

Article

Reading to Young Children: Higher Home Frequency Associated with Higher Educational Achievement in PIRLS and PISA

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Abstract: The benefits of reading aloud to young children for their reading development are well documented, and international large-scale assessments (ILSAs) offer an opportunity to explore its unique contribution to literacy achievement at both the primary and secondary levels. Using Portuguese data from ILSAs, this study shows the relationship between reading to young children in the home context and their later reading performance. Specifically, we use the Program for International Reading Literacy Study (PIRLS) 2011, which tests fourth-grade students, and the Program for International Student Assessment (PISA) 2018, which is used for the assessment of 15-year-olds. Data sources from these surveys include the mean reading performance of similar cohorts of students and home/parental questionnaires that include questions about the frequency of home book-reading, as well as other background variables. Linear regression analyses show a positive and significant relationship, both at the fourth-grade level and in secondary school, between students' performance and having been read to at home during early childhood. These findings indicate that the advantages associated with book reading in the early years are maintained throughout students' schooling. In addition, the analysis shows that, in both surveys, girls score higher than boys in reading, and that there is a positive association between parental education and reading achievement. Implications about how children's early literacy development sets the foundation for future educational achievement are discussed, namely in the context of country-specific reading initiatives and reading practices.

Keywords: early childhood; home book-reading; reading performance; PIRLS; PISA



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1. Introduction

Planting the seeds for children to learn to read starts in early childhood. In particular, “reading aloud with children is known to be the single most important activity for building the knowledge and skills they will eventually require for learning to read” [1] (p. 9). In turn, primary-school children who have good reading skills read more for enjoyment, which makes them develop as even better readers [2]. Secondary school students who report reading for enjoyment outside of school also have higher reading scores [3]. This reciprocal causality effect between reading frequency and reading ability, known as the Matthew effect [2], is well documented. Young students who learn to read with ease and have good reading skills read more for enjoyment throughout their primary school years, and this leads to better reading skills [4]. From a developmental perspective, those who have better reading skills are more likely to engage in reading for enjoyment, while poor readers avoid reading, and the less they read, the further behind they become [5].

Decades of research show that parental book-reading at a young age contributes to the creation of good readers [6,7]. Furthermore, it “might increase children’s motivation to read, which in turn will result in more frequent reading for enjoyment” [8] (p. 901). Indeed,

the authors of [9] have shown that children of parents who reported a high frequency of shared reading when the child was in kindergarten also reported the child's reading more for enjoyment in fourth grade, after controlling for parent education, child vocabulary and reading skills.

Studies using data from international large-scale assessments (ILSAs), such the Program for International Reading Literacy Study (PIRLS), the Longitudinal Study of Australian Students (LSAC) and the Program for International Student Performance (PISA), also show that frequent home book-reading during childhood is associated with higher reading achievement for both fourth graders and 15-year-olds [10–12]. For example, Australian children who had been read to frequently at ages 4–5 score higher in reading in primary school [13] and are more likely to report that they enjoy reading at ages 10–11 [10]. Similarly, fourth graders from several European countries have higher reading scores in PIRLS when their parents or someone at home had read to them often during early childhood, prior to school entry [11]. Additionally, 15-year-olds who had been read to by their parents on a daily basis during the first year of primary education perform better in reading than do their counterparts who did not have this experience [12].

Importantly, ILSA studies with primary and secondary school students indicate that the benefits of home book-reading are significant when other school factors and the educational and socioeconomic status of families are taken into account [11–13]. Specifically, both PIRLS and PISA include parental questionnaires designed to capture different student, home and school variables. Regarding home-background variables, these ILSAs ask parents to indicate how often they had read to their children during early childhood.

The purpose of our study is to investigate whether home book-reading in early childhood has similar relationships with the average reading performance of Portuguese fourth graders in PIRLS and with those of Portuguese 15-year-olds in PISA. In other words, we ask whether the expected positive association is similar and stable throughout schooling. The students tested in the first assessment were fourth graders in 2011 and were between 9 and 10 years of age. In PISA 2018, the students were 15 years old and were thus sampled from a similar birth cohort [14].

