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Article

The impact of sociodemographic variables in early reading acquisition

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Abstract: Research indicates a strong correlation between sociodemographic factors and success in learning to read. This study examines the sociodemographic characteristics of 1131 preschool and 1st-grade children in Portuguese public schools and explores the relationship between these characteristics and key competencies for reading acquisition. The collection included a sociodemographic questionnaire and pre-reading skills, such as letter-sound knowledge. To assess the relationship between the sociodemographic variables and the letter-sound knowledge, inter-subjects (parametric and non-parametric) difference tests were conducted, as well as correlation analyses. To understand whether letter-sound knowledge is predicted by sociodemographic variables, a multiple linear regression analysis was performed using the Enter method. The results suggest that the mother's education is the variable that most strongly contributes to success in reading acquisition. Socioeconomic status and the type of school also play a role in reading achievement. Identifying the sociodemographic factors that most strongly correlate with reading acquisition success is crucial for a more accurate identification of at-risk children and to provide targeted support/inclusion in reading skills promotion projects.

Keywords: sociodemographic variables; reading acquisition success; socioeconomic status; mother's education; letter-sound knowledge

1. Introduction

Successful reading acquisition is closely linked to educational, social, and occupational success (Jamshidifarsani et al., 2019; Jeffes, 2013). The way children begin formal schooling can greatly impact their subsequent educational path (Stanovich, 1991). Specifically, when children experience difficulties, they tend to avoid reading-related tasks, which can negatively impact their motivation towards school and learning in general (Lyytinen and Erskine, 2016). However, when difficulties are identified early and addressed through systematic, intensive, individualized, or small-group interventions, the likelihood of reversing underachievement trajectories and improving school outcomes is high (Hall and Burns, 2018). This is of particular importance as it is well known that mastery of reading is a prerequisite for success in a major number of areas of the curriculum (Mcgrath and Tejero Hughes, 2017). Therefore, it is crucial to create the best conditions for children to begin formal schooling well-prepared for future needs (Mcgrath and Tejero Hughes, 2017).

These results support the theoretical motivation for research into the predictors of success in learning to read since there is currently a lack of literature in Portugal on the effect of sociodemographic variables on pre-reading and reading skills. Research reveals the importance of the following variables: Native language (Azevedo, 2006),

preschool attendance (Cardoso and Balça, 2017), socioeconomic status (Guo et al., 2018), and mother's education (Zalewska-Łunkiewicz et al., 2016).

In this study, the research question was: "Are the native language, years of preschool attendance, socioeconomic status, and mother's education important sociodemographic factors that significantly influence reading acquisition for Portuguese children attending public schools, as sustained by the literature (for children speaking other languages)?". This study aims to contribute to a greater knowledge of the Portuguese reality by: (i) characterizing kindergarteners and 1st graders regarding sociodemographic variables and (ii) exploring the relationship between sociodemographic variables and fundamental skills for reading acquisition.

1.1. Native language

Several international studies have focused on promoting language development in the preschool context, specifically vocabulary development (Chacko et al., 2016; Foorman et al., 2017; Johanson et al., 2016; McCoy et al., 2019; Milburn et al., 2017; Pollard-Durodola et al., 2016; Vaknin-Nusbaum and Nevo, 2017; Van Kleeck, 2008). These studies have established a relationship between language knowledge, particularly vocabulary development, and reading skills, including phonemic awareness and letter-sound knowledge (LSK). The role of native language, or the language spoken at home is pivotal in the early acquisition of reading skills. Previous research has highlighted several key aspects related to the native language, such as the linguistic foundation (Gaté et al., 2009; Scull, 2013) cognitive benefits (Nadalim et al., 2021); cultural relevance (Nadalim et al., 2021); family involvement (Zalewska-Łunkiewicz et al., 2016). Early literacy development is strongly linked to the language exposure a child receives at home. Children who are exposed to a rich and varied vocabulary in their native language tend to have a solid linguistic foundation, which can facilitate the acquisition of reading skills (Gaté et al., 2009; Scull, 2013).

Research suggests that early literacy skills often transfer more effectively when initially developed in the native language. Cognitive processes such as phonological awareness, vocabulary acquisition, and comprehension skills are closely tied to a child's proficiency in their native language (Ju et al., 2023; Oschwald et al., 2018).

Learning to read in one's native language provides a connection to cultural contexts, making the content more relevant and meaningful to the child. This connection can enhance motivation and engagement with reading materials (Sun, 2019; Sun et al., 2021). Parents are typically more comfortable and effective in supporting their child's literacy development in the native language. This involvement can include reading together, storytelling, and engaging in literacy-related activities, contributing to the child's overall literacy skills (Lewis et al., 2016; Sun, 2019).

