each family member reads with the child is the same as the one presented in column (3) in **Table 2**, except that it includes age of each household member as a control variable in order to improve the predictive power of the model.

Figure 1 shows the average number of minutes each household member spends reading with the MA child, by gender of the child. Mothers spend 41 minutes per week reading with their sons, and 42 minutes with their daughters. Fathers spend a little more time with their sons than with their daughters (42 and 39 minutes, respectively). Sisters are the type of household member that spends the most time reading with MA children. Sisters spend 49 minutes reading with their younger sisters, the most that any household member spends with MA children, and 45 minutes with their younger brothers, second only to grandfathers, who spend 48 minutes with their grandsons, but only 30 minutes with their granddaughters. Brothers spend time reading with their MA siblings less than sisters do (37 minutes with both MA boys and MA girls). Both aunts and uncles spend more time reading with their nieces than with their nephews, while the opposite pattern is observed for both grandfathers and grandmothers, who spend more time reading with their grandsons than their granddaughters. In fact, the only type of family member for which we find a significant difference (at 10 percent of confidence) is for grandfathers. Finally, female cousins spend more time with their male MA cousins than with their female MA cousins, and the opposite is true for male cousins.

There are a few patterns that are worth highlighting. First, as it has just been said, sisters are the ones reading the most to children, and they seem to be doing so without any gender bias, that is, they spend roughly the same amount of time with their younger sisters than with their younger brothers. In fact, there seem to be no major differences on how much time each family member type spends with MA children by the gender of the latter. The exception are grandfathers, who spend much more time with their grandsons than with their granddaughters. When we compare sisters and brothers, it is clear that sisters spend more time than brothers reading with their MA younger siblings.

4. The relationship between time spent reading and reading skills

To explore the correlation between student achievement and the amount of time family members spend reading with the MA child, we run regressions of the frequency at which family members read with the child on their EGRA scores. To aggregate the frequency at which family members read with the child, we calculate for each child the number of family members that read to the child at least once, and use that sum as the covariate of interest in a regression on the scores of each of the 5 subtasks included in the instrument, namely Letter sound identification, Non-word reading, Oral reading, Reading comprehension and Listening comprehension.⁵

⁵ The Letter sound identification subtask where students are asked to identify a list of letters. In total, students are supposed to identify 100 letters. The next section is called Non-word reading, where students need to read a list of 50 made-up words. Next, for the Oral reading subtask, students are asked to read a short passage out loud that has 41 words. Students are also asked 5 comprehension questions on this passage. It is important to highlight that the number of questions each child is asked varied depending on how much of the text they were able to read. Students that are not able to read anything are automatically assigned a zero in the reading comprehension skill. Finally, for the listening comprehension section, students are asked five comprehension questions about a text the interviewer reads for them.

shows results of this exercise. Columns (1) and (2) show results for students in grade 2. In column (1) the only covariate in the regression is the number of family members that read to the MA child at least once a week. In column (2) we include as control in the regressions sociodemographic variables, namely child's age and gender, the number of household members older than 5 years old, two dummy variables for whether the mother and the father know how to read, and the first principal component of 4 dummy variables indicating ownership of household assets⁶; as well as a full set of school fixed effects. All the coefficients are positive under both specifications but for the more saturated model (column 2) the parameter is significant only when the outcome variable is non-word reading. In columns (3) and (4) the same results can be observed for students in Grade 3. In this case the coefficients are positive and significant for both specifications across all evaluated subtasks.

It is intriguing that the results for the number of family members that read to the child at least once a week seem to be more stable for 3rd graders than for 2nd graders. It is possible that 2nd graders are just starting to learn how to read (this data was collected in January 2016, when the school year was starting, so most 2nd graders had completed actually just one year of formal education), so any joint reading efforts that are being undertaken by the family members may not translate into better reading outcomes yet.

