DOI: 10.5433/2237-4876.2025v28n1p21-38

Phonological awareness and vocabulary knowledge in English as an additional language in children immersed in a bilingual schooling context

Ingrid **FINGER***
Aline Mara Agostini **RICHETTI****

*Full Professor in the Graduate Program in Language and Literature at UFRGS, where she coordinates the Laboratory of Bilingualism and Cognition (LABICO). She holds a PhD in Language and Literature (PUCRS/2000). She is a PQ-CNPq researcher and member of the National Science Network for Education. finger.ingrid@gmail.com

**Holds a Bachelor's Degree in Language and Literature - Portuguese Language and Portuguese Language Literature, English Language and English Language Literature from UFRGS (2024). Works as a proofreader for a Digital Reading Platform. richetti.aline@gmail.com

Resumo

A alfabetização em duas línguas é um tema relevante no contexto de Escolarização Bilíngue de Línguas de Prestígio, alvo de crescente interesse no Brasil (Alves; Finger, 2023). Dois construtos importantes para o processo de alfabetização, seja em uma ou em duas línguas, são a consciência fonológica e o conhecimento de vocabulário, pilares fundamentais do desenvolvimento da leitura e da biliteracia. Nesse contexto, o presente estudo investigou a relação entre o conhecimento de vocabulário em inglês na Educação Infantil e a consciência fonológica em inglês em crianças no primeiro ano do Ensino Fundamental, averiguando também o efeito da exposição à língua adicional sobre os índices de consciência fonológica dessas crianças. Foram utilizadas duas tarefas: uma adaptação do Peabody Picture Vocabulary Test (Dunn; Dunn, 2007) e a Bateria de Avaliação Metafonológica Bilíngue (BAMBI) para crianças em fase de alfabetização no Brasil proposta por Azevedo et al. (2024). Os resultados ressaltam a importância da exposição qualificada e frequente à

língua adicional durante a Educação Infantil, bem como da ampliação do conhecimento de vocabulário e do desenvolvimento da consciência fonológica em inglês durante essa etapa escolar, visto que esses construtos são fundamentais para o processo de alfabetização em uma ou duas línguas.

Palavras-chave: Consciência fonológica; Vocabulário; Alfabetização em duas línguas.

Abstract:

Literacy acquisition in two languages is a relevant topic in the context of Bilingual Schooling of Prestigious Languages, an area of growing interest in Brazil (Alves; Finger, 2023). Two important constructs regarding the literacy process, whether in one or two languages, are phonological awareness and vocabulary knowledge, essential pillars for reading development and biliteracy. In this context, the present study investigated the relationship between vocabulary knowledge in English in Early Childhood Education and phonological awareness in English in children in the first year of Elementary School, also investigating the effect of exposure to the additional language on the phonological awareness rates of these children. Two tasks were used: an adaptation of the Peabody Picture Vocabulary Test (Dunn; Dunn, 2007) and the Bilingual Metaphonological Assessment Battery (BAMBI), proposed by Azevedo et al. (2024) for Brazilian children in the literacy development phase. The results highlight the importance of qualified and frequent exposure to the additional language during Early Childhood Education, as well as expanding vocabulary knowledge and developing phonological awareness in English during this school stage, since these constructs are fundamental to the literacy process in one or two languages.

Key words: Phonological awareness; Vocabulary; Biliteracy acquisition.

Signum: Estudos da Linguagem, Londrina, v.28, i.1, p.20-37, april. 2025
Received on: 09/03/2025
Accepted on: 14/07/2025

Phonological awareness and vocabulary knowledge in English as an additional language in children immersed in a bilingual schooling context[1]

Ingrid Finger
Aline Mara Agostini Richetti

INTRODUCTION

Given the increasing interest in bilingual education in Brazil (Brentano, 2023), it has become imperative to understand how children in the early stages of literacy acquisition develop reading and writing skills in two languages, in order to design appropriate and inclusive pedagogical interventions and teaching materials. The development of biliteracy is a source of considerable concern for teachers, school administrators, and parents, who often express uncertainty about the advantages and disadvantages of simultaneous versus sequential literacy instruction in both languages (Alves; Finger, 2022). As highlighted by Alves and Finger (2023), the rationale for supporting simultaneous literacy acquisition lies in the shared nature of core skills that underpin reading development in both the first language (L1) and an additional language (AL), such as, for instance, phonological awareness (PA) skills and vocabulary.

In this article, we argue that it is crucial to examine the relationship between such fundamental constructs for the development of biliteracy within the Brazilian context of Bilingual Schooling of Prestigious Languages. Within that context, we present the results of a study that investigated the association between vocabulary knowledge in English during Early Childhood Education and PA in English in children in the first year of primary school. The study also examined the effects of early exposure to the additional language on the children's PA scores in first grade.

THEORETICAL FRAMEWORK

Given the complexity involved in children's reading development, literacy acquisition has become the center of an intense debate concerning the nature of such development and the most effective instructional approach. In the United States, this controversy has been labeled "reading wars", reflecting the intensity of the discussion and the oscillation between a phonics-based approach, in which letter–sound correspondences are explicitly taught, and a whole-language approach, which centers instruction on the child's construction of meaning through immersion in a print-rich and stimulating environment (Castles; Rastle; Nation, 2018). It is generally understood that the former approach operates through bottom-up processes, while the latter relies on top-down processing. In Brazil, this discussion continues to shape the literacy acquisition field and is examined in detail by Soares (2016).

According to Goodman (1967 as cited in Castles; Rastle; Nation, 2018), one of the main proponents of the whole-language approach, reading should be considered a guessing game rather than an analytical process (Goodman, 1967, as cited in Castles; Rastle; Nation, 2018). However, recent research emphasize the importance of including phonics instruction focusing on decoding in

[1] Reviewed by: Fatima Liseane Avila Margarites.

early literacy instruction. One of the most prominent examples is the report by the *National Reading Panel* (NICHD, 2000), developed in the United States, which reviewed numerous studies in the field. In Brazil, this debate is addressed in the *National Literacy Policy* (Política Nacional de Alfabetização, Brasil, 2019), which outlines guidelines and principles with the goal of improving literacy outcomes in the country. Based on scientific evidence and reviewing successful international initiatives, the document emphasizes the importance of oral language development in infancy and the fostering of reading and writing opportunities.