Children who start 1st grade with language deficits, such as vocabulary delays or a lack of proficiency in the language in which reading instruction is delivered (Azevedo, 2006), are more likely to have their long-term educational outcomes affected (Adlof and Hogan, 2018; Lousada et al., 2016). Additionally, language proficiency through vocabulary development is also related to reading comprehension (Gaté et al., 2009; Scull, 2013).

In the case of bilingual children, the need to maintain more than one lexicon is associated with a less developed receptive vocabulary and, in this sense, to poorer performance on reading skills tasks than monolingual children (Oschwald et al., 2018).

In Portugal, the latest reports from the National Education Council (CNE) on the state of education show an increase in foreign children attending preschool (CNE, 2021) and primary school (CNE, 2022). Foreign children represent 4.5% of the children attending preschool. Within foreign children attending preschool in Portugal 73% speak non-European versions of Portuguese: 42.4% speak Brazilian Portuguese and 14.6% speak Portuguese versions adopted in African Countries (PALOP[1]) (CNE, 2022). In the North of Portugal 3% of all children attending preschool are foreigners, and 73.2% of these speak non-European Portuguese: 68.5% Brazilian Portuguese and 4.7% PALOP Portuguese (CNE, 2022). As for the primary school, 7.8% of the children do not have European Portuguese as native language; in the North of the country, these children represent 4.3% (CNE, 2022).

This information deserves our attention, as there is a significant number of children attending school in Portugal, learning to read in Portuguese, whose native language is not Portuguese.

In sum, native language plays a critical role in reading acquisition, influencing both cognitive and sociocultural aspects of literacy development (Chacko et al., 2016; Van Kleeck, 2008).

1.2. Preschool attendance

Preschool attendance plays a crucial role in both cognitive and social development (Cardoso and Balça, 2017; Sucena et al., 2023). During preschool children acquire skills such as the perception of the function of reading and writing, the conventions and connections between oral and written language, and the characteristics of the alphabetic system (Albuquerque and Martins, 2018). Portuguese Curricular Guidelines (DGE, 2016) emphasize the importance of pedagogical practices towards motivating and preparing children for reading-related activities.

Several studies have focused on isolating the key variables that effectively contribute to reading and spelling acquisition, concluding that there is a strong relationship between children's previous knowledge, namely phonological awareness and language, and success in reading and spelling acquisition (Cadime et al., 2017; Lervåg et al., 2018; Sucena et al., 2023). Children attending preschool for less time reveal more difficulties developing written language skills (Hulme and Snowling, 2016). Early exposure to reading and literacy activities stimulates cognitive development, fostering skills such as memory, attention, and language processing (Archibald et al., 2019; Sucena et al., 2023; Teng and Zhang, 2023). Also, reading supports language acquisition by exposing children to a rich vocabulary, sentence structures, and various communication styles (Sucena et al., 2023; Volkmer et al., 2019).

Proficiency in early reading skills prepares children for the academic demands of school. Early positive experiences with reading foster the motivation for learning and curiosity, creating a positive attitude toward education (DGE, 2016) and a positive trajectory for lifelong learning (Cruz et al., 2022; DGE, 2016).

In sum, early reading skills support not only academic success but also contribute to the overall development (Ecalle et al., 2020). Early identification and intervention for potential reading difficulties can be initiated during the preschool period, increasing the chances of successful intervention (Cruz et al., 2022; Ecalle et al., 2020; Keller-Margulis et al., 2019).

1.3. Factors affecting the development of early reading skills

1.3.1. Socioeconomic status

Research consistently indicates that children from higher Socioeconomic Status (SES) are in advantage for developing early literacy skills (Carroll et al., 2019; Guo et al., 2018; Lopes, 2021). There is a strong correlation between disadvantaged SES and failure in children's educational path, particularly in reading (Carroll et al., 2019; Guo et al., 2018; Lopes, 2021). Failure to learn and increased dropout rates affect children's reading skills (Aikens and Barbarin, 2008; Carroll et al., 2019; Kulic et al., 2019; Lopes, 2021), such as working memory and phonological awareness (Sucena et al., 2023), which in turn impacts their later academic success, perpetuating under-achieving communities (Aikens and Barbarin, 2008; Ecalle et al., 2020; Schmerse, 2020).

