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Phonological processing and reading in children with learning difficulties in Portuguese-English bilingual schools: case reports

Processamento fonológico e leitura em crianças com dificuldade de aprendizagem em escolas bilíngues português-inglês: relatos de casos

Procesamiento y lectura fonológica en niños con dificultades de aprendizaje en escuelas bilingües portugués-inglés: reporte de casos

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Abstract

Introduction: There is a positive influence on language development when there is exposure to a new language. However, when considering this context in children with learning difficulties, the deficits presented in the first language can be transferred to the learning of the second. **Objective**: The aim of the present study was to characterize the performance in phonological processing and reading in three children with learning difficulties from Brazilian-English bilingual schools**. Method**: General data on the development and performance in phonological awareness skills, phonological working memory,

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Authors' contributions:
TALR: study conceptualization; methodology and article outline.
ACDM, BLCM, AILA: data collection.
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access to mental lexicon and reading in three children aged 8 to 9 years, attending the 2nd and 3rd year of elementary school were described; all with at least two years of exposure to bilingual school, especially in literacy. In the evaluation, the protocols CONFIAS, Phonological Working Memory, TENA, RAN and Protocol for Assessment of Reading Comprehension of Expository Texts were applied. **Results**: The children performed below expectations in terms of phonological processing skills, difficulties in oral reading fluency, as well as in reading comprehension. **Conclusion**: These results can contribute to the understanding of aspects of written language in the performance of speech therapists with bilingual children, regarding clinical and educational implications, given the scarcity of studies in this area in Brazil.

Keywords: Multilingualism; Reading; Academic Failure.

Resumo

Introdução: Há influência positiva no desenvolvimento da linguagem, quando ocorre a exposição a um novo idioma. No entanto, quando se considera esse contexto em crianças com dificuldade de aprendizagem, o *deficit* apresentado na primeira língua pode ser transferido para o aprendizado da segunda. **Objetivo:** O objetivo do presente estudo é caracterizar o desempenho em processamento fonológico e leitura em três crianças com dificuldade de aprendizagem em escolas bilíngues português-inglês. **Método:** Os dados gerais sobre o desenvolvimento e desempenho nas habilidades de consciência fonológica, memória de trabalho fonológica, acesso ao léxico mental e leitura em três crianças de 8 a 9 anos de idade, cursando 2º e 3º ano do ensino fundamental foram descritos; todos com, ao menos, dois anos de exposição à escola bilíngue, especialmente na alfabetização. Na avaliação, foram aplicados os protocolos CONFIAS, Memória de Trabalho Fonológica, TENA, RAN e Protocolo de Avaliação da Compreensão Leitora de Textos Expositivos. **Resultado:** as crianças apresentaram desempenho aquém do esperado nas habilidades do processamento fonológico, na fluência da leitura oral, bem como na compreensão leitora. **Conclusão:** esses resultados podem contribuir tanto para a compreensão de aspectos da linguagem escrita na atuação do fonoaudiólogo com crianças bilíngues, quanto para as implicações clínicas e educacionais, haja vista a escassez de estudos nessa área, no Brasil.

Palavras-chave: Multilinguismo; Leitura; Fracasso Acadêmico.

Resumen

Introducción: Existe una influencia positiva en el desarrollo del lenguaje cuando hay exposición a un nuevo idioma. Sin embargo, al considerar este contexto en niños con dificultades de aprendizaje, los déficits presentados en el primer idioma se pueden trasladar al aprendizaje del segundo. **Objetivo**: El objetivo del presente estudio fue caracterizar el desempeño en procesamiento fonológico y lectura en tres niños con dificultades de aprendizaje de escuelas bilingües brasileño-inglés. **Método**: Se describieron datos generales sobre el desarrollo y desempeño en las habilidades de conciencia fonológica, memoria de trabajo fonológica, acceso al léxico mental y lectura en tres niños de 8 a 9 años de 2º y 3º de primaria; todos con al menos dos años de exposición a la escuela bilingüe, especialmente en alfabetización. En la evaluación se aplicaron los protocolos CONFIAS, Memoria Fonológica de Trabajo, TENA, RAN y Protocolo de Evaluación de la Comprensión Lectora de Textos Expositivos. **Resultados**: Los niños se desempeñaron por debajo de las expectativas en términos de habilidades de procesamiento fonológico, dificultades en la fluidez de la lectura oral, así como en la comprensión lectora. Conclusión: Estos resultados pueden contribuir a la comprensión de aspectos del lenguaje escrito en el desempeño de logopedas con niños bilingües, en cuanto a implicaciones clínicas y educativas, dada la escasez de estudios en esta área en Brasil.