Phonological awareness (PA) can be defined as a subset of metalinguistic skills that arise when children are able to perform conscious reflection and manipulation of the sound structure of language (Alves, 2012). It is therefore one of the key components of decoding, which is one of the pillars of reading, since knowledge of the alphabetic code, that is, the representation of speech sounds in writing, is essential to this process. In order to establish these correspondences and decode successfully, readers must be able to reflect upon and manipulate the sounds of spoken language.

On the other hand, vocabulary knowledge corresponds to the second major pillar of reading: linguistic comprehension. Vocabulary knowledge can be understood as a measure of oral language comprehension skills. This construct is particularly relevant in the context investigated here, in which the additional language (AL) is developed primarily through formal education. The two pillars of reading discussed here were first established by the *Simple View of Reading* (Gough; Tunmer, 1986), a seminal model of reading, which has been revisited by other frameworks, including Scarborough's Rope Model (2001) and Kim's Direct and Indirect Effect Model of Reading (Kim, 2017).

1. Reading Models: *The Simple View of Reading* and *the Rope Model*

One of the most influential reading models in the literature that underscores the importance of decoding is the *Simple View of Reading* (hereafter, SVR) (Gough; Tunmer, 1986; Hoover; Tunmer, 2020). Its proponents define reading as "the ability to extract and construct literal and inferred meaning from linguistic discourse represented in print" (Hoover; Tunmer, 2020, p. 26). Other definitions have also been proposed, such as the one formulated by the *Research and Development* (RAND) *Reading Study Group* (2002, as cited in Snow, 2010, p. 1), which defines reading as "the process of simultaneously constructing and extracting meaning through interaction and engagement with print". By including engagement with the printed text, researchers emphasize the reader's role as a crucial dimension in reading success. In addition, two other dimensions are highlighted: the text and the task, acknowledging that all these elements exist within a shared sociocultural context, and a mismatch between at least two of them may result in failure in reading comprehension (Snow, 2010). Nevertheless, all of these definitions assume that, for the reader to successfully interact with the text, certain prerequisite skills must already be in place.

The reading model proposed by Gough and Tunmer (1986) identifies decoding and linguistic comprehension as the fundamental pillars of reading and outlines some of the implications of this model, especially regarding reading disorders. Their central claim is that reading is the product of decoding and comprehension, expressed mathematically as $R = D \times C$. Therefore, if either of these components equal zero, reading ability will also be zero. These concepts are revisited in a more recent publication, Hoover and Tunmer (2020), which presents a framework grounded in the SVR that encompasses the cognitive foundations of reading and its acquisition. The authors argue that, just as word recognition must be accurate and rapid, complying with the limits of short-term memory, there must be a direct link between the orthographic representation of letter sequences and the retrieval of the corresponding word from the mental

lexicon, thus satisfying the requirements of automaticity in word recognition. In light of these considerations, Hoover and Tunmer (2020) revisit the terminology and propose that "under the SVR, decoding is best thought of in the broader sense of word recognition rather than in the narrower sense of alphabetic coding" (Hoover; Tunmer, 2020, p. 28). For this reason, the term "word recognition" has come to replace "decoding" as the label for such reading component.

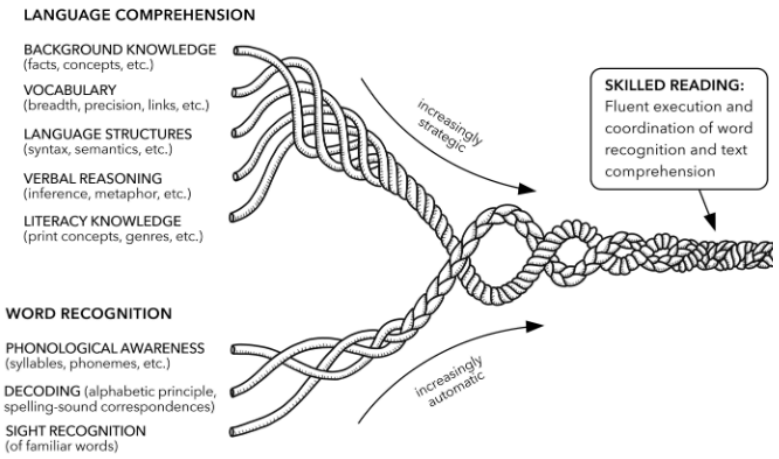
It can thus be inferred that reading automatization also involves a top-down process, not being limited to bottom-up processing. According to Alves and Finger (2023, p. 31–32), literacy acquisition begins with decoding through bottom-up processing, starting from the smallest elements (graphemes linked to phonemes) and progressing toward larger units (syllables, words), and is later followed by top-down processing, wherein children, having established visual word representations, no longer need to read each letter individually. This shift enhances reading comprehension, as certain cognitive resources are no longer as heavily taxed by bottom-up decoding, and semantic information is less likely to be lost. This observation aligns with the claims of Hoover and Tunmer's model and with the two reading pathways (Phonological and Lexical/Semantic) supported by findings from Neuroscience of Reading (Dehaene, 2012). Alves and Finger (2023) emphasize that both processes, or reading routes, are employed simultaneously and can be used by readers regardless of age or developmental stage.

Regarding comprehension, within the SVR, oral knowledge of the target language is regarded as essential for successful reading, since, after decoding graphemes, the comprehension mechanisms used in reading are assumed to be exactly the same as those used in oral comprehension. The authors illustrate this point by stating that "reading is the ability to convert language represented in print to a representation from which the child can already derive meaning, namely, one based in the child's spoken language" (Hoover; Tunmer, 2020, p. 24).

Moreover, Hoover and Tunmer (2020) argue that one of the necessary cognitive foundations for "learning to read" that supports linguistic comprehension is knowledge of the language's semantics, which includes vocabulary and morphology. Given the importance of oral language knowledge for linguistic comprehension, the reference to vocabulary in the 2020 framework, and the body of research investigating its role in reading, we assume here that vocabulary can be used as a measure of linguistic comprehension in the bilingual schooling context explored in this study, in which children begin formal education with greater proficiency in Portuguese, their mother language (L1) and are introduced to English as an additional language (AL) in the school setting.