Portuguese students participated in both surveys, and in PISA, parents responded to an optional parental questionnaire. This gives us the opportunity to test whether home book-reading during early childhood is positively associated with reading performance for similar birth cohorts in a country that has put reading at the forefront of public policies for almost two decades now. Specifically, the National Reading Plan (NRP) was instituted in 2006 as an initiative of the Portuguese Government (Decree Law no 64/2006), with the goal of creating the conditions to promote the development of reading and writing skills and the expansion of reading habits among the school population, from preschool to the end of compulsory education, as well as among adults [15]. The NRP resources available include recommendations of books for specific age groups and reading-strategy suggestions to be implemented by parents and preschool, elementary school and high school teachers.

Portugal has participated in all triannual cycles of PISA since its launch in 2000, and the results show that until 2012, Portuguese 15-year-olds performed below the OECD average in reading [16]. In PISA 2015 and 2018, the performance of Portuguese students was within the mean of students from all participating countries. Additionally, in 2018, Portugal's participation included the administration of an optional parent questionnaire that collected information about early literacy practices. Portugal has participated in PIRLS since 2011, and in this survey, all countries administer a home questionnaire that includes questions about such practices, in particular, about reading practices. These data give us an opportunity to look at the relationship between reading to children, which was considered by [6] to be a component of the home literacy environment (HLE), and reading performance at different points in students' schooling trajectories. More specifically, this was at the end of primary education for Portuguese fourth graders in PIRLS 2011, and at 15 years of age in PISA 2018.

2. Review of the Literature

Exploring children's engagement with stories during early childhood promotes their aesthetic experiences and offers opportunities for socio-emotional learning [17]. Furthermore, the language knowledge they acquire "predicts later language, social, and health outcomes" [18] (p. 297). Afterwards, as regards later reading skills, and specifically future reading comprehension, studies show the important contribution of reading to young children [19]. Research by [20], with Canadian kindergarten children, shows that family literacy practices, reading aloud in particular, are related to better reading comprehension in fourth grade. Her studies show that "parents' reports of shared reading were a robust predictor of children's receptive and expressive vocabulary" in fourth grade [20] (p. 179).

Other studies indicate that home book-reading to young children during the preschool years is positively associated with an increase in reading performance in the later primary-school years. This evidence has been gathered not only in Canada, but also in PIRLS-participating countries in Europe [11] and in the United States [21,22], as well as in Australia. In the latter, Kalb and van Ours [13] used data from LSAC to investigate the causal effect of parental reading to children at age 4-5 on their reading skills at ages 8-9 and 9-10. They concluded that there is a positive effect, after controlling for a range of endogenous factors, and that parental book-reading gives children a firm basis for later learning. This type of parental investment in the early life of children supports the children's later cognitive development and should thus be encouraged [13]. This view is also supported by analyses of secondary school students' performance in PISA. In this survey, students whose parents read to them frequently during the first year of compulsory schooling performed better in reading than did their peers who did not have this parental support [12].

Literacy researchers have established a body of knowledge supporting the idea that parents who read books, and specifically, picture books, to their young children boost the children's future reading skills [11,23]. Picture books offer a context that facilitates deriving meaning from print, because of the interrelationships between pictures and print [6], and this is the type of book caregivers typically read to their children [24]. Frequent reading aloud to children supports their acquisition of new vocabulary from context [9,25,26]. Children learn new vocabulary by listening to picture books, because the books contain words that are not commonly used in oral language [27,28]. Thus, storybook reading gives children opportunities to hear language that is normally not used in oral speech [29], and this contributes to the acquisition of new vocabulary, enlarging children's knowledge of the world and enabling them to learn about syntax and language structures. This implicit knowledge about language that children acquire when they are read to during early childhood makes them better readers in primary school and beyond [30], because it enables them to comprehend what they read [5,31].

Picture books include more novel vocabulary than what is normally used in oral speech [32], but also more complex sentences, including passive sentences and sentences containing relative clauses [24,33]. And children's exposure to books during the early years also predicts their spoken production of complex sentences when they are eight years old [34]. In short, picture books offer varied vocabulary and complex language input, which supports later reading comprehension [2,35].