Several studies indicate that children from disadvantaged SES tend to perform worse compared to children from more advantaged SES (Carroll et al., 2019; Corso et al., 2016; Denton and West, 2002; Ecalle et al., 2020; Freitas et al., 2019; Klibanoff et al., 2006; Kulic et al., 2019; Lopes, 2021; Schmerse, 2020). This advantage stems from a combination of factors, including greater access to educational resources, a print-rich home environment, and increased parental involvement (Buckingham et al., 2013; Zalewska-Łunkiewicz et al., 2016). Specifically, families with higher SES tend to provide a supportive foundation for literacy development, contributing to enhanced vocabulary, cognitive stimulation, and exposure to literacy-promoting activities (Buckingham et al., 2013; Zalewska-Łunkiewicz et al., 2016). On the other hand, the most disadvantaged families lack access to materials and resources (e.g., storybooks) (Cruz et al., 2022; Roza et al., 2020). Another issue related to children living in communities with low SES is the vulnerability to inadequate education and increased dropout (Sucena et al., 2023).

In Portugal, the most widely adopted equity indicator is the School Social Action (SSA) (DGEEC, 2022a). Support under the SSA is determined by the family's income bracket for the allocation of family allowance, based on documents issued by social security. According to DGEEC, (2022a), between 2018 and 2020, the percentage of students who completed the 1st cycle of basic education within the expected four years increased by 3 percentual points, but for students covered by the SSA program, this progress was 5 percentual points. These results are encouraging as they represent a reduction in the gap associated with students' SES of origin.

In this study, the variables SSA and type of school (TEIP[2] and non-TEIP) were adopted to assess the relationship between SES and success in learning to read. The SSA is based on the family allowance scales for children, which in turn are based on the family allowance scales assigned by Social Security. In the 1st-cycle, there are two scales: Scale A, in which meals are provided at 100% and school supplies have a

maximum contribution of 16€ and study visits of 20€; and Scale B, in which meals are provided at 50%, the maximum value for school supplies is 8€, and a limit of 10€ stands for study visits (DGE).

In Portugal, according to the PISA Report (2022) (International Student Assessment Programme), in the field of reading there is a tendency for those in the field of mathematics and science, with a significant difference of 89 points, among students from of families with a higher SES and students from a disadvantaged SES: 527 vs. 438 points (IAVE, 2023).

In sum, there is scientific consensus in considering SES as a predictor variable of school success (Carroll et al., 2019; Guo et al., 2018; Islam and Khan, 2017; Kulic et al., 2019; Lopes, 2021).

1.3.2. Mother's education

The mother's level of education has been identified as one of the strongest variables associated with children's early academic success (Alsubaie, 2022; Dearing et al., 2004; Fan and Chen, 2001; Hofslundsengen et al., 2019; Strauss and Bipath, 2020; Zalewska-Łunkiewicz et al., 2016). There is a strong correlation between the mother's level of education and children's educational achievement. Specifically, children whose mothers hold a college degree show a significantly higher success rate than those whose mothers did not complete more than the 1st cycle of schooling (Casey et al., 2018; DGEEC, 2022b; Elbro et al., 1998; Koponen et al., 2020; Vandermaas-Peeler et al., 2012).

The mother is often the primary caregiver and the main influence on children's educational path (DGEEC, 2022b; IAVE, 2021). Children whose mothers have a higher level of education are at an advantage in the process of reading acquisition. Mothers with higher education levels are more likely to create a conducive atmosphere for literacy development by engaging in activities that promote reading and intellectual growth (DGEEC, 2022b), because they are more aware and more alert to the importance of their stimulating role in emerging literacy (Alsubaie, 2022; Curenton and Justice, 2008; Hofslundsengen et al., 2019; Tiryaki et al., 2021) and, consequently, they apply family literacy practices (Zalewska-Łunkiewicz et al., 2016). Consequently, children often exhibit advantages in early reading skills, setting a foundation for continued academic success (Alsubaie, 2022; Incognito et al., 2022; Incognito and Pinto, 2021). Their elevated educational attainment is associated with increased language modeling, advanced vocabulary exposure, and a heightened emphasis on educational aspirations (Zalewska-Łunkiewicz et al., 2016).

Understanding these sociodemographic influences helps educators and policymakers develop targeted interventions to bridge gaps and promote equitable access to early literacy opportunities for all children (Sucena et al., 2023).

1.4. Letter-Sound knowledge

Letter-sound knowledge is the foundation skill for reading acquisition and for the development of more complex reading skills–decoding and development of the orthographic lexicon, fundamental for fluent reading and reading comprehension (Sucena et al., 2023). Letter-sound knowledge is the ability to match each letter to a sound from the spoken language, that is, the letters of the alphabet represent specific

sounds of speech (Clayton et al., 2020). Research indicates that knowledge of letter-sound relationships is the basic skill for the alphabetic principle (Clayton et al., 2020), being the most robust predictor of success or failure in learning to read (Lyytinen and Erskine, 2016; Sucena et al., 2023).

