Literacy Development in Europe

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1. Introduction

The European Union (EU) is a political and economic union of 27 Member States (MS)[1]. Its members are industrialized nations that value inclusion and allow free movement of its citizens within the union (European Union, Charter of fundamental rights of the European Union, 2016). In most countries in the EU, primary education starts at age 6 and compulsory education lasts 9-10 years, but in many countries students are required to enroll in training programs until they reach 18 (Eurydice, 2016). The EU has common education benchmarks, such as the reduction of low achievers in reading, mathematics and science in secondary school, and tertiary education completion rate. The latter has been achieved and stands at 40% in 2020 (Education and Training Monitor, 2020). These targets reflect common agreement on what is deemed important to achieve in education and schooling, namely appropriate qualifications for jobs acquired in professional training and/or a university degree. Good skills in reading, mathematics, and science are viewed as a prerequisite for integration in the knowledge society (Education and Training Monitor, 2017), but challenges remain. In the EU socioeconomic status is still a determinant of education achievement. Immigrant students have lower achievement in reading, mathematics and science in secondary school (OECD, 2016), and the foreign-born have lower tertiary attainment than native students (Education and Training Monitor, 2017).

This chapter offers an overview of literacy development in Europe. The focus is on indicators of reading literacy achievement in countries that are members of the EU and participate in International Large-Scale Assessments (ILSA). First, we present evidence related to the spread of literacy in Europe and discuss current notions about the relationship between schooling and literacy abilities and about the role of skills for full integration in society.

[1] The European Union (EU) is an economic and political union of 27 countries also called Member States: Austria, Belgium, Bulgaria, Croatia, Republic of Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden.

Second, we summarize evidence on the variation of reading acquisition and development in different linguistic systems. Third, we give an overview of variations in literacy achievement and their relation with home and school factors. Next, we present current literacy achievement levels in primary and secondary school and discuss their association with home background factors captured in ILSA. Finally, we summarize the role of ecological factors and conclude by discussing how ILSA can contribute to our understanding of reading development in Europe and inform policy decisions.

2. Literacy and Schooling in Europe

2.1 Historical Perspective

Educational attainment grew enormously from 1960 to 1995 in most of the Western world, with the average number of years of schooling nearly doubling (Heckman & Jacobs, 2009). As of 2015, in the European Union [2], 80% of youngsters under 25 completed upper secondary education or the equivalent to 12 years of schooling (OECD, 2017). This average is for 22 EU countries with available data, still includes the United Kingdom but excludes Bulgaria, Croatia, Cyprus, Lithuania, Malta and Romania. It is possible that if data were available for the current 27 EU Member States this average would be slightly different. For the EU22, it reflects wide variation among countries in terms of progress over time and differences in recent education attainment rates. For example, while in Portugal the secondary school completion rate grew from 51% in 2005 to 83% in 2012 in Hungary it increased only two percentage points, from 80% to 82%, during the same time interval. In 2015, in Spain 68% of young adults completed secondary school compared to 87% in Finland.

The expansion of schooling is a major factor influencing the spread of literacy worldwide and three major periods have been identified in the diffusion of literacy (UNESCO, 2005). Before 1800, reading was already widespread in northern Europe in countries like Denmark, Finland, England and France, but confined to the upper classes. In Germanic-language countries and German-speaking regions more than 50% of males were already literate before 1790 (Diebolt & Hippe, 2017). In contrast, in southern European countries like Spain, Portugal and Italy illiteracy was the norm. Between 1800 and 1860, little progress in

[2] The European Union average – EU22 - for upper secondary completion rate includes the following countries: Austria, Belgium, the Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Ireland, Italy, Latvia, Luxembourg, the Netherlands, Poland, Portugal, the Slovak Republic, Slovenia, Spain, Sweden and the United Kingdom. Education at a Glance, 2017, p. 63.

literacy rates was registered in these countries while in northern Europe modest progress was achieved. Several European countries introduced compulsory education in the first half of the 19th century, but actual enrolment in primary schools was very low (Hippe & Fouquet, 2015). After 1860, literacy levels improved in much of Europe as a result of the introduction of legislation regulating compulsory education although literacy levels in Hungary, Italy, Spain and the Balkan countries continued to remain low even around 1900. Following low literacy levels in most of nineteenth century Europe, schooling became more available to all but social elites after the mid-nineteenth century. This change was rooted in the need for record keeping and for skilful labour linked to the use of new technologies, such as the steam engine, that required workers that could maintain and fix machinery. However, the spread of literacy remained a challenge (Hippe & Fouquet, 2015) and the situation in the following century was as follows:

> "During the early twentieth century, literacy levels increased throughout Europe, with few changes in the ranking of countries. By mid-century, central and northern Europe were reported to have achieved over 95% literacy; Western Europe, over 80%; Austria and Hungary, over 70%; and Italy, Poland and Spain, over 50% literacy. In Portugal and the Eastern Orthodox countries, adult literacy rates were not above 25%; only after 1945 did the ability to use written languages extend to the masses" (UNESCO, 2005, p. 191).

Different factors may account for the cross-country and within-country regional differences in adult literacy rates from the 1800s to the 21st century. These include literacy traditions (Elley, 2001), geographical location and linguistic background. For example, during the 1800s, geographical proximity appears to have played a role in the spread of literacy from Germany, Switzerland and the Netherlands to neighbouring regions in Belgium, France and northern Italy (Diebolt & Hippe, 2017). Furthermore, regional discrepancies in literacy rates within a country were often associated with linguistic variations. This may have been the case in Bretagne where French was not widely spoken before the 19th century and which registered much lower literacy rates than other French regions in the 1800s (Diebolt & Hippe, 2017).

The beginning of the 20th century clearly marked the widespread attendance of all children in at least primary school in most of the industrialized world (Weber, 2001), although in some countries the literacy rate of all their citizens did not significantly increase until the second half of the century (UNESCO, 2005). During this latter period, the spread of schooling

in most of Europe is clearly linked to the attainment of more sophisticated levels of literate abilities and to greater economic returns. Put differently, while in earlier periods an individual could be considered literate if only he could sign his name (Venezky, 1991) schooling in the second half of the 20th century made it possible for individuals to further develop reading and writing abilities and the raising education levels translated into better jobs and higher salaries (Heckman & Jacobs, 2009). The accumulation of knowledge through schooling, often referred to as human capital, paid off in economic terms. However, at the turn of the century and into the 21st century the picture is more complex, because studies show that more school attainment doesn't translate directly and unequivocally into higher literate abilities.

Research conducted in the last decades has shown that quality of education is a better indicator of life outcomes than quantity of education, as measured in years of schooling (Heckman & Jacobs, 2009). This suggests that "School attainment is not a very good proxy for knowledge" (p. 27) and that, as Hanushek and Woessmann (2015) contend "…direct measures of cognitive skills offer a superior approach to understanding how human capital affects the economic fortunes of nations" (p. 28). In relation to literacy attainment, children who fail to develop basic reading skills to comprehend what they read by the fourth grade are likely to face reduced educational opportunities (Chall & Jacobs, 2003; Adams, 2009). This, in turn, will affect their chances of acquiring the skills that are essential for full participation in society and in the labour force (Hanushek & Woessmann, 2015).

As we have discussed, schooling and associated literacy rates in Europe vary from country to country and this variation has been present since the 1800s. While the relation between years of schooling and literacy abilities is not well documented prior to the 20th century, in the 1800s someone with the ability to sign his or her name would be considered a literate individual (UNESCO, 2005). If the ability to sign one's name was already considered a literate behaviour in the 1800s, and a useful one to sign a work commitment or a property possession (Venezky, 1991), what reading literacy skills characterize the European student population of the 21st century and how do children develop them?