The way adults attend to, and possibly expand, the printed text during shared reading interactions [6] may strengthen this support. As expressed in Ref. [28], "Book reading helps children learn language because it requires the participants to be active and engage in responsive interactions about word meanings. It is an opportunity for a parent or other caring adult to focus on the child and make efforts to be responsive to his or her interests. When parents and young children communicate around book reading and move away from the text as occurs during dialogic reading" (p. 32). This expansion of meaning through dialogic, or shared, reading includes asking open questions, pointing, providing definitions, or asking children questions as one reads [36], and is key for the development of language knowledge [37,38]. The provision of vocabulary definitions, in particular, seems to make a difference, with children acquiring more new vocabulary when provided with

explanations for novel words [39]. Thus, both the text itself, as well as the interactions around it contribute to children's appropriation of meaning.

Grolig [6] presents a review of research which shows that effective reading performance in primary school can be traced back to previous shared reading experiences in the home, as well as in educational contexts. Shared reading may occur in the home environment, as a part of the HLE and as part of the CCLE. Evidence gathered in the CCLE supports the notion that children's language and literacy abilities are influenced by the quality of teacher-child interactions during shared reading [38]. Children learn more vocabulary when teachers use an interactional style of reading that includes explanations of word meanings in meaningful contexts [36,40]. Furthermore, such interactions positively influence future literacy-based knowledge. For example, Dickinson and Porche [41] found that fourth-grade vocabulary knowledge was related to shared reading experiences in preschool and kindergarten classrooms.

Research conducted in the HLE suggests that there is wide variability in household selection of picture books [42], and that a child will typically hear about 10 picture books in one month within shared reading experiences [43,44]. Studies that focus on the type of language input children receive when listening to speech from text indicate that speech from and around text may account for three to ten percent of all speech children hear in one day, with that percentage varying according to how often a child is read to (e.g., twice daily, once per day, or less) [45,46]. Research also indicates that the frequency of book-reading interactions between parents and children matters. Specifically, children who are read to three times per week or more do better academically than children who are read to less [22], and studies show that reading frequency is determined by social background and the child's gender [11,47]. Parents with higher socio-economic status and/or higher educational levels read more to their children, and evidence gathered in Canada, the UK and the US indicates that parents spend more time reading to their preschool daughters than to their sons [48].

Some contend that differences in gender-specific parental practices are due to biological or developmental differences between boys and girls, with girls being more verbal and more interested in reading [49], while others view these differences stemming from the example parents themselves provide as role models [50]. For instance, if girls see their mothers read more, the girls develop a positive attitude toward reading [50]. More research is needed to determine the causes of the gender gap in terms of HLE practices and reading achievement, but it is clear that girls are read to more often during childhood, that subsequently they choose to read more for enjoyment than boys, and that they consistently score above boys in reading tests [51].

In the US, The National Assessment of Educational Progress (NAEP) shows that girls have always scored higher than boys in the fourth, eighth and twelfth grades [49]. In PIRLS 2011, girls outperformed boys in 44 out of 49 participant countries at the fourth-grade level [52], and in PISA, 15-year-old female students outperformed males in reading in all sixty-five participating countries [53]. The same pattern was found in PISA 2018: "...in all PISA-participating countries and economies girls outperformed boys in reading in 2018" [51] (p. 18).

Forty-two countries participated in both PIRLS 2011 [52] and in PISA 2018 [14]. The students tested in the first assessment were fourth graders in 2011 and were between 9 and 10 years of age. In PISA 2018, 7 years later, students were 16/17, an age close to the 15-year-olds sampled in PISA and thus from a similar birth cohort [14]. OECD analysis shows that there is a strong correlation ($R^2 = 0.72$) between the student results in PIRLS 2011 and the results of the PISA 2018 reading assessment amongst 15-year-old students [14]. PISA analyses also indicate that, even when considering evidence from different birth cohorts, "The scores of the 2016 PIRLS are highly correlated with those of the 2015 PISA round across participating countries, which indicates that the average performance of education systems remains stable throughout school years and that such assessments are reliable" [54] (p. 192).