In addition to the SVR, another influential model is the Rope Model, developed by Scarborough (2001). In this model, the author presents a visual and metaphorical representation (Figure 1) of the processes involved in skilled reading and emphasizes the interaction among each of the "strands" that make up the "reading rope," moving away from the notion of independent operation between the two pillars of reading. The necessity of both components remains evident, since the rope would weaken if any of its strands were frayed or broken.

Figure 1 - Scarborough's *Rope Model* (2001)



Fonte: Adapted from Scarborough (2021, p. 26).

According to Scarborough (2001), the word recognition pillar/strand comprises three components: (a) phonological awareness, involving knowledge of syllables and phonemes; (b) decoding, related to the alphabetic principle, which refers to the correspondences between phonemes and graphemes; and (c) sight word recognition, which is the instant visual recognition of familiar words. As these components intertwine and strengthen, the reading process becomes increasingly automatic. Conversely, the linguistic comprehension pillar/strand is detailed through five interwoven components: (a) background knowledge, including factual and conceptual information; (b) vocabulary, involving breadth, precision, and lexical connections; (c) language structure, such as syntactic and semantic knowledge; (d) verbal reasoning, or reasoning based on verbal information, including inference and metaphor; and (e) literacy knowledge, such as understanding how print works and familiarity with textual genres. As these strands intertwine and reinforce each other, reading becomes progressively more strategic.

Scarborough (2001) emphasizes the importance of linguistic comprehension by noting that, even when a child is able to decode letter sequences in a given text, comprehension will be hindered if the child lacks oral familiarity with the words, cannot interpret syntactic and semantic relations, or does not possess sufficient background knowledge and inferential skills. Therefore, insufficient oral vocabulary may pose a challenge in the context of bilingual schooling in prestigious languages, in which the child is exposed to the AL primarily at school and is still in the process of building linguistic repertoire.

When discussing the most effective components of literacy intervention systems, Scarborough (2001) identifies not only phonological awareness and letter knowledge, which support the acquisition of the alphabetic principle, but also verbal skills related to comprehension as potential additional components. She notes that expressive vocabulary may be a better predictor than receptive vocabulary. In this sense, the model highlights the importance of both PA and vocabulary as predictors of reading. While PA is part of the word recognition pillar within the SVR model and has even been shown to be causally linked to reading acquisition, vocabulary knowledge reflects oral language proficiency and plays a crucial role in the linguistic comprehension pillar. Additionally, the *Rope Model* reinforces the connection between the two pillars outlined in the SVR, word recognition and oral comprehension, by illustrating how they "weave together" to form the "reading rope." Given the established importance of these two constructs for L1 reading

development, we now turn to examining their relation in the context of reading development in an AL.

2. Reading in an additional language

To address reading in an additional language, it is important to consider the *Common Underlying Proficiency Model*, which draws on the metaphor of two icebergs that appear separate above the surface but are connected below the waterline. According to this model, languages do not operate in isolation; rather, they rely on a shared processing system in which certain skills are shared (Cummins, 1979). This proposition is supported by evidence of parallel activation of both languages, even when only one is being spoken, among both proficient bilinguals and language learners (Kroll *et al.*, 2008).

In discussing the development of reading and writing in an AL, Alves and Finger (2023) argue that language transfer is not only natural but can also be beneficial. The authors emphasize that biliteracy development involves more than the application of skills acquired in L1 to support AL literacy; rather, it draws upon "a shared cognitive repertoire of L1 and AL literacy skills that can be accessed at any time by the child and that underlies their use of written language in both languages" (Alves; Finger, 2023, p. 135). In light of this view, Finger (2024), in a more recent publication, advocates for caution in the use of the term "transfer" and instead proposes the term "co-activation." Given these considerations, it becomes necessary to examine the relation between the constructs investigated in the present study and the development of reading in an AL, particularly in bilingual literacy school contexts and in the process of learning to read in an additional language.

3. The relation between phonological awareness and bilingual literacy

As previously discussed, according to Scarborough (2001), PA is a strong predictor of future reading abilities in an L1. Alves and Finger (2023) also claim that PA plays a key role in the development of biliteracy. Thus, when considering reading in an AL, studies that demonstrate the transfer of phonological awareness from L1 to a bilingual's second language (e.g., Lovelace-Gonzalez, 2020) are particularly relevant. One study that provides evidence in support of this claim is the one conducted by Tong, Chiu and Tong (2023). By examining the effects of PA, vocabulary, and word reading on the development of reading comprehension in Chinese-English bilingual children in Hong Kong from second to fourth grade, the authors concluded that higher scores in PA in Chinese (L1) or broader vocabulary knowledge were associated with higher proficiency in reading comprehension in English as an AL. Studies such as these highlight the role of PA in L1 as a contributing factor to reading in an AL, demonstrating the potential for transfer of this set of skills – or coactivation – across the languages of bilingual individuals. Moreover, it is worth noting that these authors also emphasize, based on the shared nature of metaphonological skills, that the influence can occur bidirectionally, that is, from the AL to the L1, and not only the other way around. Building on this premise and on the assumption that these skills are fundamental to literacy development, Alves and Finger (2023) and Finger (2024) argue that literacy acquisition in one language supports the development of literacy in the other. This understanding provides theoretical justification for promoting simultaneous literacy instruction in both of the bilingual languages.

4. The relation between vocabulary and reading development in an additional language

Bernhardt (2011), in describing the complexities of reading in an additional language, states that vocabulary and comprehension are the components most clearly distinguishing reading in a first language (L1) from reading in an AL. According to the author, reading in L1 typically involves recognizing words already present in the oral lexicon and incorporating new ones, which implies learning new sound/print representations and associated concepts. In an AL, however, the reader may not yet have the word encountered in their oral vocabulary. This may require adding a new oral representation to an already known concept, or learning a new concept associated with a new word form. The additional challenge faced in AL reading, related to dealing with potential cultural differences in texts, in addition to linguistic ones, is also noted by the author.