2.2 Reading Development in Different Orthographies

Several cross-linguistic and/or cross-national studies have looked at how children develop reading skills in different orthographies (Seymour, Aro & Erskine, 2003; Vaessen, Bertrand, Toth, Csepe, Faísca, Reis, & Blomert, 2010; Ziegler, Bertrand, Tóth, Csépe, Reis, Faísca, Saine, Heikki, Vaessen, & Blomert, 2010). In the case of alphabetic writing systems,

orthographic depth explains different rates of reading development and children seem to acquire reading faster in transparent orthographies (Pollatsek & Treiman, 2015). The facilitating effect transparent orthographies have in reading development has mostly been established in the first stages of learning to read, first and second grades, and confirmed by studies that ask children to read words and non-words (Seidenberg, 2013). In a comparative study of reading acquisition in twelve different languages, Seymour, Aro and Erskine (2003) found that English and Danish first graders take longer than Finish, Spanish or Italian ones to master word decoding skills.

In a transparent or shallow orthography, such as Finnish, there is a one-to-one phoneme to grapheme mapping whereby one letter represents one sound and vice-versa. Research indicates that there is a continuum, with English being one of the most opaque alphabetic languages – different pronunciations for the same spelling patterns - and French and Danish positioned somewhere in the middle of the orthographic depth continuum (Schmalz, Marinus, Coltheart, & Castles, 2015). For example, in French spelling-to-sound relations are reasonably predictable, but sound-to-spelling relations are more ambiguous (Schmalz, Marinus, Coltheart & Castles, 2015). Among Western European languages, English has the most inconsistent orthography and this impacts the rate at which English-speaking children develop literacy (Sproat, 2016). A child learning to read in English is confronted with the task of learning inconsistent print-to-speech correspondences, such as "ea" having one sound in "bread" and another in "leak" (Schmalz, Marinus, Coltheart & Castles, 2015). To a lesser extent, a Portuguese first grader is also confronted with a phonological inconsistent orthography; e.g., CA can correspond to /ka/ or /kɐ/ (Ventura et al. 2019). In contrast, a child learning to read in Spanish does not encounter many words that have graphemes that share the same spelling but can be pronounced differently in different words. This facilitates learning to an extent that a child's ability to name letters and segment speech sounds in kindergarten are not such strong determiners of that child's reading ability in second grade and beyond (Caravolas et al., 2012).

Other studies specifically addressing the impact of predictors of reading ability, for example the ability to segment speech sounds or phonological awareness (PA), indicate that reading development is modulated by orthography transparency. PA is a stronger predictor in less transparent orthographies, such as French and Portuguese, than in more transparent ones like Dutch, Hungarian, and Finish (Ziegler *et al*., 2010). Although researchers have questioned the relevance of PA as a reading predictor in different languages, because most studies have been conducted in English (Share, 2008), current evidence suggests that PA is a predictor of

reading ability across European alphabetic languages (Vaessen et al., 2010). Perfetti and Verhoeven (2020) recently concluded that this association of PA and reading development holds for 14 European languages. Some studies indicate that accuracy in word recognition is a better predictor of reading ability in less consistent orthographies, whereas variations in speed in more consistent orthographies explain reading performance (Vaessen et al, 2010; Landerl et al., 2013; Pollatsek & Treiman, 2015). However, the cognitive processes involved in word decoding - accuracy and speed - are identical in orthographies that vary along the transparency continuum (Hulme & Snowling, 2013; Vaessen et al., 2010), and this has been observed also in grades 3 to 6 of primary school (Moll et al., 2014).

As children move beyond the initial stages of learning to read, knowledge of other aspects of language beyond accurate and fluent word reading, namely grammar and vocabulary knowledge, are associated with reading comprehension (Hulme & Snowling, 2013; Seidenberg, 2013; Sénéchal, 2012). During the learning to read phase (Chall, 1996) fast word identification skills serve as the foundation for text comprehension (Perfetti, 1992), but as the ability to decode words develops other factors such as vocabulary knowledge support reading to learn (Chall & Jacobs, 2003). In fact, "… research indicates that reading with comprehension depends on understanding at least 95% of the words of the text" (Adams, 2009, p.172). This understanding of the meaning of words develops, for example, when preschool-age children are exposed to book reading and parents explore the meaning of print with them. Later, the oral comprehension they developed early in life will assist them in comprehending what they will read by themselves (Sénéchal, 2012). For example, Sénéchal, Ouellette, and Rodney (2006) found that preschool Canadian children's vocabulary knowledge, acquired from parental book reading, predicts reading comprehension in grade three. The influence of this home literacy practice of shared reading on future reading achievement has been found in studies with English and French-speaking children (Sénéchal, 2006), as well as in studies in other more transparent languages. For instance, in Greek (Manolitsis et al., 2011; Manolitsis et al., 2013), Lithuanian (Aunola, Lerkkanen, & Raiziene, 2020/submitted), German (Lehrl, Ebert, & Roßbach, 2013; Niklas and Schneider, 2017; Rose, Lehrl, Ebert, & Weinert, 2018), and Finnish (Silinskas et al., 2012; Silinskas et al., 2020). As Kalb and van Ours (2014) put it, reading to young children gives them a head start in life**.** In their study of the impact of book reading by Australian parents they found that children who are read to in the home frequently, 3-5 days a week and 6-7 days a week, obtain between the equivalent of 6 to 12 months higher scores in

literacy at 8/9 years of age. Smaller effects of reading to children were found for numeracy skills.

Sénéchal's home literacy model (2012) postulates that during the preschool years both meaning-based interactions during shared reading as well as code-based teaching by parents, like naming alphabet letters, contribute to later reading achievement and this view is consistent with theories of reading development (Mol & Bus, 2011; Perfetti, Landi, & Oakhill, 2005). More specifically, shared reading supports vocabulary knowledge (Sénéchal, 2012) and code-based teaching by parents during shared reading can also assist children in learning to read. Nonetheless, "… achievement-based skills such as early reading, early math, and letter recognition skills appear to be more sensitive to Head Start attendance than cognitive skills such as IQ, vocabulary, and attention which are less sensitive to classroom instruction" (Shager et. al, 2013, p. 90).

In summary, country variations in reading development are associated with linguistic differences related to orthographic depth in the early years of reading instruction and individual variations in reading achievement are linked to different levels of language knowledge and to the specific contexts, at home and/or at school, where this knowledge is acquired.

2.3 Variation in Reading Achievement

Home and school socioeconomic and linguistic contexts are relevant in explaining differences in reading achievement that are already present during the primary school years. In the US, for example, the reading gap between students from high and low income families and between students of different ethnic and linguistic backgrounds has been well documented (Seidenberg, 2013). Similarly, in Europe data from comparative education surveys show that there is a relationship between socioeconomic and linguistic backgrounds and achievement.
Large-scale studies, such as the *Progress in International Reading Literacy Study* (PIRLS), offer unique information about fourth graders' comprehension of authentic texts – the goal of learning to read - and related predictors of reading ability. The contextual information collected in different participant countries via student, home, school and teacher questionnaires in PIRLS makes it possible to look at reading achievement from an international comparative perspective. This information can be used to study both student background factors and environmental ones and to explore variations across countries in terms of reading literacy universals and particulars (Lenkeit, Chan, Hopfenbeck & Baird, 2015). In this sense, PIRLS

allows us to characterize the reading literacy skills of fourth grade students in European countries and to understand their relation with different sociolinguistic contexts.