Additionally, as Ref. [55] contend, both reading assessment frameworks are similar in that they ask for the same type of reasoning about texts and have students respond to similar questions [55]. Reading literacy in PIRLS is defined as “the ability to understand and use those written language forms required by society and/or valued by the individual” [55] (p. 103). In PISA, reading performance refers to “understanding, using, evaluating, reflecting on and engaging with text”, according to [56] (p. 2).

3. Methods

3.1. Data Sources and Participants

We used PIRLS 2011 and PISA 2018 datasets. PIRLS is an international large-scale assessment (ILSA) conducted by the International Association for the Evaluation of Educational Achievement (IEA) and designed to measure trends in reading achievement at the fourth-grade level. The PIRLS sample design is as follows: firstly, schools are randomly selected (with a probability proportional to the estimated number of students enrolled in the target grade), and then one or two classrooms are randomly selected within each school. PIRLS 2011 was administered as a pencil-and-paper assessment and included both multiple-choice and constructed-response test items. The PIRLS scaling of achievement data is based on item response theory (IRT), with the scores scaled to have an international average of 500 and a standard deviation of 100 points. The first cycle of PIRLS was carried out in 2001 and it has been administered every 5 years since then. In 2011, 48 countries participated in PIRLS.

PISA is a cross-sectional survey that was launched in 2000 by the Organization for Economic Co-operation and Development (OECD). Since then, the OECD has been running this international large assessment of 15-year-old students’ skills in mathematics, science, and reading every three years. Each assessment cycle presents a more complete picture of only one of the knowledge areas. The main domain in PISA 2018 was reading. PISA target population in each of the participating countries are the 15-year-old students who attend school between the 7th and 11th grades. The sampling design is stratified into two steps, of which the primary sampling is school-based. Schools are selected with probabilities proportional to size. The second sampling unit is the student. The students’ test scores are computed according to IRT and standardized with a mean of around 500 and standard deviation of around 100. In 2018, 79 countries participated in PISA.

PIRLS and PISA also collect contextual information on students’ socio-demographic and dispositional characteristics, students’ home environment and teaching and schools’ learning contexts through the application of several questionnaires (e.g., students, home, and principal) in each participating country.

Only data from Portugal was used in this study. The number of students participating in PIRLS 2011 in this country was 4085 and the number of students in PISA 2018 was 5932.

3.2. Measures

The descriptions of the main variables considered in this study are presented in Table 1. Our dependent variable is the students’ reading scores in both surveys—with an international mean of 500 and a standard deviation of 100. The independent variables include parental book-reading, students’ genders, and a proxy for students’ socio-economic status—parental education. In both surveys the information on parental book-reading was collected through the questionnaire applied to the parents. Specifically, in PIRLS 2011 this information was collected from the Home Questionnaire (Learning to Read Survey), and in PISA 2018 the information was collected from the Parent Questionnaire. To capture the concept of frequent book-reading, in PIRLS a dummy variable was created which took the value of “1” if someone read to the children “often”, and similarly in PISA the value of “1” if someone read to the child every day or almost every day”. Thus, for the purpose of our analysis, book reading equals 1 indicates a high frequency of book reading, and 0 indicates a low frequency of book reading. For students’ genders and parental education variables the information was collected from the student’s questionnaire. Two parental education

categories are distinguished: “university”, at least one parent with a university degree, and “no university” otherwise. In PIRLS, university education is coded as university or higher, while in PISA it includes ISCED (International Standard Classification of Education) levels 5A and 6.

Table 1. Variables included in the analysis.