Given the importance of vocabulary for comprehension, its role as a predictor of reading performance, and the differences associated with reading comprehension in L1 and in an additional language, vocabulary development might be seen as a particular challenge in the context of bilingual schooling in prestigious languages. It is important to consider that children immersed in these contexts are typically exposed to the AL only in the school setting and have much greater exposure to their mother language. For this reason, they are still in the process of developing their oral vocabulary in their AL, while simultaneously acquiring other foundational skills needed for literacy – skills that, as previously discussed, can be applied across both languages. This highlights the need for maximizing exposure to the AL to support the development of children's oral language skills, including vocabulary, which is a key component in reading comprehension processes.

Evidence for the contribution of vocabulary to reading development in an AL is also provided by Tong, Chiu and Tong (2023). In their analysis, among the several variables examined, vocabulary showed the strongest and most direct effects on reading comprehension, both in L1 and AL. It was also strongly related to word reading, contributing directly to reading performance. Given the importance of vocabulary and phonological awareness as constructs underpinning the key pillars of reading, it is necessary to explore the possible relations between them, as discussed in the following section.

5. The relation between phonological awareness and vocabulary in the development of reading in an additional language

Lund, Werfel and Schuele (2015) compared PA skills (specifically rhyme awareness and initial phoneme awareness) and vocabulary knowledge in monolingual and bilingual (Spanish/English) children with and without hearing loss in early childhood education. Although no such association was found in the groups with hearing loss (both monolingual and bilingual), significant correlations between levels of PA and vocabulary were observed in the monolingual and bilingual groups without hearing loss. This indicates that, in these groups, as children’s vocabulary increased, their phonological awareness skills also improved, and conversely, as their PA skills developed, their vocabulary likewise tended to expand. The authors attribute this relation to the *Lexical Restructuring Model* (Walley; Metsala; Garlock, 2003), which suggests that PA evolves as children's vocabulary grows and they begin to restructure their mental representations of words through the acquisition of phonologically similar lexical items. From this perspective, the authors state that “children with normal hearing who have large vocabularies tend to have better phonological awareness skills than children with small vocabularies” (Lund; Werfel; Schuele, 2015, p. 86). Given the previously mentioned challenge of vocabulary development as a component of children’s oral language in this context, it is important to examine whether such a relation between vocabulary and PA is also present in the context investigated in the present study, considering the importance of both constructs for reading and the literacy acquisition process. By identifying such

relations, future studies may further examine and test strategies to support children's development of these skills.

METHODOLOGY

The present study is part of a broader research project titled "Bilingualism and Biliteracy: Investigating the Trajectory of Linguistic and Cognitive Development in First- and Second-Grade Children Immersed in a Bilingual Education Context in Brazil," sponsored by CNPq and approved by the UFRGS Research Ethics Committee under protocol number 70223123.7.0000.5347 (July 26, 2023). Considering the growing interest in bilingual schooling involving prestigious languages in Brazil and ongoing debates surrounding biliteracy development in such educational contexts, this study pursued two main objectives: (a) to investigate the association between English vocabulary knowledge during Early Childhood Education (ECE) and English phonological awareness scores obtained by children in the first year of Elementary school; and (b) to examine the effect of AL input, verified by continuous enrollment in the same school since ECE, on English PA performance in the first year of elementary school.

Based on these objectives, the following hypotheses were formulated: (a) a significant and positive correlation was expected to be found between vocabulary knowledge in ECE and phonological awareness in the first year of Elementary school. This hypothesis is grounded in prior studies, such as Lund, Werfel and Schuele (2015), which report a positive correlation between PA and vocabulary in bilingual children; and (b) children who had been enrolled in the same school since ECE were expected to show higher PA scores in the first year of elementary school. This expectation is based on the assumption that children attending the same institution since ECE have been exposed to a relatively high level of English input, given that instruction time in English in the upper levels of ECE reaches 37.5% of the schedule.

The sample consisted of 54 participants (24 male), all enrolled in the first grade of a private bilingual-curriculum school located in a capital city in southern Brazil. Among them, 28 participants (13 male) had been continuously enrolled at the same school since ECE. The average age of the participants was 6.79 years (SD = 0.28). Moreover, it is a private school context, and the sample is relatively homogeneous in terms of the participants' family socioeconomic status.

The participants are native speakers of Portuguese, which is the language spoken at home and in the community. English, the additional language, is mainly developed through the school's bilingual curriculum beginning in ECE. Instruction in the AL does not focus solely on linguistic structure but it is integrated with other areas of academic content, in line with the principles of bilingual schooling outlined by Brentano (2023). It is also important to reiterate that the participants are simultaneously learning to read in two prestigious community languages (Portuguese and English), and that English is primarily learned and practiced within the school environment.

Two different instruments were used to assess the two constructs analyzed in the present study: an adapted version of the Peabody Picture Vocabulary Test (Dunn; Dunn, 2007), and the Bilingual Metaphonological Assessment Battery (BAMBI) for children in the early stages of literacy development in Brazil (Azevedo *et al.*, 2024). The PPVT-4 measures receptive vocabulary, meaning that the child is required to recognize, but not produce, the word. This measure was considered more appropriate than expressive vocabulary due to the previously discussed context, as well as the participants' age and proficiency level. Additionally, Lund, Werfel and Schuele (2015) adopted receptive vocabulary in their study, since it has been found to influence the development of PA. The Peabody Picture Vocabulary Test (PPVT-4) consists of a sequence of picture sets of increasing difficulty and can be used with both children and adults. Each set includes 12 items, and for each item, the participant is presented with four images and must point to the one that corresponds to the word spoken by the examiner. Participants in the present study completed the

first two sets of the test. Regarding scoring, the test manual advises against using standardized scores when the test is administered to non-native English speakers. Therefore, the total number of correct answers across the two sets was summed to calculate each participant's vocabulary score.