Measures of socioeconomic status (SES) can include income, number of books and children's books at home parental education level, occupation level or a combination of these and other variables indicative of available home resources such as possession of internet connection and own room (Araújo & Costa, 2015; Caro & Sandoval-Hernández & Lüdtke, 2014). Supportive literacy environments, such as books at home, have been conceptualized as a measure of cultural capital and found to explain reading score differences among students (e.g., Park, 2008). Moreover, both a school's intake of children from a certain range of socio-economic status levels and the school's average of students' cultural capital account for part of the reading score differences between schools (Caro, Sandoval-Hernández & Lüdtke, 2014; Myrberg & Rosén, 2006). This indicates that there is a school compositional effect whereby students in schools with a higher SES composition have higher reading achievement and this trend has been found in Germany, France and Denmark (Stancel-Piatak, Mirazchiyski & Desa, 2013). Similarly, Myrberg and Rosén (2006) found that in PIRLS 2001 students' cultural capital accounted for a great part of reading score differences between Swedish independent and public schools. In Sweden the share of students with a migrant background is higher in public schools and this explains the lower reading achievement, when compared to private schools. This has been corroborated in Dutch studies that also use PIRLS data and show that students who speak Dutch as a second language have lower achievement (Netten, Voeten, Droop, & Verhoeven, 2014; Netten, Luyten, & Verhoeven, 2016).

Literacy achievement in PIRLS in European countries reveals that both common underlying factors such as socioeconomic and linguistic backgrounds are associated with student achievement. Nonetheless, the strength of the association between reading achievement and SES and between achievement and family/student characteristics varies across countries. For instance, a positive correlation of parents' socioeconomic status and children's fourth grade reading achievement is present in all European countries participating in PIRLS 2006 and 2011 (Araújo & Costa, 2015; Park, 2008). However, score point differences between students from high and from low SES backgrounds are wider in some countries than in others and both home literacy activities and students' early literacy skills also seem to mediate results (Costa & Araújo, 2017). In a PIRLS study that considered aspects of the home literacy model proposed by Sénéchal (2012), Myrberg and Rosén (2009) found that parental book reading and storytelling during preschool made a positive contribution to reading achievement and that

book reading was mediated by cultural capital, as measured by the number of books at home. Additionally, this study showed that Swedish students' early literacy skills influenced positively reading attainment, without any mediating effect of cultural capital, or number of books at home. Other studies with PIRLS that include several European countries (e.g., Martin, Foy, Mulis & O'Dwyer,2013;Stancel-Piatak, Mirazchiyski & Desa, 2013) also support the notion that early literacy skills, such as recognizing letters of the alphabet and being able to write some words, exert a positive influence on achievement. However, Netten, Voeten, Droop and Verhoeven (2014) examined PIRLS data for the Netherlands and found a positive influence of early literacy activities, but not of early literacy skills, on achievement.

In short, students who enter elementary school knowing how to name letters of the alphabet and how to write some words score higher in PIRLS. This has been observed in most European countries, after controlling for SES, except in the Netherlands (Netten, et al., 2014).

Nevertheless, the studies reviewed suggest that variations in reading achievement in PIRLS may be related to sociocultural and linguistic factors, as well as to individual literacy abilities and skills. Furthermore, PIRLS studies suggest that individual reading habits and enjoyment of reading are related to achievement in Denmark, Sweden and France (Costa & Araújo, 2017), after accounting for SES. Similar findings are reported in a Dutch study that assessed reading ability using the PIRLS variable that measures reading motivation (Netten, Droop & Verhoeven, 2011).

With respect to school factors, analyses of PIRLS data have shown that adequate resources for teaching reading are related with increased reading achievement (Mullins et al., 2013), as is a school's emphasis on academic success (Costa & Araújo, 2017; Martin, Foy, Mullis, & O'Dwyer, 2013). Considering instructional factors, PIRLS studies do not show a strong relation with reading scores. For instance, an emphasis on reading skills in first grade is only positively related to achievement in Grade 4 in one European country – Germany (Martin, Foy, Mullis, & O'Dwyer, 2013). Similarly, no relationships have been reported between reading achievement and types of reading instruction - whole group vs small group or individualized instruction and time spent on reading (Shiel & Eivers, 2009). Reading literacy achievement in PIRLS 2011 compared with PIRLS 2006 has been associated with a decline in students' ability to answer questions that require higher-order comprehension processes, such as understanding text structure and main idea (Netten, et al, 2014). However, this finding has not been linked to teachers' instructional strategies or, more specifically, to different emphasis in reading processes. It remains difficult to ascertain cause and effect relations between the

way teachers teach comprehension and reading achievement in PIRLS, but studies suggest that reading instruction influences reading ability (Hulme & Snowling, 2013). For example, comprehension instruction that focuses on practicing making inferences from text enhances reading attainment (Elbro & Buch-Iverson, 2013).

Turning next to secondary school attainments, observed variations in reading achievement reveal that similar student background factors are associated with achievement and that schools can also make a difference. All rounds of the *Program for International Student Assessment* (PISA) show, for example, that the higher the SES the higher students score in reading and that migrant students perform lower than native students. In PISA, the reading achievement gap between immigrant and native students is observed even after controlling for SES (Lenkeit et al., 2015). Nonetheless, students' achievement reveals that European immigrant students perform better in reading test items that mirror educational situations or contexts where reading serves the purpose of learning or acquiring information (Costa & Araújo, 2012). Moreover, they perform better than native students in test items linked to occupational reading or reading that involves accomplishing a task such as looking for a job in a newspaper or following directions in the workplace. Conversely, native students perform better in personal and public situations that imply reading for recreational purposes as well as attending public events (e.g. a concert). Last, at the European level immigrant students perform better in exposition and instruction types of text, which again are text types likely found in textbooks used in school.

Additional student background factors related to students' reading achievement in PISA include parental book reading and students' reading for enjoyment. Results show that the parent effect in reading is present because of students whose parents report reading to them frequently during first grade score higher (OECD, 2012). Furthermore, that resilient students, as defined by those that score above what would be expected given their SES background, read frequently outside of school.

The school factors associated with reading achievement in PISA are similar to those found in PIRLS studies. Besides emphasis on academic success, PISA results highlight that school climate – discipline - and student-teacher relations are associated with higher achievement. Students in schools where there is a good disciplinary climate, where teachers support students and emphasize academic achievement score higher (OECD, 2012, 2013, 2016). School compositional effects are also present in PISA. For example, students attending

schools with a socio-economically advantaged intake tend to perform better than those attending schools with more disadvantaged peers (OECD, 2010b).

It is with the PISA surveys that the European Commission monitors progress in the EU goal of reducing the share of low achievers in reading, mathematics and science. However, PISA 2015 results indicate that, on average, the percentage of low achievers in reading has increased slightly from 17.8% in 2012 to 22.5% in 2018 in the EU (Education and Training Monitor, 2020). This indicates that almost one fifth of 15-year olds in the EU do not attain a satisfactory level of reading ability that would enable them to interpret texts effectively, although there are wide variations among countries (e.g. the share of low achievers is 26% in Hungary, but only 8% in Estonia).

In the following section, we present research evidence on literacy levels in the EU based on PIRLS primary school data and PISA secondary school data. The analyses illustrate the association of SES and home literacy practices with reading scores in both surveys and the relation between early literacy skills and reading achievement in PIRLS.