Variable	PIRLS 2011		Variable	PISA 2018	
	Original Categories	Categories Considered		Original Categories	Categories Considered
Book reading: <i>Before your child began primary/elementary school, how often did you or someone else in your home-do the following activities with him or her? Read books</i>	Often; Sometimes; Never or almost never	High frequency Low frequency	Book reading: <i>When your child attended the first year of ISCED 1, how often did you or someone else in your home undertake the following activities with her or him?-Read books</i>	Every day or almost every day; Once or twice a week; Once or twice a month; Never or hardly ever	High frequency Low frequency
Gender: <i>Are you a girl or a boy?</i>	Girl Boy	Girl Boy	Gender: <i>Are you female or male?</i>	Female Male	Girl Boy
University education: <i>The highest educational level of one of the parents (derived variable created by IEA)</i>	University or higher; Post-secondary but not university; Upper secondary; Lower secondary; Some primary, lower secondary or no school	No university	University education: <i>Highest education of one of the parents (derived variable created by OECD-HISCED)</i>	None ISCED 1 ISCED 2 ISCED 3B,C ISCED 3A, ISCED 4 ISCED 5B ISCED 5A and 6	No university

3.3. Analysis

We start by presenting descriptive statistics of the variables considered, namely, book reading, gender, parental education, and students’ reading scores for PIRLS 2011 and PISA 2018 data. Secondly, we calculate the average of students’ reading scores considering high frequency of book reading vs. low frequency of book reading, girls vs. boys, and university-level education vs. no university education.

Finally, we present the linear regression analysis in order to identify the relationships between students reading scores and home book-reading, at the fourth-grade level in PIRLS, and for 15-year-old students in PISA. This analysis provides estimates which allow us to test the associations between students’ home practices and other factors that contribute to an explanation of students’ achievement. The analysis was performed using the Stata software, and the complex design of both ILSAs was taken into account, namely, the use of plausible values in reading was used in the analysis (5 for PIRLS and 10 for PISA), as were student weights.

4. Results

Table 2 shows the descriptive statistics (percentage, average of the reading score, and the number of observations) of the variables considered in the analysis, and Table 3 presents the average reading scores of students by variable category. The results are presented for the Portuguese datasets of PIRLS 2011 and PISA 2018.

Table 2. Descriptive Statistics for PIRLS 2011 and PISA 2018.

	PIRLS 2011	PISA 2018
% of girls	48.73	49.22
% of book-reading frequently	42.47	47.13
% of parents with university-level education	25.53	36.79
Average reading score	540.84	491.80
N	4085	5932

Table 3. Average reading score by gender, book reading and parental education for PIRLS 2011 and PISA 2018.

Reading Score		PIRLS 2011	PISA 2018
Gender	Boys	533.93	479.85
	Girls	548.23	504.10
Book reading	Low frequency	529.57	485.24
	High frequency	561.91	506.48
Parental education	Non-tertiary	534.38	477.93
	Tertiary	573.04	520.01

Data from PIRLS 2011 in Portugal indicate that the reading mean score is 540.84 and that 42.5% of parents report that someone in the home read to their children frequently. The sample is almost equally composed of boys and girls; the balance is 51% and 49%, respectively. At the fourth-grade level, girls outperform boys in reading—girls' reading mean score is 548.23 versus a reading mean score of 533.93 for boys. Students whose parents possess a university education present better scores than do students whose parents do not have a university education, with 573.04 for the former and 534.38 for the later, and high frequency of book reading is associated with a higher reading score, compared to a low frequency of book reading, respectively, 561.91 and 529.74.

In PISA 2018 the mean reading score of Portuguese students is 491.80. The data show that the same trends hold for 15-year-old students. That is, girls perform better than boys in reading, 504.10 versus 479.85, and students with a higher socio-economic status (parents having a university degree) have better attainment in reading, 520.00 and 477.93, respectively. The data also show that 47.1% of the parents reported having read to their children in the first year of ISCED 1 every day or almost every day, and that a higher frequency of book reading is similarly associated with higher reading scores for 15-year-old students, 506.48 versus 485.24.

Table 4 presents the association between students' reading scores and book reading, taking into consideration control variables that can influence the students' reading scores. Across both surveys, it stands out that, even after controlling for students' socio-economic status, there is a positive relationship between high frequency of book reading and students' reading scores. In PIRLS, students exposed to a high frequency of book reading scored 24 points in reading above students exposed to a low frequency of book reading. The same is true for 15-year-old students, where the difference was 15 score points.

The results also show that Portuguese students whose parents have completed university perform better in reading in PIRLS, when they are in fourth grade, and in PISA, when they are 15 years old, and that girls consistently outperform boys. The findings also show that the performance gap between boys and girls is wider for 15-year-olds.