The Bilingual Metaphonological Assessment Battery (BAMBI) for children in the early stages of literacy development in Brazil (Azevedo *et al.*, 2024) has been specifically designed to account for the particularities of bilingual schooling in the Brazilian context. Featuring equivalent types and numbers of subtask items in both Portuguese and English, the instrument allows the assessment of metaphonological skill development in both languages using comparable measures. Regarding the English-language subtasks, the battery considers the typical vocabulary knowledge of children who are learning English as an AL in Brazil in academic contexts and who have their first contact with the language during Early Childhood Education. This feature is particularly relevant, as in this context, the use of overly broad or unfamiliar vocabulary may prevent the effective application of phonological awareness assessment protocols originally designed for native English-speaking children. BAMBI is composed of five subtasks assessing metaphonological skills at the syllable level and four subtasks assessing these skills at the phoneme level in both Portuguese and English. These skills are tested not only at different linguistic levels (syllables and phonemes) but also through different operations (synthesis, identification, or deletion). In the present study, only the English subtasks of BAMBI were administered, in accordance with the research scope. In each subtask, the child receives instructions, completes two practice items, and then responds to six test items.

Data collection occurred at two separate time points. The first session assessed receptive vocabulary knowledge using the adapted version of the Peabody Picture Vocabulary Test and took place at the end of the final year of ECE with children who were enrolled in the school. The second session involved only the task assessing PA skills and was conducted when the children were enrolled in the first year of elementary school, approximately three to six months after the start of the academic year. Both sessions were conducted individually on school premises during regular school hours.

Furthermore, given the participants' age, it was necessary to make the BAMBI assessment a playful activity. To this end, the children were introduced to the English-language picture book The Word Collector (Reynolds, 2018), in which the main character collects words. During data collection, the children were invited to "play with words" and "help the character" as part of the task. Handling the book and a puppet of the character helped motivate the children to participate in the assessments, so much so that when researchers entered the classroom to invite participants, several children would often express eagerness to be the next to take part.

DATA ANALYSIS

The sample was divided into two groups: "previously enrolled students", that is, those who had been enrolled in the institution since Early Childhood Education (28 participants), and "new students," who joined the school in the first year of elementary school (26 participants). Descriptive results are presented in Table 1.

Table 1 – Descriptive Analysis (Full Sample)

	Mean (SD)	Median (IQR)	Min	Max
Previously Enrolled Students (n = 28, 14 meninos)				
Age	6.83 (0.28)	6.89 (0.42)	6.26	7.17
Total PA	35.86 (6.15)	35,5 (9.25)	20	47
Vocabulary *(n = 25, 13 boys)*	18.36 (3.24)	18 (3)	13	24
New Students (n = 26, 10 boys)				
Age	6.75 (0.28)	6,7 (0.52)	6.39	7.23
Total PA	32.23 (7.83)	33 (12.25)	18	45

Note. *n* = Number of observations; *SD* = Standard Deviation; *IQR* = Interquartile Range; PA = Phonological Awareness.

Source: The authors.

For the first research objective, only previously enrolled students were considered, since the PPVT-4 was administered during the final year of ECE. Three participants from this group were excluded from the analysis due to missing vocabulary data. Therefore, for the first objective, the total sample comprised 25 participants. For the second objective, the full sample of 54 participants was considered, divided into 28 previously enrolled students and 26 new students.

The mean age of the previously enrolled students was 6.83 years (SD = 0.28), while the mean age of the new students was 6.75 years (SD = 0.28). An Independent Sample *t*-test revealed no significant difference between the groups, indicating that the sample was homogeneous in terms of age. The maximum possible scores for each test were 24 points for the PPVT-4 (vocabulary) and 54 points for BAMBI (phonological awareness). The following sections present the results pertaining to each research objective and their respective hypotheses.

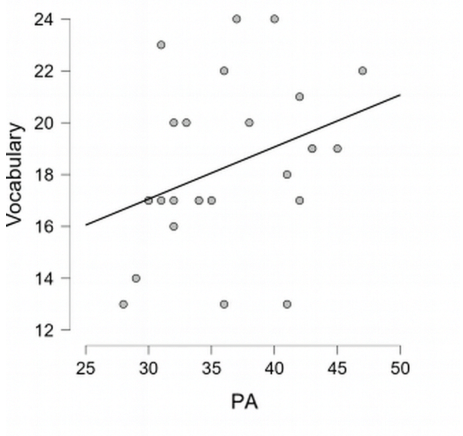
Vocabulary Knowledge and Phonological Awareness

To address the first research objective, which was to investigate the association between English vocabulary knowledge during Early Childhood Education (ECE) and English phonological awareness scores obtained by children in the first year of Elementary school, a correlational analysis was conducted. The hypothesis derived from this objective predicted a significant positive correlation between the two variables.

Initially, the data distribution was examined. Given the non-normal distribution, a Spearman correlation test was performed to assess the strength of the relation between the variables. The test revealed a significant, albeit low, positive correlation ($r(25) = 0.399$, $p = 0.044$). This result suggests that children who obtained higher vocabulary scores tended to also perform slightly better in phonological awareness tasks, and vice versa, aligning with the initial hypothesis.

The results are visually represented in the scatterplot shown in Figure 2. The trendline, which is not parallel but ascends relative to the *x*-axis, indicates a positive and increasing association between the variables. However, the dispersion of the data points suggests that while there is a general tendency for one variable to increase as the other increases, there may be some variability explained by other factors. Thus, we suggest that there is a general tendency for phonological awareness scores in the first year of Elementary school to increase as vocabulary scores in ECE also increase, although vocabulary is likely not the only contributing factor.

Figure 2 - Correlation between vocabulary knowledge and phonological awareness



Source: The authors.

One possible reason for the low correlation observed may relate to the age of the children at the time of testing. It is important to note that, in the study conducted by Lund *et al.* (2015), all children were in the same grade, whereas the present study aimed to examine the relation between one variable assessed during ECE and another assessed in the first year of Elementary school. It is worth noting that this temporal gap, which may be considered a methodological limitation, was due to practical reasons rather than a deliberate methodological choice.

To interpret the results, it is useful to recall that both vocabulary knowledge and phonological awareness are key components of traditional reading models discussed earlier in this article, especially the *Simple View of Reading* (Gough; Tunmer, 1986). Vocabulary serves as a measure of oral language proficiency and is closely tied to reading comprehension. Phonological awareness, in turn, is a fundamental element of the word recognition component of reading, as it underlies decoding processes that require knowledge of the alphabetic code, that is, the ability to associate speech sounds with written symbols. To perform such tasks, individuals must be "aware" of the sounds of speech, capable of reflecting on and manipulating them. Findings from Gough and Tunmer (1986) also emphasize the role of phonemic awareness, the most refined level of phonological awareness, as a critical factor for successful decoding, which they describe as typically underdeveloped in children with dyslexia.