3. Literacy Levels Across European Societies

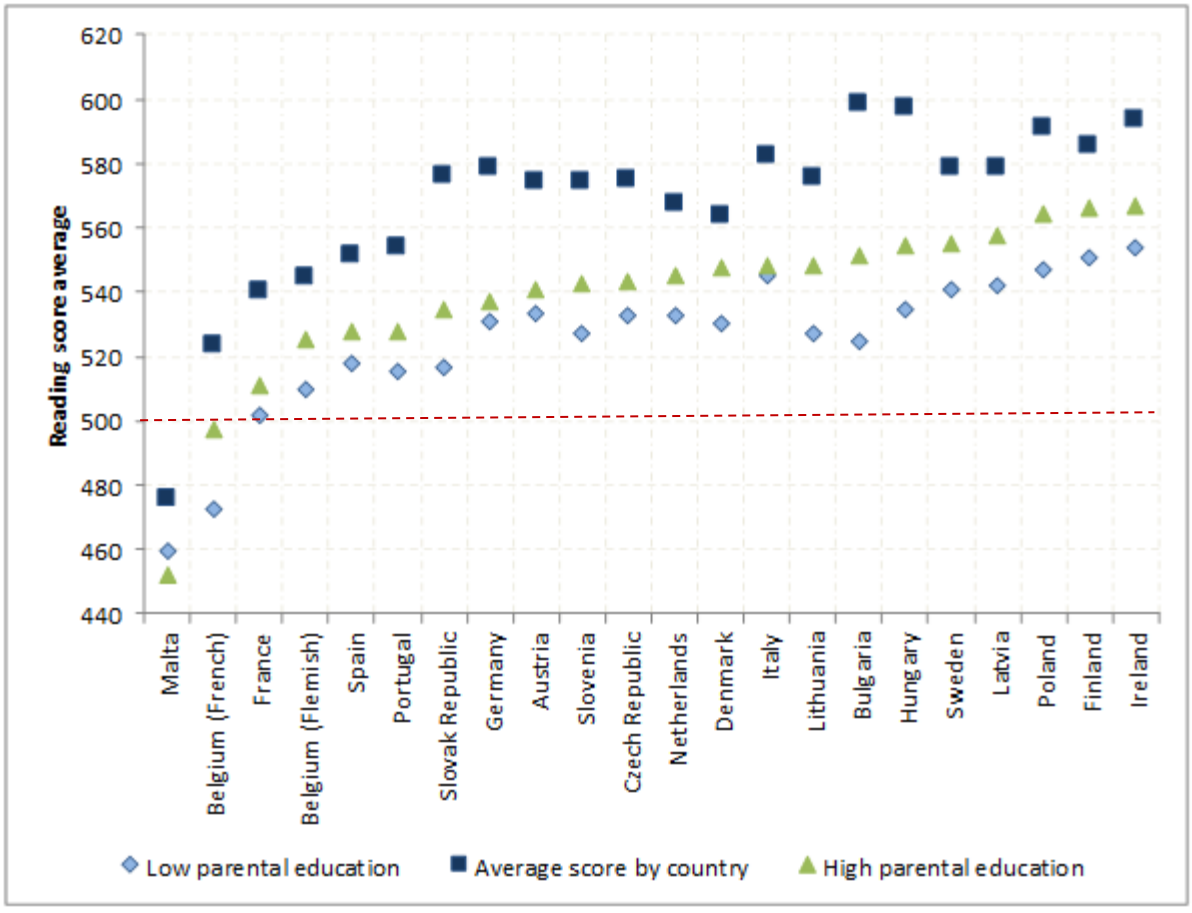
3.1 Literacy Levels in Children

The *International Association for the Evaluation of Educational Achievement* (IEA) runs PIRLS every five years to measure trends in the reading achievement of fourth grade students. At this point in their schooling, students have moved from learning to read to reading to learn (Chall, 1996) and PIRLS tests students' ability to comprehend both literary and informational texts. Its assessment framework defines reading literacy as "the ability to understand and use those written language forms required by society and/or valued by the individual. Young readers can construct meaning from a variety of texts. They read to learn, to participate in communities of readers in school and everyday life, and for enjoyment" (Mullis, Kennedy, Martin, & Sainsbury, 2006, p.103). Reading comprehension is tested in questions that ask for the following:1) focus on and retrieve explicitly stated information, 2) make straightforward inferences, 3) interpret and integrate ideas and information, and 4) evaluate and critique content and textual elements (Mullis, Martin, Foy, & Hooper, 2017).

Twenty-four European Union Member States (EU-MS)[3] collected representative data on the reading literacy skills of their fourth-grade students in 2001. The PIRLS achievement scale is based on item response theory (IRT) and scores are 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 the most recent PIRLS survey in 2016 recorded the participation of 50 countries and 11 regional entities.

Figure 1 presents the average reading achievement by country and SES of fourth graders in the 22 EU-MS that participated in PIRLS 2016. The graph shows that in 2016, Ireland, Finland and Poland are the top performing countries in Europe. Conversely, Malta, Belgium-French and France are the countries with the lowest reading scores in Europe.

Figure 1: Average Reading Achievement by country and by SES in Grade Four in 22 countries participating in PIRLS 2016 EU-MS dataset



Source: PIRLS 2016, authors' calculations
Notes: Countries are ranked in ascending order of the reading score average. High parental education denotes completion of tertiary education or higher education and Low parental education denotes completion of up to upper secondary education.

[3] Educational systems referring to regions (i.e. Belgium-French and Belgium-Flemish) are considered in the EU analysis. We refer to the EU countries and regions as Member States (MS).

When we look at the reading scores of low SES students, using as a proxy low parental educational levels, we see that students whose parents have up to a high school education have lower achievement than students whose parents have gone on to complete higher education. Differences in students' reading achievement vary from about 16 to 73 points, favouring the ones with a high parental education level, although the associations differed by country. Larger differences in reading achievement are found in Bulgaria and Hungary and the smallest in Malta, Spain and Denmark.