Table 4. Regression model estimates for PIRLS 2011 and PISA 2018.

VARIABLES	PIRLS 2011 Estimate (S.E.)	PISA 2018 Estimate (S.E.)
High frequency of book reading	23.55 *** (3056)	14.69 *** (3460)
University education	30.77 *** (3269)	42.41 *** (3585)
Girl	11.12 *** (2547)	23.36 *** (3018)
Constant	521.1 *** (2732)	462.37 *** (3109)
r^2	12.1%	7.03%
Observations	3701	5053

***, statistically significant at $p \leq 0.01$.

5. Discussion

Consistent with the results from previous studies, we find that students reap benefits from a home literacy environment that includes frequent parental reading during early childhood [12,13]. Importantly, we show that the advantages associated with book reading in the early years are maintained throughout schooling for Portuguese students. In this sense, the finding corroborates the notion that frequent parental reading during early childhood gives children a firm basis for later learning [13]. Of course, many other factors can contribute to increases in students' reading performance and related educational outcomes. What stands out is that this early literacy practice can play a positive role in improving future reading skills in primary and secondary school.

The analyses reveal that parental book-reading during preschool, as measured in PIRLS 2011, and parental book-reading, either in the first year of ISCED 1 or the first year of primary education, as described in PISA 2018, are positively related with students' reading scores. For this similar birth cohort, in 2011, 42.5% of Portuguese parents/guardians reported a high frequency of book reading, and in 2018, the high frequency of book reading percentage reached 47.1%. The advantage of a high frequency of book reading in terms of students' reading scores translates into an additional 24 points in PIRLS, and 15 in PISA. This advantage is present even after considering students' socio-economic status and genders, and, considering that 40 points correspond to about 1 year of schooling in PISA [57], 15 points corresponds to a few months of improved reading outcomes.

Consistent with previous findings from ILSAs, we also find that girls score higher than boys in reading in both surveys. In PIRLS 2011, this advantage translates into a difference of 11 points for fourth-grade girls. Later on, in PISA 2018, 15-year-old girls gain an additional 23 points. Nonetheless, in Portugal, the score point difference favoring girls is lower than the international average of 16 points reported in PIRLS [52]. In PISA the same trend can be observed; the gender gap is almost 30 score points, on average, across OECD countries [51]. The lower value we obtained in our model—23 points favoring girls—may be explained by the fact that we considered the students' parental educational levels.

In PISA 2018, the coefficient associated with being a girl in Portugal is much larger than the one estimated for a high frequency of home book-reading. The opposite is true in PIRLS 2011; the coefficient associated with being a girl is smaller than the one estimated for a high frequency of home book-reading. This indicates that the gap between boys and girls grows wider as students progress through their schooling. This may be related to the finding that girls enjoy reading much more than boys do. Indeed, in PISA 2018, only 24% of 15-year-old boys and 44% of girls of the same age agreed that "Reading is one of my favorite

hobbies”, while 60% of boys and 39% of girls agreed with the statement that “I read only to get information that I need” [51] (p. 159). Considering the results when parents have a university-level education, it stands out that, independently of how often they read to their children, coming from an advantaged background translates into a greater advantage in terms of reading scores.

The adjusted model for PIRLS 2011 explains 12.1% of the variation in students’ reading scores and the adjusted model using PISA 2018 data explains 7.03% of the variation in students’ reading scores. This suggests that in Portugal, parental book-reading and parents’ high educational level are not as strongly related to students’ reading performance at the age of fifteen as they are when children are 9–10 years of age, or fourth-grade students. This is not surprising, as many other variables come into play and can explain reading achievement, namely, in-class peer group influences and school compositional effects. Children tend to associate with and adopt the reading practices of their peers, and schools that have more socio-economically disadvantaged students have lower reading performance [58,59]. Indeed, the variance explaining reading performance is also relatively low for PIRLS. However, research shows that correlations between background variables and students’ achievement is, in general, low in ILSAs. For example, students’ socio-economic status in PISA accounts for, on average across OECD countries, 12% of the variance in reading scores [51]. The difference between our r-square and the PISA one can be attributed to the fact that the PISA index for economic, social and cultural status considers several dimensions and contains more information than just the parents’ educational levels. In this study we used parental educational level because this variable is available and is comparable in both surveys.