A high performance in pre-reading skills is related to success in reading acquisition. Among pre-reading skills, LSK is the key foundation for reading acquisition (Clayton et al., 2020; Hulme and Snowling, 2013; Piasta et al., 2022). Differences in LSK are associated with SES (Piasta et al., 2022), mother's education (Koponen et al., 2020), vocabulary, and training before formal reading instruction (Porta and Ramirez, 2020).

2. The current study: Aims and hypotheses

The present study aims to: (i) characterize preschool and 1st-grade children attending public schools in (Northern) Portugal regarding sociodemographic variables–native language, years of preschool attendance, SES (assessed through SSA and type of school), and mother's education; (ii) analyze the relationship between these sociodemographic variables and the key competencies for reading acquisition at 1st-grade (assessed through knowledge of LSK) (H1, H2, H3, and H4); (iii) analyze whether these sociodemographic variables are predictors of success for reading acquisition (H5), with first graders. In this study, we assume:

H1: Portuguese native-speaking children will have more success in early reading acquisition.

H2: A positive relationship between the duration of preschool attendance and success in early reading acquisition.

H3: A positive relationship between SES and success in early reading acquisition, specifically demonstrated by children attending non-TEIP schools and/or not being supported with SSA with better results than those attending TEIP schools and/or being supported with School Social Action.

H4: A positive relationship between the mother's education and success in early reading acquisition.

H5: A predictive relationship of the sociodemographic variables described above on success in reading acquisition.

3. Materials and methods

The type of study is descriptive and correlational, with a quantitative approach.

3.1. Participants

At the beginning of the school year, 1131 children attending the final year of preschool and the first grade in 26 schools in the littoral north of Portugal (municipality of Porto) were assessed. Of these children, 405 (50.4% boys) were in the final year of preschool and 726 children (51.7% boys) were enrolled at 1st-grade. **Table 1** describes the distribution of children according to gender and age in preschool and **Table 2** describes the distribution of children according to gender and age in 1st-grade.

Table 1. Distribution of children by gender and age: Preschool.

		Boys	**Girls**	**Total**
		N	***n***	***N***
Age (in years)	5	116	127	243
	6	86	74	160
	7	2	0	2
	Total	204	201	405

Table 2. Distribution of children by gender and age: 1st-grade.

		Boys	**Girls**	**Total**
		N	***n***	***N***
Age (in years)	6	244	224	468
	7	127	125	252
	8	1	2	3
	9	2	1	3
	Total	374	352	1131

3.2. Instruments

Information regarding the sociodemographic variables (i) native language; (ii) years attending preschool; (iii) SES; (iv) type of school (TEIP or non-TEIP) and (v) mother's education were collected using a questionnaire designed for this purpose. The questionnaire included dichotomous questions regarding gender (boy or girl), type of school (TEIP or non-TEIP), and SES (low or high), which were filled in by the teacher. For the variable years of preschool attendance, a direct response question was used, asking the teacher to indicate the number of years. To assess the mother's education level, a 5-point Likert scale was used, with 0 representing education below the 1st-cycle, 1 representing 1st-cycle, 2 representing 2nd-cycle, 3 representing 3rd-cycle, 4 representing high school, and 5 representing higher education.

In addition to collecting sociodemographic data, pre-reading skills were assessed, specifically LSK. To assess LSK, the Letter Reading subtest of the ALEPE-Reading Assessment in European Portuguese (Sucena and Castro, 2011) was administered to both preschool and 1st-grade students. In this subtest, the letters of the alphabet are presented individually on a computer screen, and the child's task is to name each letter. The evaluator marks the answers given by the child on a record sheet, with 0 indicating a wrong answer and 1 indicating a correct answer. The total number of correct items is then recorded, providing a raw score of how many letters the child got correct out of a total of 23 letters. To analyze the letter-sound relation, the raw score of the letter recognition task was used. The ALEPE Letter Spelling subtest was also administered to 1st-graders. In this subtest, the rater marked the answers given by the student on the record sheet, counting 0 as a wrong answer and 1 as a correct answer. Since this study aimed to analyze the LSK, a variable was created for this purpose, using the mean of these two subtests (reading and letter spelling).