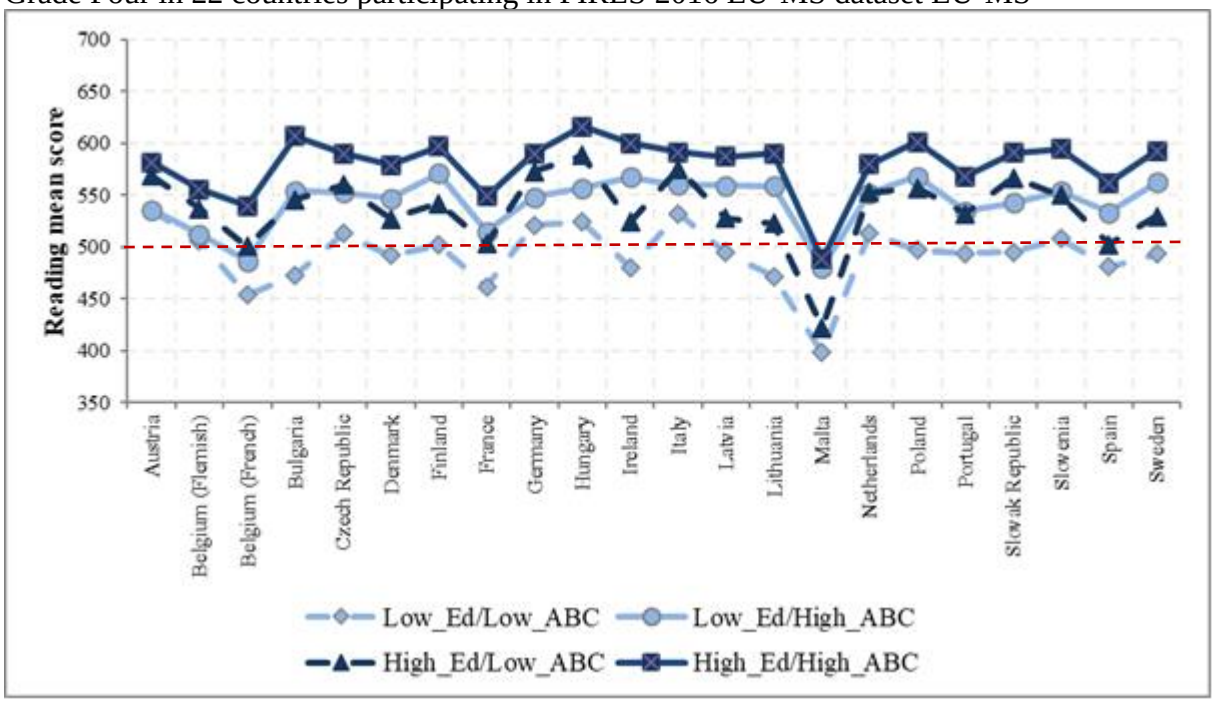
Turning next to variables prior to school entry, we use items from the PIRLS home questionnaire which asks parents to indicate how well their children were able to name letters of the alphabet before starting school and how often they or someone in the household read to their children. Evidence from studies with PIRLS data indicate that both greater alphabet knowledge and more frequent book reading at home before the start of compulsory education are associated with students' achievement in Grade 4 (Alivernini, 2013; Araújo & Costa, 2012, 2015; Myberg & Rosén, 2009). Furthermore, good knowledge of the alphabet and high book reading frequency benefit children from both high and low SES backgrounds across countries. These data are consistent with trends reported in several small-scale studies: Children's ability to name letters of the alphabet before formal reading instruction begins is one of the strongest predictors of children's reading ability (Bond & Dykstra, 1967; Riley, 1996, Piasta & Wagner, 2010) because naming letters shares a reciprocal relation with phonological awareness (PA) (Adams, 1990; Verhoeven, van Leeuwe, Irausquin, & Segers, 2016). Similarly, parental book reading promotes reading development because when preschool-age children are exposed to book reading they develop the understanding of vocabulary that is not commonly used in daily oral interactions (Kalb & Ours, 2014; Sénéchal, 2012).

Figure 2 presents the reading score average according to alphabet knowledge and students' SES. High alphabet knowledge is positively associated with student scores. For students from low SES, Austria shows the smallest difference (1 point) and Lithuania shows the largest, difference between high alphabet knowledge and low alphabet knowledge (87 points). For students whose parents have tertiary education Austria is again the country with the lowest difference in students scores (13 points) and Ireland is the country with highest difference (75 points).

Overall, except for Austria, Spain and Belgium (Flemish speaking) and France the differences in reading scores related to alphabet knowledge are larger for the low parental

education group. That is, children whose parents have low educational level seem to reap more benefits from knowing the letters of the alphabet very well than children whose parents have higher levels of education. However, as Figure 2 shows, within the same SES background knowing the letters of the alphabet very well is consistently related to higher student achievement.

Figure 2 - Average Reading Achievement according to alphabet knowledge and SES in Grade Four in 22 countries participating in PIRLS 2016 EU-MS dataset EU-MS

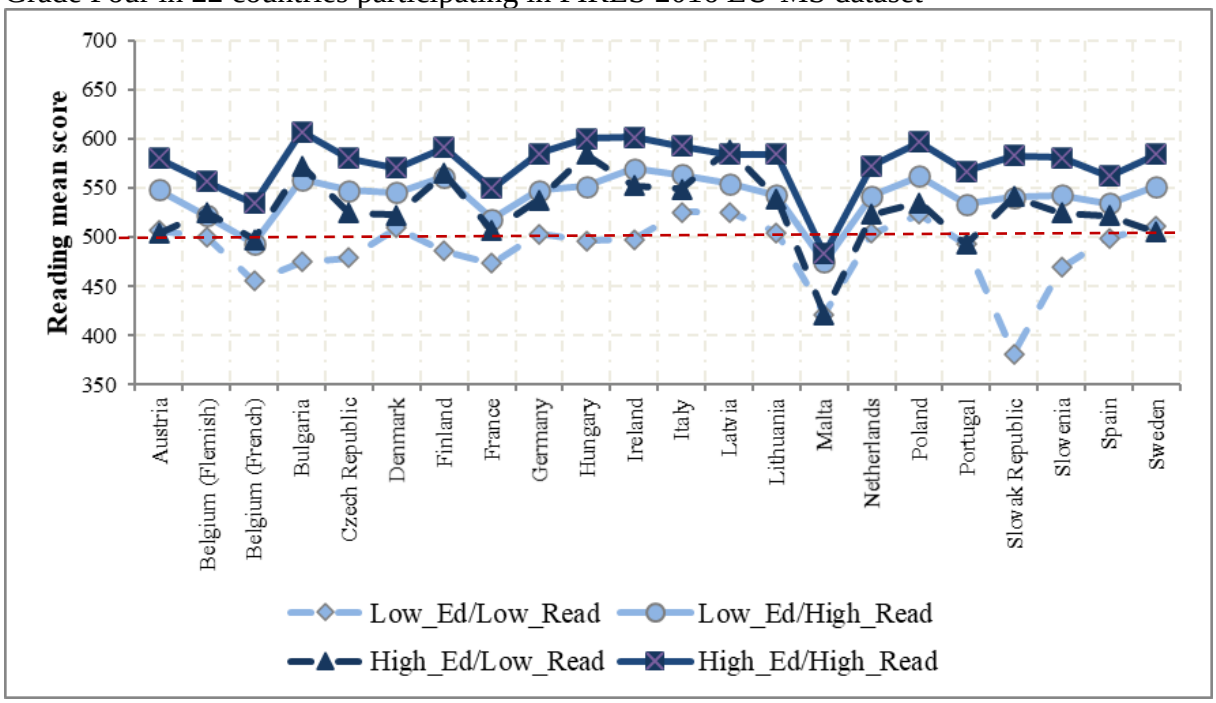


Source: PIRLS 2016, authors ´calculations
Notes: Light blue lines and symbols correspond to Low Parental Education. Dark blue corresponds to High Parental Education. Dotted lines correspond to Low Alphabet Knowledge and solid to High Alphabet Knowledge.

Figure 3 shows the association between frequency of book reading before the start of compulsory education and the reading achievement of fourth grade students whose parents have high and low education levels (SES). It clearly shows that within a SES band, high frequency of home book reading is always related to higher student achievement although there are country-wise variations in the range within each band. For students whose parents have low educational levels, the Slovak Republic shows the largest effect of pre-school book reading (160 points); for students whose parents have high educational levels, Sweden has largest effect (79 points). The graph also reveals that the contribution of home reading to the achievement of students from distinct SES backgrounds is different in different countries. In particular, in a group of 10 countries: Bulgaria, Czech Republic, Finland, France, Hungary,

Ireland, Latvia, the Slovak Republic, Slovenia and Belgium Flemish, the magnitude of the reading score difference between High vs Low home reading exposure is larger for students with low SES. In contrast in Austria, Denmark, Germany, Italy, Lithuania, Malta, Netherlands, Poland, Portugal, Spain, Sweden and Belgium Flemish the magnitude of the reading score difference between high parental book reading and low parental book reading is larger for students with high SES.