On the other hand, although all coefficients for 3rd graders are significant, they are pretty small. In the most saturated specification (column 4), the results imply that increasing by one the number of family members that read to the child at least once a week is associated with an increase of 0.5 letters correctly identified, 0.5 non-words correctly read, 0.8 (real) words correctly read, 0.06 reading comprehension questions answered correctly and 0.06 listening comprehension questions answered correctly. To put these estimates in context, note that this sample of 3rd graders, on average, identified correctly 9.8 letters (of 100), read 4.2 non-words (of 50), read 6.6 real words (of 41), answered correctly 0.5 reading comprehension questions (of 5), and answered correctly 3 listening comprehension questions (of 5). While it is true that in terms relative to the average performance the estimated parameters are not negligible, even after considering that, it would seem that the impact of having more family members read to the child is not substantial.

5. Final comments

The analyzed data on time spent reading with the MA child shows a few important patterns. First, literacy-related gender gaps are being reduced over time, and by the analyzed metrics are now negligible. In effect, while the estimated literacy gap was the largest between grandfathers and grandmothers, it is smaller among younger generations, and negligible between brothers and sisters, and between male and female cousins. A similar pattern is observed when we look at how much time family members spend reading with the MA child. In effect, we show that there are no major differences between how much time family members spend reading with the MA child by gender of the child. The exception are grandparents, in particular grandfathers, that on average spend more time reading with their grandsons than with their granddaughters.

⁶ These are a television, a bed, a bike and a radio.

Second, sisters are the type of relative that spends the most time reading with the MA child. We estimate that sisters spend 47 minutes per week on average reading with the MA child, while brothers spend 37 minutes per week. Sisters also spend more time reading with their younger siblings than any other family member, on average. Programs aimed at increasing girls' schooling should include this type of spillover effects as part of the benefits that should be expected.

Finally, we found a positive and significant correlation between the amount of time family members spend reading with MA child and his or her EGRA scores. Moreover, even after controlling for a rich set of sociodemographic variables a positive correlation is still detected, and is significant in the case of 3rd graders. While the estimated effects are not negligible relative to the average results, the slopes are small. That being said, it is important to keep in mind that joint reading can affect skills other than reading achievement, including attitudes towards reading and attentiveness in the classroom. Further research should address whether there are specific joint reading techniques that allow for larger impacts on reading achievement.

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Tables and Figures

Table 1. Summary statistics of family members

	Knows how to read	Age	Read at least once a week to child	Average time reading (min/session)	N
Father	0.79	40.7	0.53	27.1	1,882
Mother	0.57	34.3	0.48	28.3	2,076
Grandfather	0.86	61.7	0.43	30.5	231
Grandmother	0.53	57.4	0.37	25.3	427
Uncle	0.80	23.6	0.38	30.7	561
Aunt	0.70	23.9	0.44	28.3	526
Brother	0.74	15.7	0.45	27.1	2,009
Sister	0.75	14.5	0.52	27.5	1,611
Male cousin	0.67	14.6	0.41	32.1	431
Female cousin	0.67	12.5	0.44	28.4	288
Male other	0.81	19.5	0.48	27.0	164
Female other	0.59	19.1	0.37	23.5	192
Total	0.70	26.7	0.47	27.8	10,398

Source: MA Baseline data.

Table 2. Interval regressions of family members' characteristics on reading with MA child frequency

	(1)	(2)	(3)
Mother	-0.0580 (0.0646)	0.256*** (0.0547)	0.251*** (0.0554)
Sister	0.159* (0.0710)	0.216*** (0.0614)	0.212*** (0.0620)
Brother	-0.136* (0.0528)	-0.0512 (0.0479)	-0.0503 (0.0473)
Grandmother	-0.380*** (0.107)	0.00148 (0.0883)	0.00368 (0.0885)
Grandfather	-0.233 (0.121)	-0.316** (0.122)	-0.316** (0.121)
Aunt	-0.150 (0.110)	-0.0114 (0.0973)	-0.0298 (0.0972)
Uncle	-0.355*** (0.0864)	-0.374*** (0.0800)	-0.383*** (0.0799)
Female cousin	-0.101 (0.141)	0.0846 (0.129)	0.0591 (0.130)
Male cousin	-0.152 (0.121)	0.0208 (0.102)	-0.00161 (0.101)
Female other	-0.343* (0.143)	-0.0221 (0.124)	-0.0553 (0.125)
Male other	-0.0866 (0.134)	-0.0998 (0.144)	-0.109 (0.148)
Family member knows how to read		1.392*** (0.0417)	1.363*** (0.0441)
Respondents' gender		X	X
Socioeconomic indicators			X
N	9681	9625	9608