Considering this, the correlation between these two constructs may be attributed to the fact that both are known predictors of reading ability, as proposed by Scarborough (2001). Although phonological awareness is regarded as a stronger predictor, both play essential roles within the SVR framework. Therefore, in the context of literacy development, the results of this study suggest that providing instruction and learning opportunities that foster both lexical and phonological skills may lead to gains in both areas. In other words, as one skill improves, there is a tendency for the other to also increase. Furthermore, given the nature of these abilities, promoting instruction in either is likely to reinforce foundational elements that support reading development. Even though reading

comprehension was not directly assessed in the present study, findings from literacy and reading development models suggest that both vocabulary and phonological awareness may contribute to its development.

In the context of bilingual literacy acquisition within bilingual schooling programs in prestigious languages, in which the AL is first introduced at school, particular attention should be paid to the development of children's oral language proficiency. In the present study, oral skills were measured through vocabulary knowledge. Drawing on Brentano (2023), we highlight the need for high-quality language input and consistent/frequent exposure to the AL in the school environment. In addition to facilitating future reading comprehension, vocabulary knowledge also shows some degree of correlation with phonological awareness. Therefore, it is important to nurture vocabulary development as fully as possible to support gains in phonological awareness as well.

Likewise, promoting phonological awareness skills may also contribute to vocabulary development to some extent, particularly if we consider the concept of AL-specific phonological awareness, which reflects the particularities of the AL's phonetic-phonological system and its contrasts with the L1. As learners become aware of specific contrasts, such as minimal pairs, they may gain a finer-grained understanding of the sound system of the AL. This, in turn, may facilitate the identification and differentiation of new lexical items. For example, instruction using minimal pairs like ship /ʃɪp/ and sheep /ʃiːp/ can help children distinguish phonemes that are meaningful in the AL but may not exist or function contrastively in their L1. In this sense, phonological awareness may be considered a key skill for the accurate acquisition of new vocabulary in the AL.

Examining the association between vocabulary knowledge in ECE and phonological awareness in the first year of Elementary school aligns with the recommendations of Alves and Finger (2023), who stress the importance of early childhood instruction in supporting the development of what they call *Sociometalinguistic Skills*. These include oral discourse comprehension and syllabic and intra-syllabic phonological awareness, which are considered precursors to literacy. Although such skills may emerge naturally, explicit attention to them can greatly facilitate later literacy development. Thus, our results highlight the importance for teachers and other educational professionals, such as curriculum coordinators, to prioritize the development of both vocabulary and phonological awareness in children during both ECE and the early years of Elementary school, as these skills serve as foundational support for reading and literacy acquisition.

Besides, the findings also underscore the role of parents and caregivers, who can contribute to the development of these skills through family literacy practices, that is, through shared experiences involving reading and writing before formal schooling begins (Finger, 2024). In the case of an AL, access to printed materials and storybooks in the additional language may be more limited in some contexts. However, given the activation of literacy-related skills across languages, family literacy in L1 may still support the development of similar processes in an AL, especially when the two languages share linguistic features.

Phonological awareness and exposure to an additional language during Early Childhood Education

Regarding the second research objective, the study aimed to examine the effect of AL input, measured by continuous enrollment in the school since ECE, on English PA scores in the first year of Elementary school. The hypothesis of such a prediction, at least to some extent, was based on the observation that children who had been enrolled in the institution since ECE had experienced a relatively high degree of exposure to English. It was anticipated that this level of exposure during ECE could lead this group of students to attain higher English PA scores in Elementary school. This expectation was grounded in the assumption that such exposure would translate into "experience"

with the AL, particularly in terms of oral language, including, for instance, vocabulary knowledge and awareness of the phonetic and phonological features of the AL.

As shown in Table 2, the mean BAMBI scores for previously enrolled students and new students were 35.86 (SD = 6.15) and 32.23 (SD = 7.83), respectively. For previously enrolled students who had attended the school since ECE, the scores ranged from 20 to 47. In the group of new students, who enrolled in Grade 1, scores ranged from 18 to 45.

In the Linear Regression Model presented in Table 2, the "new students" group was set as the Intercept. For this group, the model predicted a mean PA score of 32.23, with a 95% confidence interval ranging from 29.47 to 34.99. When comparing this to the "previously enrolled students" group, the model estimated an increase of 3.63 points. However, this effect size was small and did not reach statistical significance.

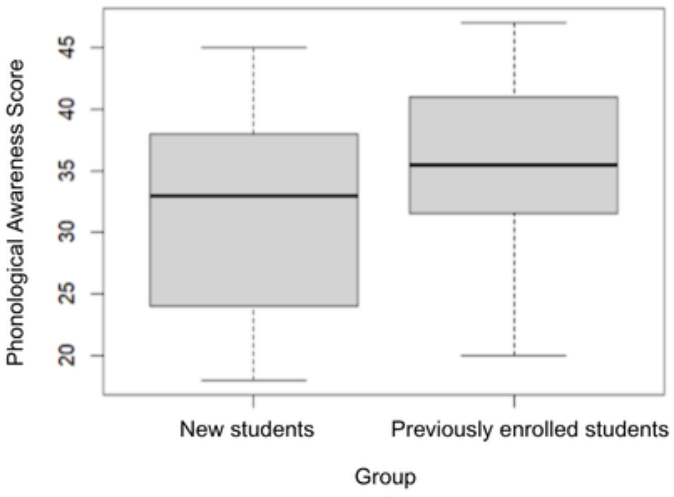
Table 2 - Inferential Statistics – Linear Regression

	Phonological Awareness Score		
Predictors	*Estimates*	*CI*	*p*
(Intercept)	32.23	29.47 – 34.99	<0,001
Group [Previously Enrolled Students]	3.63	-0.20 – 7.46	0.063
Observations:	54		
R^2 / Adjusted R^2	0.065 / 0.047		

Source: The authors.