Figure 3 - Average Reading Achievement according to parental book reading and SES in Grade Four in 22 countries participating in PIRLS 2016 EU-MS dataset



Source: PIRLS 2016, authors ´calculations
Notes: Light blue lines and symbols correspond to Low Parental Education. Dark blue corresponds to High Parental Education. Dotted lines correspond to Low Book Reading frequency and solid to High Book Reading frequency.

3.2 Literacy Levels in Adolescents

PISA is a cross sectional survey launched in 2000 by the Organization for Economic Co-operation and Development (OECD). Its purpose is to assess how ready youngsters are to either enter the workforce or continue further studies, enabling countries to monitor their progress in meeting key learning objectives (OECD, 2013a). The OECD has been running this international large-scale assessment of 15-year-old students' skills in reading, mathematics and science every three years. Each assessment cycle focuses on a main domain or knowledge area and reading was the main domain in 2000, 2009 and 2018, whereas Science was the focus in

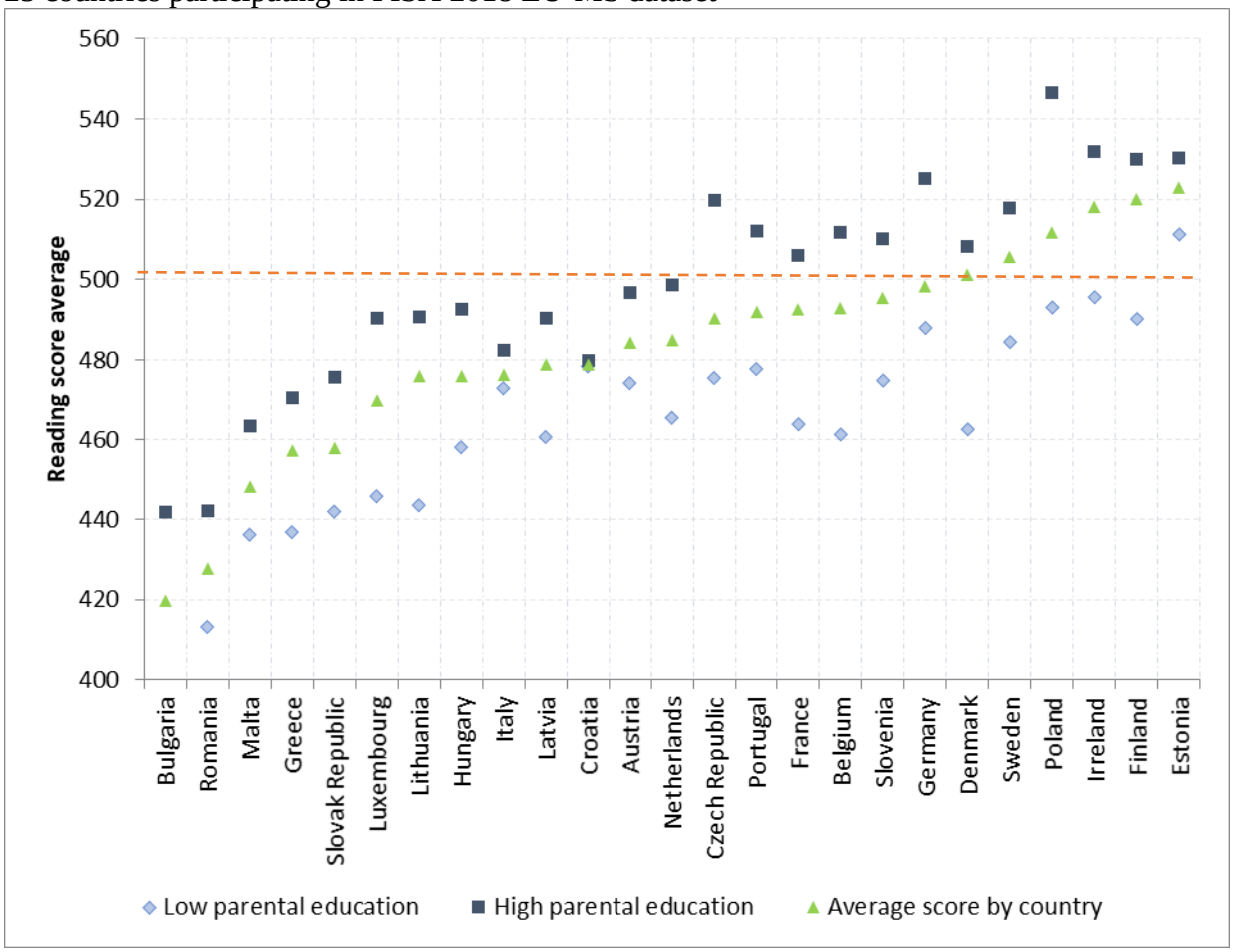
2006 and in 2015 and Mathematics the focus in 2003 and 2012. In PISA, students' scores are computed according to IRT and standardized with an OECD mean of 500 and a standard deviation set at 100 in 2000.

In PISA 2018, "reading literacy is understanding, using, evaluating, reflecting on and engaging with texts in order to achieve one's goals, to develop one's knowledge and potential and to participate in society" (OECD, 2019, p.28). In much the same way as PIRLS does, PISA examines the extent to which students are able to understand and integrate the information in informational and literary texts by including the following dimensions in its assessment framework: 1) Retrieve texts and access them, 2) Interpret and integrate texts and 3) Reflect and evaluate texts. In addition to the achievement score, PISA also collects information on students' socio-demographic and dispositional characteristics, students' home environment and teaching and learning contexts in schools (Lenkeit et al., 2015) through the application of student and school questionnaires.

In order to examine the reading achievement of 15-year-old European students we focus on the most recent PISA 2018 data, which had reading as a main domain. Figure 4 shows the average reading score by country and SES across the PISA 2018 participating EU-MS, for which data is publicly available. The graph shows that there is great variation in students' reading scores, with the difference in scores among European Union-Member States (EU-MS) reaching about 100 points (Estonia vs Bulgaria). Estonia, Finland and Ireland are the top performers, while the EU-MS with lower performance in reading are Bulgaria, Romania and Malta.

When comparing the reading scores for high and low SES students, using as a proxy parental educational levels, we see that students whose parents have tertiary education perform better in reading than the ones whose parents have not completed higher education . Differences in students' reading achievement vary from about 1, in Croatia, to 53 points, in Poland, favouring the ones with a higher parental education level. These findings are in line with the ones from the previous section showing that differences in reading achievement according to students' SES are already present in primary education.