Palabras clave: Multilingüismo; lectura; fracaso académico.

Introduction

The definition of bilingualism is not yet an overall consensus. Even though the concept is still largely debated in the literature, the most accepted description is that a bilingual child is someone who speaks fluently two different languages[1].

Bilingualism is rather common in some countries. As for Brazil, given the increasing globalization – with fast, easy, and accessible interaction between people from the various countries –, there is an evident interest on the part of parents to enroll their children in educational institutions that have a bilingual pedagogical approach[2].

Some measures – such as their age when they acquired each language and their relative amount of experience or exposure – must be considered when assessing children exposed to two languages[3]. Thus, individuals can be classified as early bilingual (when the second language is acquired in childhood) or late bilingual (when it is acquired in adolescence or adulthood). Considering the early bilinguals, it is important to distinguish simultaneous from sequential bilingualism. The first one refers to acquiring two languages at the same time, while the second refers to acquiring the second language after the first one has been consolidated[4]. Hence, in such groups, children exposed early to a foreign language may have better performance in linguistic skills[5].

Therefore, placing children in a bilingual environment can be enriching to them, whereas it may be challenging for those with learning difficulties. Hence, if they have impairments in their mother tongue (L1), such difficulty can manifest in the second language (L2) as well, affecting the learning process. This concept is grounded on the assumption that the acquisition of the first and second languages explore the same mechanisms[6].

Among these difficulties, deficits in the phonological processing skills in L1 – which include phonological awareness, phonological working memory, and access to the mental lexicon, which are greatly important to the process of learning to read and write and developing reading fluency – are believed to have a negative effect in learning L2[7].

Phonological awareness is associated with the capacity to reflect on word structures, handle them, and understand them as linked syllables and sounds[8]. Studies in the literature point out the benefits of bilingualism to phonological awareness skills. Thus, bilingual children have greater mastery over this skill, especially in terms of phonemic awareness, showing greater ease of phoneme distinction than their monolingual peers[2,9]. Although some studies verify a positive effect on phonological awareness in bilingual children, other consequences are also observed, such as phonological transfer, in which the sounds of a language are pronounced with the phonetic characteristics of the other one[7].

The phonological working memory is an important skill to successfully learn L2 because repeating words in an unfamiliar language is a precursor element in such a process[10]. Therefore, children with deficits in the phonological working memory in L1 are more susceptible to having difficulties learning L2[11]. Moreover, bilingual children are believed to have better phonological working memory performance in L1, since repeating nonwords in L2 is a more complex task[12].

The access to the mental lexicon, in its turn, is assessed by the speed with which visual and phonological information is processed. A study of bilingual and monolingual children showed that both have similar rapid automatic naming time, which was not affected by their grade in school[9].

When children have low performance in phonological processing skills, they also have difficulties learning to read. Hence, difficulties in the acquisition of reading in L2 may be associated with the same difficulties in L1[6]. On the other hand, a study demonstrated that some poor readers in L2 may be free from reading difficulties in L1, raising the hypothesis that these difficulties may not be only a by-product of reading difficulties in L1[11]. Thus, some other aspects must be considered, such as the type of orthography and structure of both languages[10,11]. In more transparent languages, whose grapheme-phoneme correspondence is clearer and more direct, most readers are faster to attain precise reading[13].

Although there are many origins to such reading difficulties, it is important to keep in mind that, as well as monolingual children, the bilingual ones may also have associated biological changes – e.g., specific learning disorder with consequences to reading. However, such a diagnosis requires a multidisciplinary team, especially concerning their response to at least 6 months of intervention in order to confirm the diagnosis[14].

In Brazil, the studies addressing bilingual learning difficulties and written language characterization in this population are still insufficient to better clarify the diagnostic criteria that distinguish reading learning disorders in the context of educational difficulties. Therefore, the case presentation of three children in such a situation may help understand important signs in their performance in reading and phonological processing skills, which in turn can lead to intervention and differential diagnosis strategies in multidisciplinary teams.

Given the above, the objective of this study is to characterize the performance in reading and phonological processing in three children with learning difficulties at Portuguese-English bilingual schools.

Case presentation

This is the report of three clinical cases, regarding the assessment of reading and phonological processing skills in three children with learning difficulties who attended Portuguese-English bilingual schools in Natal, Rio Grande do Norte, Brazil. The study was approved by the Research Ethics Committee of the *Universidade Federal do Rio Grande do Norte* (Federal University of Rio Grande do Norte – UFRN), under number 1.012.635. The participants' and their families' previous authorization were obtained by their signing the informed consent form. The perspective of case studies, as a research method that considers the clinical profile with origin in therapeutic practice, is to explain how patients react to different circumstances[15].