3.3. Data collection procedures

This study is part of a larger project that focuses on assessing and improving reading skills. The project partners with school directorates to obtain permission from parents and ensure the confidentiality of data. The sociodemographic data was collected by teachers by reviewing school records and administering a questionnaire. The assessment of letter-sound knowledge was conducted individually for each child, lasting approximately 10 minutes, at the start of the school year. The assessment was conducted by a team of teachers, educators, speech therapists, and psychologists, under the supervision of the project's scientific coordination.

As part of this research, there was a strict commitment to the privacy and security of the data collected. All data collection, analysis and storage practices were carried out in accordance with the General Data Protection Regulation. To maintain the anonymity and confidentiality of the participants, a numerical code was assigned to each one.

3.4. Data analysis procedures

Statistical analyses were performed using the *Statistical Package for the Social Sciences* (SPSS IBM) for *Windows*, version 28.0. Descriptive statistics, such as mean, standard deviation, mode, and median, were used to characterize the participants for interval variables, and percentages were used for nominal or ordinal variables. In ordinal variables, the mode, median, and interquartile range were used (Martins, 2011). To check for statistically significant differences between the sociodemographic variables and the LSK, inter-subjects (parametric and non-parametric) difference tests were performed. Next, to understand the relationship between the variables under study, correlation analyses were performed (parametric and non-parametric). In the second stage, and to understand whether LSK is predicted by sociodemographic variables, a multiple linear regression analysis was performed using the *Enter* method (Martins, 2011). Based on the *Beta* values, the variable that most predicted LSK was identified. The following assumptions for multiple linear regression analysis were previously tested: Sample size greater than 20 cases for each independent variable, linearity between the variables, independent residuals, absence of uniqueness and multicollinearity, absence of *outliers*, normal distribution of the *Standardized Residuals* (Martins, 2011).

4. Results

4.1. Descriptive results

The **Table A1** describes the general results of all the sociodemographic assessed variables in preschool and 1st-grade and can be found in the Appendix.

4.1.1. Native language

Native language was divided into four categories: European Portuguese, Brazilian Portuguese, PALOP Portuguese, and Non-Portuguese (other than Portuguese). **Table A1** describes the number of children by native language. The results are quite homogeneous, with approximately 90% of the children having Portuguese nationality and European Portuguese as their native language. The

linguistic homogeneity increases if instead of European Portuguese, we analyze only Portuguese (independently of the variant–Brazilian or PALOP). For 98% of the children, Portuguese is the native language.

4.1.2. Years of attendance in preschool

On average, children attend three years of preschool (preschool: $M = 2.74$, $SD = 1.17$; 1st-grade: $M = 2.89$, $SD = 1.3$). Attendance at preschool for two or three years represents 66% of children, 21% attended for 4 years or more, 12% attended for one year, with a marginal number of children not attending preschool (1%).

4.1.3. Type of school

There is an equitable distribution between types of school both in preschool (TEIP = 51%) and in the 1st-grade attend groupings (TEIP = 44%).

4.1.4. SES

The number of low SES children represents around half of the children, with a slightly higher percentage of high SES children in preschool (58%; $n = 162$), and the opposite in the 1st-grade (54%; $n = 228$).

4.1.5. Mother's education

Both in preschool and 1st-grade, the median for mothers' education corresponds to high school (*Mdn* = 4-secondary, IIQ = 2), whereas the mode is higher education for both preschool and 1st-grade (preschool Mo^3 = 5-higher education; 35.8%, 1st-grade: Mo^3 = 5-higher education; 38.4%).

4.2. Results of the impact of the sociodemographic variables on the LSK in the 1st-grade

The results of the LSK, according to the sociodemographic variables, are described in **Table A2** and can be found in the Appendix. Results on LSK do not differ according to the native language. Regardless of native language, children know an average of 9 letter-sound relations. Regarding the number of years of attendance in preschool, similarly to what is observed for native language, the performance in the LSK does not seem to vary. Children reveal an average of 9 LSK, regardless of the number of years of preschool attendance.

Concerning the territory where the school is located, there is a different performance pattern, with a tendency to more LSK in the non-TEIP schools (ca. 10) than in the TEIP schools (ca. 7), with statistical significance, $t\ (642) = 6.08$, $p < 0.001$.

The same trend is seen when we analyze the SES variable, with high SES children with more LSK (ca. 11) than low SES children (ca. 7), again with statistical significance, $t\ (419) = 6.95$, $p < 0.001$.