Figure 4. Average Reading Achievement by country and by SES of 15 years-old students in 25 countries participating in PISA 2018 EU-MS dataset



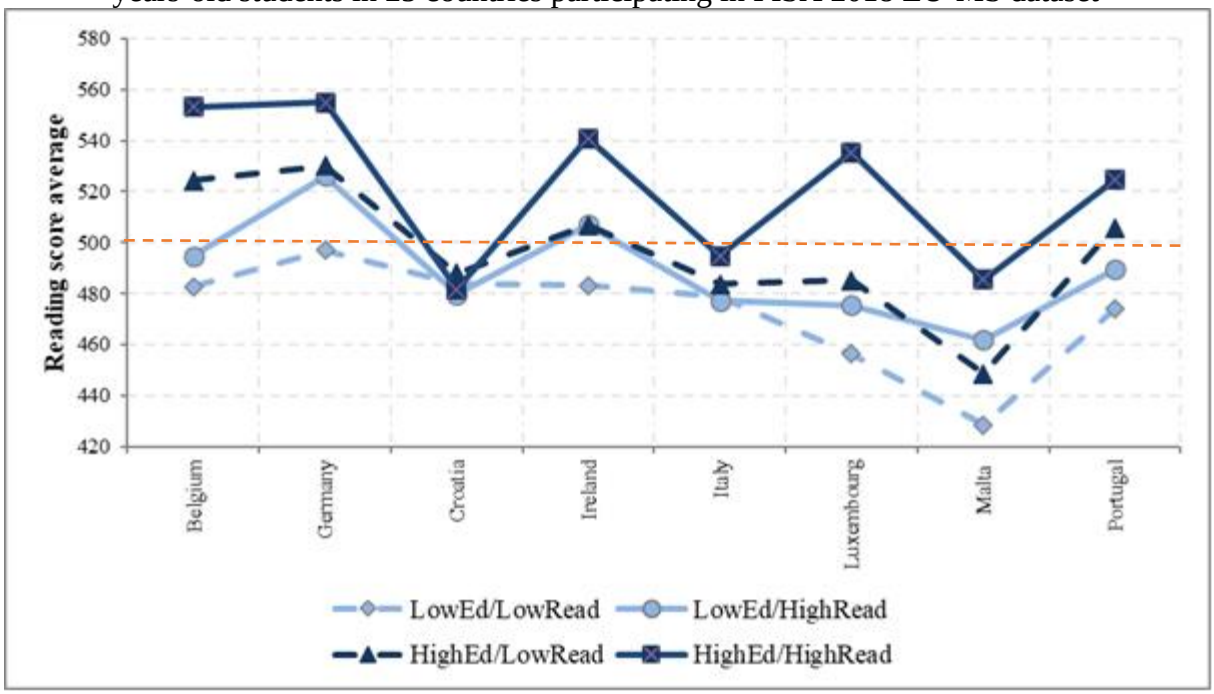
Source: PISA 2018, authors' calculations
Notes: Countries are ranked in ascending order of the reading score average. High parental education denotes completion of tertiary education or higher education and Low parental education denotes completion of up to upper secondary education.

Additionally, this is in line with evidence from OECD using PISA 2009 data. In particular, across OECD countries students with a higher socio-economic status outperform disadvantaged students on average by 38 score points, or about one year's worth of education, in reading (OECD, 2010b). This corroborates evidence that there is an association between parents' educational attainment, used as a proxy of students' SES (Jerrim & Micklewright, 2014), and students' achievement (Pokropek, Borgonovi & Jakubowski, 2015).

With respect to the home environment, and in accord with Sénéchal's home literacy model, the PISA home questionnaire implemented in some countries in 2009 and 2018 asked parents how often they read to their children during their first year in primary education (OECD, 2012). Figure 5 presents the association between frequency of book reading and the reading achievement of 15 years-old students by parental educational level in EU-MS. It is evident that, in general and irrespective of parental educational level, high frequency of home

book reading is associated with higher student achievement. The highest contribution of home reading for the achievement of students is found in Luxembourg and Belgium and the lowest difference is found in Croatia. These results are in line with those found using PIRLS data (Araújo & Costa, 2015), showing that a higher frequency of home book reading is related to higher student achievement in the same MS, although these results do not pertain to the same cohort of students.

Figure 5 - Average Reading Achievement by country, parental book reading and SES of 15 years-old students in 25 countries participating in PISA 2018 EU-MS dataset



Source: PISA 2018, authors' calculations
Notes: Light blue lines and symbols correspond to Low Parental Education. Dark blue corresponds to High Parental Education. Dotted lines correspond to Low Book Reading frequency and solid to High Book Reading frequency. The graph includes EU-MS for which PISA 2018 data is available for the variable "home book reading".

A comparison of home literacy in PIRLS and PISA shows that reading to young children gives them a head start in reading achievement, as retrospectively reported by parents in PIRLS (e.g. how often children were read to before the start of compulsory education) and during the first year of primary education in PISA (e.g. how often children were read to during the start of compulsory education).

Overall, the analyses presented in this chapter show that in PIRLS students are better readers in fourth grade when they were read to during the preschool years (Araújo & Costa, 2015). Similarly, PISA 2018 students who were read to when in first grade are better readers at age 15 and this is in line also with findings using the PISA 2009 dataset (OECD, 2011). This

highlights the positive reading outcomes accrued from home reading at a young age, a significant finding also with Australian children (Kalb & van Ours, 2014) and with Canadian children (Sénéchal, 2012). Clearly, ILSA such as PIRLS and PISA provide rich data for cross-country comparative analyses and the contextual information they collect allows us to understand what factors are associated with variations in the reading literacy performance of students. Although they are not longitudinal studies, the findings related with book reading in European countries converge with evidence from longitudinal research in Australia and Canada (Kalb & van Ours, 2014, Sénéchal, 2012). The PISA results, however, also suggest that different European countries present particular relations between reading achievement and home book reading. In Croatia, for example, student scores change very little according to frequency of parental book reading with SES level. In contrast, in Poland, Belgium and Bulgaria score differences are much wider according to SES level. It is possible that children's exposure to shared book reading in preschool kindergarten classrooms also varies among countries and that frequent exposure reduces the effects of home variables, but PIRLS and PISA do not collect such data. Research supports this conjecture and there is evidence that this effective early instruction practice promotes fourth-grade language and reading abilities (Dickinson & Porche, 2011).

4. Role of Ecological Factors

4.1 Role of Socio-Economic Status

The analyses we present show that there are variations in achievement across countries and that socioeconomic variations within and across countries are associated with differences in reading achievement. High SES students surveyed in PIRLS and PISA have higher achievement than low SES students in all EU-MS. In addition, our analyses show that home book reading and early literacy skills can contribute to increase reading achievement in PIRLS for both groups of students. In this sense, early literacy skills and home practices before the start of primary school can help improve the reading abilities of students with different SES.

PIRLS research also shows that a school's SES composition explains variation in students' reading achievement in EU-MS (Martin, Foy, Mullins, & O' Dwyer, 2013). The study by Stancel-Piatak, Mirazchiyski and Desa (2013) found that in three PIRLS 2011 participating European countries – Denmark, Germany and France - a school's average of students' cultural

capital, measured by the number of books at home, was one of the most relevant variables in explaining variation in reading scores. Myrberg and Rosén's study (2006) found that in PIRLS 2001 students' cultural capital accounted for a large part of reading score differences between independent and public schools. These findings suggest that it is not only individual/home SES that matters, but that to a lesser extent a school's SES compositional effect also shapes reading achievement in PIRLS (Araújo & Costa, 2012; Costa & Araújo, 2017). PISA findings corroborate this with adolescents (OECD, 2013b).

4.2 Role of Home Literacy Experiences

Different analyses of PIRLS confirm that both early literacy skills and practices, such as home book reading, in conjunction with other characteristics of effective schools have a positive influence on achievement (Araújo & Costa, 2012, Costa & Araújo, 2017). Moreover, PIRLS studies suggest that motivational factors, like students' enjoyment of reading, are positively related to achievement (Costa & Araújo, 2017; Stancel-Piatak, Mirazchiyski & Desa, 2013).