The data were collected at the Laboratory for Research and Public Outreach in Written Language, Interdisciplinarity, and Learning (LEIA, in Portuguese), located at the Speech-Language-Hearing Teaching Clinic of the UFRN.

The children were individually assessed in the part of the day opposite to their school hours, in four sessions that averaged 1 hour each, once a week, sequentially. All assessments followed a single protocol, approaching tasks to assess their performance in phonological awareness, phonological working memory, and rapid automatic naming, as well as reading recognition, level, speed, and comprehension. The number of instruments applied per day varied according to each child's needs; on average, two tests were applied per session. The children were not undergoing previous speech-language-hearing therapy.

The instruments below were used to assess the skills.

The phonological awareness skill was assessed with the CONFIAS protocol[16], in which the child must respond to the following tasks regarding the syllabic and phonemic level: synthesis, segmentation, rhyme, alliteration, initial and final syllable identification, and transposition. Before beginning the test, the evaluator must read its instructions and carry out two training tasks to verify whether the child understood them. Every correct answer score one point, while every incorrect answer score zero. The total score of syllabic awareness is 40, and that of phonemic awareness is 30, totaling 70 points. This instrument enables the investigation of the metaphonological skills, considering the relationship with the writing hypothesis.

The phonological working memory was assessed with the Working Memory test[17], comprising the nonword subtest (in which they must repeat 40 two- to five-syllable invented nonwords) and the digit subtest (which must be repeated in direct and inverted order; the direct sequence has two to eight digits, and the inverted order has two to seven digits). In both tasks, the evaluator pronounces the stimuli, and the child is instructed to repeat them immediately. Every correct answer in the first attempt scores two points; if the correct answer is given in the second attempt, the child scores one point; and if the child does not correctly repeat the stimulus in either attempt, the score is zero.

The access to the mental lexicon was assessed with the Automatic Naming Test (TENA, in Portuguese)[18] and the Rapid Automatic Naming Test (RAN)[19]. These instruments have color, object, letter, and number naming subtests. Each subtest has five stimuli that are randomly repeated 10 times in each of the five lines. In the test sheets, the child must name each item as fast as possible, in the same direction of reading (from left to right and from top to bottom). The test is timed in seconds. The reference values in the TENA consider each child's age in years and months, as the speed increases (diminishing the time) with the months. It is important to highlight that using the RAN in one child and the TENA in the other two did not interfere with the analysis of the cases because the objective of this study is to characterize these performances individually, rather than compare the children.

The reading was assessed with the Protocol for Assessment of Reading Comprehension of Expository Texts[20], which assesses third-graders' reading comprehension with expository texts. It analyzes the silent and oral reading patterns, counting the number of words the child reads per minute and verifying each child's reading level and speed. Also, their reading comprehension is investigated with guiding questions.

At the end of each assessment session, the results were recorded in answer sheets, organized into individual records, and then tabulated for analysis. The sample is described below, based on the data obtained from clinical records.

Child 1 (C1): Female, 8 years and 2 months old, referred to the service by a neuropsychologist. As reported by her parents, she substituted letters in writing and confused upper- with lowercase letters. Her parents speak Brazilian Portuguese, and she was born in France. Concerning developmental data, she was born at full term and had adequate neuropsychomotor and linguistic development. Even though she lived in France until 2 years old, she was mainly exposed to Portuguese, as this was the language in which her parents communicated. Although the exposure was simultaneous and her L1 was Portuguese, her first words were pronounced in French. At 2 years old, she moved to Brazil and soon after that began her school life at a monolingual institution (Brazilian Portuguese) to stimulate her linguistic skills in this language. This was a difficult process because she took a long time trying to express herself in French. Nevertheless, she quickly improved her Portuguese, though she used French to communicate in certain situations. Hence, by 3 years old, she started attending a French school and, by 6 years old, began learning to read and write. At this moment, the child had significant difficulties acquiring reading and writing. Because of these difficulties, associated with problems adapting to the institution, her parents wished to place her in a bilingual setting. However, she moved to a Portuguese-English bilingual school, exposed to late sequential bilingualism. This exposure was not successful because the child did not acquire the new language (English). She was retained in first grade at her parents' request because they considered that she could not read and write. At the time of this study, the child was attending second grade at the Portuguese-English bilingual school.

Child 2 (C2): Male, 8 years and 6 months old, referred by a neuropsychologist. The parents reported that the child read by syllables and had writing difficulties. He was born at full term and had adequate neuropsychomotor and linguistic development. He began his school life at 2 years old and attended a Portuguese-English bilingual school since he was 3 years old. He had difficulties learning to read and write, with an irregular size of letters and persistent hyposegmentation of words. At the time of this study, he attended third grade at the same school.