Finally, when we analyze LSK according to the mother's education, we observe a linear growth between both variables, $F\ (5507) = 17.98$, $p < 0.001$. LSK varies between two letters for children with uneducated mothers and 12 letters for children whose mothers have higher education. Specifically, there is an increase between one and three letters for each block/level of schooling of the mother. Children with mothers holding 1st-cycle know three more letters than children with uneducated mothers, in turn, children with mothers holding 2nd-cyle know one more letter than those with mothers holding 1st-cycle, and the same gain occurs from the 2nd to the 3rd-cycle; the

comparison between mothers holding high school and those holding higher education results in an increase of ca. 2.5 LSK.

4.3. Correlation and predictive power between sociodemographic variables and LSK

Table 3 shows the correlations between the sociodemographic variables and the LSK. There are positive correlations between the variables type of school and SES (r = 0.224, p = < 0.001-children from TEIP groups tend to have low SES); mother's schooling and SES (r = −0.526, p = < 0.001-children whose mothers are more educated tend to have high SES) and between mother's education and type of school (r = −0.526, p = < 0.001-children whose mothers are more educated tend to attend non-TEIP schools).

As for the correlations between the sociodemographic variables and the LSK, a positive correlation was found between mother's education and the LSK (r = 0.373, p = < 0.001-children with more educated mothers perform better in LSK) and a negative correlation between SES and LSK (r = −0.321, p = < 0.001-children with low SES perform worse in LSK-as well as between LSK and the type of school (r = −0.197, p = < 0.001-children attending non-TEIP schools perform better in LSK).

Table 3. Relations between sociodemographic variables and LSK: 1st-grade.

Variables	**1**	**2**	**3**	**4**	**5**	**6**
1.Native language	–					
2.Attendance preschool	−0.212***	–				
3.SES	−0.076	−0.046	–			
4.Type of school	−0.009	−0.051	0.224***	–		
5.Mother's education	0.098	0.069	−0.526***	−0.275***	–	
6.LSK	0.017	0.046	−0.321***	−0.197***	0.373***	–

*** p < 0.001.

To analyze the predictive role of the sociodemographic variables that correlate with LSK (type of school, SES and mother's education) a multiple linear regression analysis was conducted (cf. **Table 4**). The regression model is statistically significant F (5354) = 18.76, p = < 0.001, explaining 21% variance of performance for LSK in 1st-grade.

Table 4. Multiple linear regression model: Predictive role of the sociodemographic variables that correlate with the LSK.

	1st-grade		
	R^2	**R^2 adj.**	***F (5354)***
Model	0.209	0.198	18.757***

*** p < 0.001.

The mother's education is the most significant individual predictor of LSK–cf. **Table 5** (β = 0.275, t = 4.719, p < 0.001), followed by SES (β = −0.179, t = −3.169, p < 0.01) and type of school (TEIP or non-TEIP) (β = −0.005, t = −2.285, p < 0.05).

Table 5. Regression coefficients of sociodemographic variables in LSK.

	1st Grade	
	B	***T***
Type of school	−0.005	−2.285*
SES	−0.179	−3.169**
Mother's education	0.275	4.719***

*** $p < 0.001$; ** $p < 0.01$; *$p < 0.05$.

5. Discussion

The present study aimed to (a) describe the sociodemographic characteristics of children in preschool and 1st-grade in public schools in the north region of Portugal, including native language, years of preschool attendance, SES, and mother's education; (b) examine the relationship between these sociodemographic variables and key reading skills, specifically LSK at 1st-grade; and (c) investigate whether these sociodemographic variables can predict success in early reading acquisition.

Regarding native language, it is important to underline the existence of ca. 10% of children of foreign nationality, and with an alternative native language to European Portuguese, a value higher than the national average (7.4%). This rise tendency is in line with the trend described in the Report on the State of Education (CNE, 2022, p. 202) of an increase in the number of foreign children in Portuguese schools. If instead of European Portuguese we analyze only Portuguese, regardless of the variant (Brazilian, PALOP), 98% are Portuguese native speakers. Among the Portuguese varieties, European Portuguese stands out (90.4%), while Brazilian Portuguese corresponds to 5.9% and PALOP's Portuguese to 1.5%.

Regarding the SSA and type of school, results indicate an alarming situation as 50% of the children are in an economically disadvantaged situation. This is a higher percentage than that reported in the DGEEC National Report (CNE, 2021), which indicates that the attribution of support under the scope of SSA is ca. 30 to 40%. Investment in reading promotion measures with these children is urgent (Corso et al., 2016; Freitas et al., 2019), with the odds in favor of a positive outcome, namely in reducing the gap in learning performance between the poorest pupils and those with no economic difficulties.