The home literacy environment, namely home book reading during the preschool years and the first year of primary school, contributes to higher reading achievement in PIRLS and PISA. This is in accord with Sénéchal's (2012) home literacy model. In addition, and in accord with Sénéchal (2012) and with findings from research that looks at predictors of reading ability, the ability of young children to recognize the letters of the alphabet contributes to reading achievement in PIRLS. In this survey, parents are asked how well their children recognized the letters of the alphabet before the start of compulsory education. Children could have learned them at school or at home or in both settings. In this sense, this predictor of reading attainment in fourth grade is not restricted to the home literacy environment and research indicates that alphabet knowledge can be successfully acquired in school (Shager et. al, 2013).

Findings from other studies that use PIRLS and PISA data and the information collected in student and parental questionnaires reveal interesting links between achievement and students' socio-demographic and dispositional characteristics (Lenkeit et al., 2015). For example, in PIRLS reading for enjoyment outside of school contributes to higher achievement in Denmark, Sweden, France, after controlling for SES (Costa & Araújo, 2017). Similarly, in all EU countries secondary students who enjoy reading perform significantly better than students who have not developed an interest in reading (OECD, 2010a). This suggests that

literacy practices can partially compensate for students' socioeconomic disadvantaged backgrounds.

4.3 Role of Educational Factors

While the relationship of SES and home literacy practices with achievement is similar in all EU-MS, the relation of school-related literacy practices with achievement is more particular in terms of variation across countries. Similarly, for other school-level characteristics such as emphasis on academic success there is more variation across countries.

For example, research with PIRLS data shows that a school's emphasis on academic success is related to higher achievement in France, but not in Denmark or Germany, which suggests that school effects are country specific (Stancel-Piatak, Mirazchiyski & Desa, 2013). Martin, Foy, Mullins, & O' Dwyer (2013) used PIRLS 2011 data to study the characteristics of effective schools and their findings corroborate the positive influence of good discipline and of emphasizing academic success. However, a school's early emphasis on reading skills is only positively related to achievement in one European country – Germany. Conversely, the index of early literacy skills, which includes the ability to name alphabet letters before the start of compulsory education, is positively associated with higher achievement in all European countries (Martin, Foy, Mullins, & O' Dwyer, 2013).

Other factors related to schools and teachers have been found to also influence the achievement of 15-year old students in PISA. For instance, students attending schools with better disciplinary climate, and better teacher-student relations perform better in reading (OECD, 2010c). This is supported by school effectiveness research, which suggests that school climate is a factor that explains variance in students´ achievement in reading (OECD, 2013b).

Clearly, PIRLS and PISA-related research has called attention to the school factors that seem to make a difference or that have "… an effect on student achievement over and above" student/home predictors (Martin et al., 2013, p. 111). Nonetheless, evidence of a school´s added value linked to student-teacher relations and instructional practices is limited, especially in PIRLS studies. Moreover, existing PIRLS studies suggest that factors like a school's academic climate and literacy practices and their relation with students' achievement are more country-specific than those factors associated with student background variables.

5. Conclusions and Discussion

This chapter began by offering a historical overview of the spread of literacy in Europe and by discussing current notions about schooling and literacy abilities. Good literacy and numeracy skills equate with good life outcomes (Heckman & Jacobs, 2009) and current ILSA at the primary and secondary school levels offer indicators of these cognitive skills. PIRLS has received considerably less attention as a survey that can tell us how well the world's fourth graders read, yet the information it provides can be useful to intervene earlier to promote reading achievement (Choi & Jerrim, 2016). Given the interdependence between reading and learning, it is important to monitor if young readers develop good comprehension skills during primary education. Those who do not are at risk of school failure (Adams, 2009).

The analyses presented for EU-MS show that Finland is a top performer in both PIRLS and PISA. This only partially supports the notion that results vary according to historical patterns of the spread of literacy in Europe. Literacy was already widespread in Finland in the 1900s, but this was also the case in France, which displays a much lower reading achievement in PIRLS and PISA. In PIRLS, Italy ranks higher than France, but in France literacy was more widespread in the 1900s. Regarding orthographic depth, Irish and English fourth graders score higher than Spanish and Italian students, but the latter learn to read in quite transparent writing systems. Thus, no facilitating effect of language transparency is observable.

The cross-linguistic studies reviewed indicate that linguistic variations associated with orthographic depth can facilitate or make more difficult the acquisition and development of reading abilities. However, in PIRLS we do not observe a pattern of achievement in different countries indicating that children learning more opaque orthographies have lower reading achievement than those that learn more transparent languages. Different reasons may account for this. Perhaps the effects associated with orthographic depth are only observable in the beginning stages of learning to read. It could also be that because PIRLS uses authentic texts this produces reading comprehension results that differ from those observed when word and pseudo-word fluency and cloze comprehension tests are used (Cutting & Scarborough, 2006). As Catts (2009) argues, we should not underestimate the complexity of reading comprehension, which is “not a skill like word recognition that can be mastered in a relative short time, but rather a collection of knowledge and processes that takes many years to acquire” (Catts, 2009, p.178). In this chapter we highlighted how vocabulary knowledge can affect reading achievement but other variables related to reading instruction, namely reading comprehension, in different countries may also modulate student performance.

The results also highlight that some countries, such as Latvia, are better positioned in PISA than in PIRLS. Nevertheless, different countries participate in the two surveys and reading score averages are calculated for the specific participating countries. In addition, we must keep in mind that the reading assessment frameworks of PIRLS and PISA are similar, but not identical. PIRLS, in particular, seems to assess very basic reading comprehension processes. When compared to the National Assessment of Educational Progress (NAEP), for example, PIRLS asks for the retrieval of text information that matches verbatim the questions asked while NAEP includes more questions that require higher levels of interpretation (U.S Department of Education, 2003). Moreover, NAEP passages are written at a 7th grade level, whereas PIRLS passages are written at a 5th to 6th grade level (U.S Department of Education, 2003).

Importantly, the research evidence presented based on PIRLS suggests that although SES is a determinant of reading achievement, home book reading and alphabet knowledge can contribute to increased reading scores. PISA data, based on parental questionnaires in some participating countries also corroborate the positive influence of book reading to young children. This suggests that what parents do is important. Additional research suggests that both in PIRLS and PISA autonomous, recreational reading outside of school is a factor that relates to higher reading achievement. School factors, such as a positive disciplinary climate and good teacher-student relations, also contribute to increased student scores. Thus, teachers and what teachers do is also important to boost reading achievement. However, PIRLS and PISA variables present limitations in terms of unraveling possible links between reading instruction and achievement. For example, the role of preschool teachers in exposing children to the same types of home shared reading experiences is not captured in these surveys.

Still, International Large-Scale Assessments provide a rich basis for designing evidence-based policies and for monitoring achievement trends over time in a comparative perspective. The comprehensive information provided in these surveys and the high number of participating countries makes it possible to investigate commonalities and differences in reading achievement and their relation with student background and ecological factors. In the case of the EU, this is all the more relevant because of common educational goals. The results we present suggest, for instance, that to reduce the influence of SES background countries should encourage interactions around books. Curricula that contemplates teaching the alphabet before the start of compulsory education may also give children a head start in reading.

Building a supporting school environment that encourages academic success should also be a priority.

Future research using ILSA should build on the evidence gathered thus far about the factors that are related with reading achievement levels and try to confirm or disconfirm universals and particulars; what is country-specific and what is more universal across countries. Most studies conducted thus far are correlational in nature and more research is needed to disentangle cause and effect relationships. Additionally, our knowledge of the development of reading skills and their relation with reading achievement would gain much from observational studies that document how reading curricula is implemented and how reading comprehension strategies are taught in different educational systems.

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