The Linear Model thus indicates that the variable “group” did not have a statistically significant effect on PA scores (β = 3.63, 95% CI = -0.20 to 7.46, $p > .05$; $R^2 = 0.063$). Children who had been continuously enrolled in the school since ECE scored, on average, 3.63 points higher on the English PA task than those who enrolled only in Grade 1. Despite this apparent difference, the effect was not statistically significant. Still, as shown in the boxplot (Figure 3), a visual inspection suggests a slight advantage in the median PA score for previously enrolled students.

Figure 3 - Distribution of Phonological Awareness Scores by Group



Source: The authors.

Although the level of AL input for previously enrolled students was confirmed through their continuous attendance at the school since ECE, detailed information about prior AL experience was not available for new students. It is possible that some of them had also experienced substantial AL input before enrolling in the school, which may have affected their performance. This is particularly relevant given the greater score variability observed in the new students' group. A more precise analysis based on actual AL input levels (rather than enrollment status) might yield stronger predictive associations. Furthermore, the lack of statistical significance may also be attributed to the relatively small sample sizes in each group. Given the patterns observed, it is possible that a larger sample could produce different results.

Even though the observed effect size was small and statistically nonsignificant, the data point toward a general trend: exposure to English as an AL from ECE onward may be associated with improved PA skills in the first year of Elementary school. These preliminary findings are meaningful in discussions about the importance of frequent and high-quality AL input during ECE, as emphasized by Brentano (2023). Given the centrality of phonological awareness in early reading development, even modest gains in this area underscore the value of sustained AL exposure during the preschool years. Moreover, in relation to the quality of AL exposure and the implications thereof, it is essential to provide opportunities for the development of *Sociometalinguistic Skills* during ECE, a consideration raised by Alves and Finger (2023) and supported by the findings related to the study's first objective.

CONCLUSION

This study had two main objectives: (a) to investigate the association between English vocabulary knowledge during Early Childhood Education (ECE) and English phonological awareness (PA) scores obtained by children in the first year of Elementary school; and (b) to examine the effect of A) input, verified by continuous enrollment in the school since ECE, on English PA performance in the first year of elementary school. The motivation for conducting this study stems from the growing interest in Brazil in bilingual schooling of prestigious languages and the consequent need for research that supports the enhancement of pedagogical practices in this context, particularly with regard to biliteracy. In this sense, examining the constructs of vocabulary and PA and the possible correlation between them is justified by their recognized role as predictors of reading development and their presence as foundational components in the pillars of reading identified in the traditional *Simple View of Reading* (SVR) model, which are related to linguistic comprehension and decoding, respectively. Thus, the first specific objective of the study was to examine the association between English vocabulary knowledge during ECE and English PA scores in the first year of Elementary school. It was expected that a significant association would be found, similarly to what was reported by Lund, Werfel and Schuele (2015), albeit based on data collected at different educational stages.

Regarding the second objective, the study aimed to examine the effect of AL input, verified through continuous enrollment in the school since ECE, on English PA scores in the first year of Elementary school. This objective was grounded in the recognition of the role of PA in reading development and in the potential benefit of increased AL exposure provided by early enrollment in a bilingual school curriculum. It was hypothesized that such AL exposure could facilitate the development of PA skills in the additional language.

To test these hypotheses, data were collected at two different time points. At the end of the final year of ECE, vocabulary scores were obtained using an adapted version of the Peabody Picture Vocabulary Test (Dunn; Dunn, 2007). Then, at the beginning of the first year of Elementary school,

the phonological awareness of participants was assessed using the Bilingual Metaphonological Assessment Battery (BAMBI) for children in the early stages of literacy development in Brazil (Azevedo *et al*., 2024), which was specifically designed for the context of bilingual schooling in Brazil.

According to the results, a significant but weak positive correlation was found between vocabulary scores in ECE and PA scores in the first year of Elementary school. This finding suggests that children who scored higher in vocabulary tended to perform slightly better in PA, and vice versa, aligning with the proposed hypothesis. These results underscore the importance of addressing both constructs during ECE, as the development of one may be linked to the development of the other, with both playing important roles in the subsequent literacy process. In the discussion of results, family literacy is also highlighted as an important resource for the development of these skills.

With respect to biliteracy, the findings reinforce the importance of high-quality AL exposure. Regarding the second hypothesis, although the variable "group" did not exert a statistically significant effect on PA scores, a 3.63-point advantage was observed in the median scores of the group of previously enrolled students, those who had been enrolled in the school since ECE. These data thus suggest a slight trend towards higher PA scores for this group. The pedagogical implications related to this objective emphasize the importance of frequent and high-quality AL exposure during ECE and complement the recommendations arising from the first objective.

One limitation of the study concerns the sample size. However, it is worth noting that this limitation reflects practical challenges encountered during data collection, such as the interruption caused by the severe flood that affected the state of Rio Grande do Sul at the end of April and throughout May 2024, and the difficulty of aligning classroom schedules with the availability of quiet spaces for data collection. Additionally, the lack of information regarding the early educational background of some students during ECE also constitutes a limitation.

Beyond the separation of groups by level of AL exposure during ECE, the present study paves the way for future research investigating the development of metaphonological skills at both the syllable and phoneme levels at various stages of ECE and the early years of elementary school, since BAMBI is structured to allow for this type of analysis. Moreover, it would be interesting to assess vocabulary knowledge specifically through the lexical items used in BAMBI, in an attempt to establish possible relationships between correct and incorrect item responses in both assessment instruments. Future studies could also examine the role of vocabulary instruction as a means of promoting PA development, as well as its predictive power for metaphonological abilities over the following school years, such as in the first and second grades of elementary school.

Still in relation to pedagogical implications, another important consideration arises in addition to the emphasis on high-quality and frequent AL exposure during ECE and on collaborative work through family literacy practices. This consideration concerns the inclusion of topics such as the development of metaphonological skills and of oral skills in the additional language during ECE in the training of teachers and educators. The incorporation of these themes into curricular discussions is crucial, as professionals working in bilingual school settings, especially those involved in biliteracy development, must be theoretically and practically equipped to provide the necessary foundations for the specific challenges of literacy acquisition in two languages.