The mother's education is distributed in three large groups: 1/3 with higher education, 1/3 with high school, and 1/3 with education until the 3rd-cycle. These results illustrate the average education level of the current generation of young adults in Portugal. On the positive side, we highlight the fact that most mothers have completed higher education studies (the mode in both preschool and 1st-grade). A less positive aspect is the percentage around 32% of mothers with less than the currently compulsory education in Portugal (end of high school, corresponding to the 12th-grade).

The results of this study did not confirm H1 which predicted that Portuguese as a native language would be a protective variable for success in reading acquisition. The language variable did not correlate with the LSK. These results are not in line with the literature that reinforces the role of the language domain in which reading acquisition occurs (Milburn et al., 2017; Vaknin-Nusbaum and Nevo, 2017). It is

possible that the result was biased by the fact that the participants mostly held Portuguese as native language (98%), in result of the very high percentage, among children of foreign nationality, of Portuguese speakers (Brazil and PALOP).

Similarly, to H1, H2, which predicted that children attending more years of preschool would have more success in learning to read, was not confirmed. The variable years of preschool attendance do not correlate with the LSK in 1st-grade. Once again, these results are not in line with the literature that highlights the role of preschool in the development of essential skills to start the 1st-cycle (Cardoso and Balça, 2017). These results may be a result of little variability between years of preschool attendance (with 64% presenting between two and three years of preschool). Further studies are needed to ascertain the relationship between these variables.

H3 and H4 were confirmed, which predicted, respectively, that (i) high SES and/or attend a non-TEIP school and (ii) those whose mothers are more educated would have more success in reading acquisition.

Low SES correlated with (i) TEIP schools; (ii) mothers with less education; and (iii) lower mastery of the LSK. Regarding the SES among the children attending 1st-grade, there was an asymmetry in the performance in LSK according to the type of school; while the 1/3 of children attending TEIP schools know, on average, seven letters, the 2/3 attending non-TEIP schools know, on average, 10 letters. The same asymmetry is observed when we analyze SES: Low SES children (54%) know ca. seven letters, whilst high SES children know ca. 11 letters. Regarding the mother's level of education, most have high school education (31.2%) and higher education (37.4%). There is a positive correlation between the mother's education and the LSK, translated by an average increase of two letters for each school cycle of education increase.

These results are in line with the literature that states that children from disadvantaged SES (Lewis et al., 2016; Sun, 2019), and whose mothers have low education (Casey et al., 2018; DGEEC, 2022b; Elbro et al., 1998; Koponen et al., 2020; Vandermaas-Peeler et al., 2012) are at a greater disadvantage in the reading acquisition process (Corso et al., 2016; Freitas et al., 2019). These are especially important findings as they flag the variables that most affect children's early reading skills, which in turn impact their later academic success and thus tend to be perpetuated in the community through low educational attainment (Aikens and Barbarin, 2008).

Finally, the last working hypothesis (H5) was proved, which predicted that sociodemographic variables would be predictors of success in early reading acquisition. The results indicate that the type of school, SES, and mother's education are predictors of LSK, with the mother's education with the highest predictive value. Indeed, several results have highlighted the role of mother's education as one of the variables more strongly associated with school skills in early schooling (DGEEC, 2022b; Zalewska-Łunkiewicz et al., 2016).

By considering these sociodemographic variables, educators, policymakers, and researchers can design targeted interventions and educational programs to address potential disparities in early reading acquisition. Recognizing the impact of social and economic factors allows for more comprehensive and equitable approaches to support literacy development in all children, regardless of their background (Sucena et al., 2023).

There are limitations regarding this study, particularly the use of a dichotomous variable for SES and the potential for more detailed information on maternal education, such as years of education. In studies examining various socio-economic factors maternal education level is a commonly utilized variable (Breinholt and Holm, 2020). This variable encompasses sub-levels akin to those employed in our study, typically ranging from low to high educational attainment. We understand that these choices may impact the depth of our analyses and the richness of the information provided. In future research, we suggest considering a more nuanced approach to SES and incorporating additional details on maternal education. We recognize the importance of refining our methodology to enhance the robustness of the analyses and provide a more comprehensive understanding of the variables under investigation.

Participants, although in an adequate number, only included children from the municipality of Porto. In future studies, we suggest that it be extended to other participants from other regions of the country, including regions where there are more children of other nationalities.

Furthermore, in future research we intend to follow up these children, not only regarding their letter-sound knowledge but also regarding their classification at the end of each grade of the 1st-cycle of education (until 4th-grade).