Note: Socioeconomic indicators include the first two principal components on having 11 household assets, a categorical variable on the material of the floors and a dummy variable for whether the dwelling is connected to the electric grid. Only households members older than 5 years old are included in the sample. Standard errors clustered at the school level in parentheses.

Source: MA Baseline data.

* p<0.05 ** p<0.01 *** p<0.001

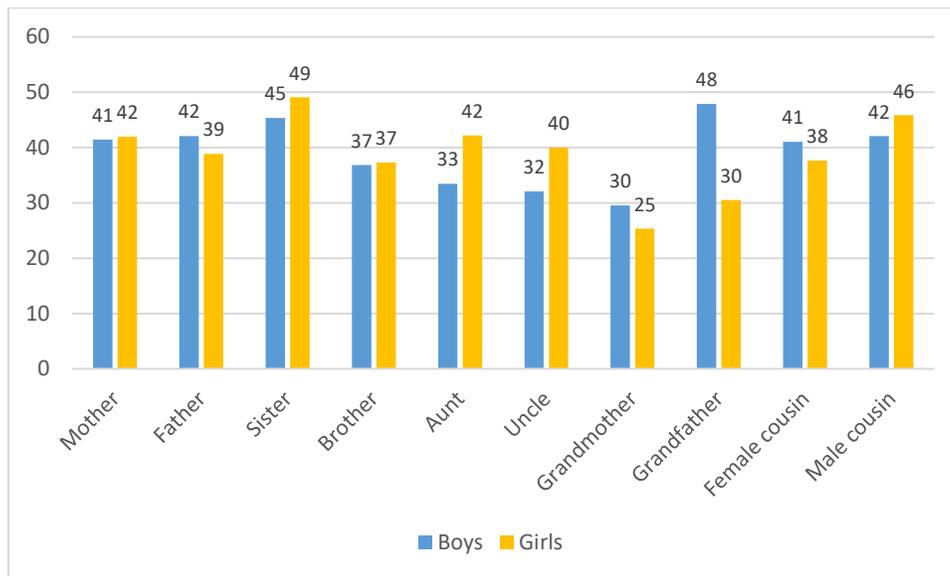
Table 3. Number of household members that read at least once a week to MA child on child's EGRA scores

	Grade 2 (N=1181)		Grade 3 (N=1082)	
	(1)	(2)	(3)	(4)
Letter sound identification	0.437* (0.208)	0.203 (0.198)	0.525* (0.212)	0.517* (0.228)
Non-word reading	0.282** (0.089)	0.222* (0.100)	0.678*** (0.160)	0.527*** (0.153)
Oral reading	0.315** (0.109)	0.232 (0.123)	1.030*** (0.263)	0.831** (0.244)
Reading comprehension	0.024* (0.010)	0.019 (0.011)	0.086*** (0.023)	0.060** (0.021)
Listening comprehension	0.028 (0.021)	0.011 (0.022)	0.058* (0.024)	0.063* (0.025)
Sociodemographic characteristics and school fixed effects		X		X

Note: Sociodemographic characteristics encompass child and household characteristics; child characteristics are age and a gender dummy; household characteristics include household size, two dummy variables for whether the mother and the father know how to read, and the first principal component of 6 dummy variables indicating ownership of four household assets, namely a television, a bed, a bike and a radio. Standard errors clustered at the school level in parentheses.

* p<0.05 ** p<0.01 *** p<0.001

Figure 1. Average number of minutes per week household members spend reading with MA child



Note: Average time spent per week is calculated by multiplying the number of times family members read with MA child. 'Other' family members are not included for clarity. Only the difference for grandfathers is significant at 10 percent of confidence.

Source: MA Baseline data.