Portuguese fourth graders in PIRLS and Portuguese 15-year-olds in PISA benefit from frequent home book-reading in early childhood, with larger gains for the former group. Thus, the benefit related to home book-reading, although not as significant for older students, remains constant throughout schooling. The present study made use of available data for only a few countries that conducted the home questionnaire in PISA. By focusing on Portuguese data, we shed light on the continuum of reading gains in students’ schooling trajectories that are associated with the practice of parental reading to young children, which can prompt future research into the importance of family literacy.

The continuing monitoring of trends in future ILSAs related to how frequently Portuguese families read to preschoolers, kindergartens and first graders can give us an idea about its association with the National Reading Plan. One would expect that creating awareness about the benefits of reading and making reading practices and resources more available contributes to increased reading practice in the HLE from an early age. As these contribute to the creation of good readers, it would be important to determine if book reading frequency increases in households with parents with lower education levels. It may not be enough to offer a vision of the value of reading, make resources available and describe good practices for these parents to embrace reading with their children. Moreover, even if frequency increases, it may be necessary to consider family intervention programs that model the kind of language interactions that lay the foundations for children to build reading skills [60].

As PISA 2022 results will be available at the end of 2023 and PIRLS 2016 data is already available, this data selection presents another opportunity to investigate any changes with another similar birth cohort. The results of students’ reading achievement in these two surveys can continue to be interpreted by taking into account parental education level as a proxy for socio-economic status, because it is measured in comparable ways in both surveys. The percentage of college-educated adults in Portugal has been steadily rising. In 2018, 35% completed a higher-education degree, whereas in 2008, only 23% did so [61]. Access to high levels of literacy and to books, via the implementation of the National Reading Plan, is likely to offset the historically low level of literacy, which was still a persistent national trend in the second half of the twentieth century, when adult literacy rates were below 25% [62]. As such, it is likely that parental-education levels will increase.

Unlike LSAC, the Australian longitudinal study of Australian children, PIRLS and PISA are not longitudinal surveys. However, they were conducted in time frames that correspond to a similar birth cohort, and at two points in time when students were already exposed to the Portuguese National Reading Plan initiated in 2005. Previous analyses have shown that there is a “strong correlation between the results of the reading test for fourth-grade students in PIRLS 2011 and the results of the PISA 2018 reading assessment amongst 15-year-old students” [14] (p. 68), with Portugal, in particular, presenting a strong correlation. This suggests that, although it would be ideal to use a longitudinal survey to make comparisons, because we would study the same students at different points in time, the high correlation found between PIRLS and PISA student results suggests that our analyses can offer insights about the relationship studied.

Also, the value added by frequent parental reading is estimated with measures that capture similar book-reading practices carried out during the preschool years in PIRLS and during the first year of primary school in PISA. Although the association between those practices and reading achievement is stronger in PIRLS, it is still significant in PISA. Moreover, it is likely that parents who read books to their children during the first year of primary education, or ISCED 1, have also read to them during their preschool years.

Lastly, this study explores the specific relationship of home book-reading, a feature of the home literacy environment, and reading performance. In so doing, its findings add to the evidence that reading to young children contributes to later reading achievement and, in the unique case of Portuguese students, we show the specific contributions at different points during students’ schooling trajectories. This study was possible because home/parent questionnaires were applied in a few selected participating countries, but it is also limited in scope. The teacher questionnaires in both PIRLS and PISA do not include questions about how often teachers read to preschoolers and first graders. If those variables were available, it would be possible to investigate their relation to reading performance. Certainly, there is background research to support the notion that reading by teachers also benefits children’s future reading development. In particular, several studies suggest that children’s language and literacy abilities are influenced by the quality of teacher–child interactions during shared reading [38], and that teachers’ talking associated with reading aloud can promote the acquisition of a receptive and expressive vocabulary [41].

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