6. Conclusions

The identification of sociodemographic factors that predict success in early reading is crucial in identifying "at-risk" children, which is of crucial importance for positive discrimination and inclusion in programs that promote reading skills (Hall and Burns, 2018). This study is exploratory to characterize the sample from our research center concerning what the literature advocates regarding the role of factors such as the mother's schooling (Zalewska-Łunkiewicz et al., 2016), SES, and type of school (Denton and West, 2002; Klibanoff et al., 2006) in the success or failure of early reading. In terms of educational policy, the promotion of social equity is one of the priority themes for politicians, educational agents, and researchers (UNESCO, 2017), however, it requires positive discrimination for children most at risk of learning difficulties. To attain this goal, it is not enough to focus only on the type of school; a more complete approach is needed, which considers factors such as the mother's education and school allowance. When it comes to implementing positive discrimination, this should be implemented early on, specifically at the preschool level, and targeted at specific skills (Corso et al., 2016; Freitas et al., 2019). To promote success in early reading, efforts should focus on developing the pre-reading skills which are strongly correlated with success in the early learning phase (Mcgrath and Tejero Hughes, 2017). This has been the focus of the Center for Research and Intervention in Reading since 2015, to increase the accuracy for identification of at risk children and to intervene early, with children attending preschool and 1st grade in Portuguese public education, not only promoting pre-reading and reading skills but also breaking down social inequalities.

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CM and LP; investigation, AS, CM, LP and MM; resources, AS, CM, LP and MM; data curation, CM and LP; writing—original draft preparation, AS, CM, LP and MM; writing—review and editing, AS, CM, LP and MM; visualization, AS; supervision, AS and CM; project administration, AS and CM. All authors have read and agreed to the published version of the manuscript.

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Notes

[1] PALOP-Acronym for Countries adopting Portuguese as the official Language–Países de Língua Oficial Portuguesa.

[2] TEIP-Educational Territories of Priority Intervention.

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Appendix

Table A1. Participants distribution by sociodemographic variables: Preschool and 1st-grade.

	Native language					**Preschool attendance: Number of years**								**Type of school**			**SES**			**Mother's education**						
	Portuguese			**Other**	**Total**	**0**	**1**	**2**	**3**	**4**	**5**	**6**	**Total**	**TEIP**	**Non-TEIP**	**Total**	**Low**	**High**	**Total**	**Unschooled**	**1st Cycle**	**2nd Cycle**	**3rd Cycle**	**High School**	**Higher Educ.**	**Total**
	European	**Brazilian**	**PALOP**																							
Preschool	359	20	6	8	393	0	51	115	145	30	35	6	382	205	200	405	119	162	281	4	13	38	64	105	125	394
1st-grade	561	41	10	13	625	11	57	154	195	50	65	14	546	240	404	644	228	193	421	2	14	48	92	152	200	508

Table A2. LSK distribution by sociodemographic variables in the 1st-grade.

LSK–1st-grade																									
Mean (SD)																									
Native language						**Preschool: Number of years of attendance**								**Type of School**			**SES**			**Mother education**						
Portuguese			**Other**	**Total**	**0**	**1**	**2**	**3**	**4**	**5**	**6**	**Total**	**TEIP**	**N.-TEIP**	**Total**	**Low**	**High**	**Total**	**Un sch.**	**1st cycle**	**2nd cycle**	**3rd cycle**	**High sch.**	**Higher Educ.**	**Total**
European	**Brazilian**	**PALOP**																							
n = 561	*n* = 41	*n* = 10	*n* = 13	*n* = 625	*n* = 11	*n* = 57	*n* = 154	*n* = 195	*n* = 50	*n* = 65	*n* = 14	*n* = 546	*n* = 240	*n* = 404	*n* = 644	*n* = 228	*n* = 193	*n* = 421	*n* = 2	*n* = 14	*n* = 48	*n* = 92	*n* = 152	*n* = 200	*n* = 508
8.97	10.05	8.95	8.31	9.03	7.86	8.69	9.40	8.82	11.7	9.19	8.68	9.25	7.08	10.0	8.93	7.04	11.1	8.9	1.50	4.6	5.41	6.54	9.07	11.8	9.2
(6.1)	(6.4)	(6.3)	(5.7)	(6.2)	(5.0)	(6.1)	(6.6)	(6.1)	(6.6)	(5.2)	(6.3)	(6.2)	(5.3)	(6.3)	(6.1)	(5.3)	(6.7)	(6.3)	-	(3.6)	(4.6)	(5.0)	(5.9)	(6.5)	(6.3)
F(46,624) = 0.858, *p* = 0.735					*F*(46,545) = 0.855, *p* = 0.740								*T* (642) = 6.08, *p* < 0.001			*T* (419) = 0.6.95, *p* < 0.001			*F*(5,507) = 17.98, *p* < 0.001						