REFERENCES

ALVES, Ubiratã Kickhöfel. O que é consciência fonológica. *In:* LAMPRECHT, Regina Ritter;

BLANCO-DUTRA, Ana Paula; SCHERER, Ana Paula Rigatti; BARRETO, Fernanda Menna; BRISOLARA, Luciene Bassols; SANTOS, Rosangela Marostega; ALVES, Ubiratã Kickhöfel. *Consciência dos sons da língua*: subsídios teóricos e práticos para alfabetizadores, fonoaudiólogos e professores de língua inglesa. 2. ed. Porto Alegre: EDIPUCRS, 2012. p. 29-41.

ALVES, Ubiratã Kickhöfel; FINGER, Ingrid. *Alfabetização em contextos monolíngue e bilíngue*. Petrópolis: Vozes, 2023.

AZEVEDO, Aline Fay de; ALVES, Ubiratã Kickhöfel; CRUZ, Marion. FINGER, Ingrid. Elaboração da bateria de avaliação metafonológica bilíngue (BAMBI) para crianças em fase de alfabetização no Brasil. *Cuadernos de la ALFAL*: Associação de Linguística e Filologia da América Latina, [Santiago], v. 16, n. 2, p. 32-53, nov. 2024.

BERNHARDT, Elizabeth B. *Understanding advanced second-language reading*. New York: Taylor and Francis, 2011.

BRASIL. Ministério da Educação. Secretaria de Alfabetização. *PNA Política Nacional de Alfabetização*. Brasília, DF: MEC, 2019. 54 p.

BRENTANO, Luciana de Souza. Escolarização bilíngue de línguas de prestígio no Brasil: uma análise da realidade nacional com vistas à criação de um framework de modelos para o contexto brasileiro, à luz da Psicolinguística do Bilinguismo. 2023. Tese (Doutorado em Letras) - Universidade Federal do Rio Grande do Sul, Porto Alegre, 2023.

CASTLES, Anne; RASTLE, Kathleen; NATION, Kate. Ending the reading wars: Reading acquisition from novice to expert. *Psychological Science in the Public Interest*, Oxford, v. 19, n. 1, p. 5–51, 2018.

CUMMINS, James. Linguistic interdependence and the educational development of bilingual children. *Review of Educational Research*, Washington, v. 49, n. 2, p. 222–251, 1979.

DEHAENE, Stanislas. *Os neurônios da leitura*: como a ciência explica a nossa capacidade de ler. Porto Alegre: Penso, 2012.

DUNN, Lloyd; DUNN, Douglas. *Peabody Picture Vocabulary Test-Fourth Edition (PPVT-4)*. Circle Pines: American Guidance Service, 2007.

FINGER, Ingrid. Bilinguismo, biliteracia e alfabetização bilíngue. *Signo*, Florianópolis, v. 49, n. 95, p. 26–40, 2024.

GOUGH, Philip B.; TUNMER, William E. Decoding, reading, and reading disability. *Remedial and Special Education*, Austin, v. 7, n. 1, p. 6–10, 1986.

HOOVER, Wesley A.; TUNMER, William E. *The cognitive foundations of reading and its acquisition*: a framework with applications connecting teaching and learning. London: Springer, 2020. (Literacy Studies; v. 20). Available in: https://link.springer.com/10.1007/978-3-030-44195-1. Acess in: 8 ago. 2024.

KIM, Young-Suk Grace. Why the simple view of reading is not simplistic: unpacking the simple view of reading using a direct and indirect effect model of reading (DIER). *Scientific Studies of Reading*, Philadelphia, v. 21, n. 4, p. 310–333, Mar. 2017.

KROLL, Judith F.; BOBB, Susan C.; MISRA, Maya; GUO, Taomei . Language selection in bilingual speech: Evidence for inhibitory processes. *Acta Psychologica*, Amsterdam, v. 128, n. 3, p. 416–430, July 2008.

LOVELACE-GONZALES, Virginia. Phonological awareness development among English learners. *In:* CÁRDENAS-HAGAN, Elsa (ed.). *Literacy foundations for English learners*: a comprehensive guide to evidence-based instruction. Baltimore: Paul H. Brookes Publishing Co., 2020. p. 45-60.

LUND, Emily; WERFEL, Krystal L.; SCHUELE, Melanie. Phonological awareness and vocabulary performance of monolingual and bilingual preschool children with hearing loss. *Child Language Teaching and Therapy*, London, v. 31, n. 1, p. 85–100, Jan. 2015.

NICHD - NATIONAL INSTITUTE OF CHILD HEALTH AND HUMAN DEVELOPMENT. *Report of the National Reading Panel*: teaching children to read: reports of the subgroups. Washington, DC: Government Printing Office, 2000. (NIH, DHHS, 00-4754).

REYNOLDS, Peter H. *The word collector*. New York: Orchard Books, 2018.

SCARBOROUGH, Hollis S. Connecting early language and literacy to later reading (dis)abilities: Evidence, theory, and practice. *In:* NEUMAN, Susan B.; DICKINSON, David K. (ed.). *Handbook for research in early literacy*. New York: Guilford Press, 2001. p. 1-29.

SNOW, Catherine E. Reading comprehension: reading for learning. *In*: PETERSON, Penelope; BAKER, Eva; MCGAW, Barry (ed.). *International Encyclopedia of Education*. 3th ed. Oxford: Elsevier, 2010. p. 413–418. Available in: https://www.sciencedirect.com/science/article/pii/B978008044894700511X. Access in: 8 ago. 2024.

SOARES, Magda. *Alfabetização*: a questão dos métodos. São Paulo: Contexto, 2016.

TONG, Xiuhong; CHIU, Ming Ming; TONG, Shelley Xiuli. Synergetic effects of phonological awareness, vocabulary, and word reading on bilingual children's reading comprehension: A three-year study. *Contemporary Educational Psychology*, San Diego, v. 73, p. 1-2, 2023.

WALLEY, Amanda C.; METSALA, Jamie L.; GARLOCK, Victoria M. Spoken vocabulary growth: Its role in the development of phoneme awareness and early reading ability. *Reading and Writing,* Dordrecht , v. 16, p. 5–20, Feb. 2003.