Child 3 (C3): Female, 8 years and 7 months old, referred to the Laboratory by indication of her parents' workmates. The family reported reading comprehension difficulties, persistent hyposegmentation of words in writing, and inattention. She was born at full term and had adequate neuropsychomotor and linguistic development. She was enrolled in a daycare school when she was 7 months old and began studying in a Portuguese-English bilingual school at 3 years old. Her process of learning to read and write was difficult because her performance fell short of that of her peers. At the time of this study, she attended third grade in the said Portuguese-English bilingual school.

According to audiological examinations, the children approached in this study did not have hearing loss, and their auditory thresholds were normal. The three children had been attending Portuguese-English bilingual schools for more than 2 years. It has been hypothesized in research that the age when bilingualism is acquired influences brain organization and laterality development, establishing the relative role of the two hemispheres in verbal information processing[21].

Regarding formal aspects of bilingual teaching, despite being different schools, the pedagogical framework of all of them provided that 50% of the content was taught in English. Moreover, teachers and students used only English in both communication and instruction.

Results

Each child's assessment results regarding their reading and phonological processing skills are described below. Hence, their performance is characterized according to the mean reference values in the instruments (Tables 1, 2, 3, and 4).

Table 1. Characterization of phonological awareness.

	CS	(%)	RV	CP	(%)	RV	CT	(%)	RV
C1	35	87.5		14	46.6	15	49	70	
C2	40	100	31	25	83.3	15	65	92.8	46
C3	36	90		27	90	15	63	90	

Legend: CS = CONFIAS Syllable; CP = CONFIAS Phoneme; CT = CONFIAS Total; %: percentage of correct answers; RV = Reference value

Table 2. Characterization of the phonological working memory.

	WMPS	(%)	RV	WMDO	(%)	RV	WMIO	(%)	RV
C1	66	82.5		20	71.42		4	16.66	
C2	79	98.75	69.43	16	57.14	13.87	10	41.66	6.20
C3	49	61.2		13	46.42		7	29.16	

Legend: WMPS: Pseudowords; WMDO = Direct order; WMIO = Inverted order; %: percentage of correct answers; RV = Reference value

Table 3. Characterization of the access to the mental lexicon.

	Letters	RV	Digits	RV	Objects	RV	Colors	RV
C1	62	52	60	46	37	29	37	28
C2	41	33	51	36	64	51	86	53
C3	24	32	24	36	45	50	52	53

Legend: RV = Reference value

Table 4. Characterization of the reading level.

	Reading level	RL
C1	Logographic-alphabetic transition	Orthographic
C2	Alphabetic	Orthographic
C3	Alphabetic-orthographic transition	Orthographic

Legend: RL = Reference level. Classified according to Frith (In: Ehri, 2013)[22]

CHILD 1 (C1)

The data obtained from the phonological awareness assessment showed a phonemic awareness score below the expected for the child's age and grade in school. The results are compatible with the syllabic-alphabetic writing hypothesis, short of what was expected for her age and grade in school, as she should be already reading and writing fluently. As for phonological working memory, her score was below the expected in the pseudowords and inverted order digit subtests. On the other hand, her result in the direct order digit test was in the average for her age, considering the reference used. In the assessment of access to the mental lexicon, her naming time was below the average for all stimuli, demonstrating a slowed processing of visual and phonological information. This skill is directly related to the capacity for fast and automatic reading.

Considering that the protocol we used is applied to second graders, which is the grade C1 was attending, she was given to read a text suggested for third graders, with a qualitative analysis to assess oral reading fluency and reading comprehension.

As a result, she read by syllables, and her reading speed was 20 words per minute, showing an extremely slowed decoding[23] for her age and grade in school. Concerning reading comprehension, she did not understand the central ideas of the text and read predominantly via the phonological route. Hence, her reading level is in the transition between logographic and alphabetic, as she either does not recognize what is written or decodes it syllable by syllable.

CHILD 2 (C2)

Regarding the assessment of the phonological awareness skills, he obtained adequate results in the phonological awareness assessment, in both the syllabic and phonemic awareness, considering his age and grade in school. The results are compatible with the alphabetic writing hypothesis, according to the expected for his age. In the phonological working memory test, his performance was in the average for the pseudowords and direct and inverted order digit subtests, according to the reference. In the assessment of access to the mental lexicon, his naming time for colors, objects, letters, and numbers was below the expected for his age – i.e., he took longer to access the visual information of these stimuli than children in the same developmental stage.

The oral reading fluency and reading comprehension were assessed with the text suggested by the test for third graders who decoded vowel and consonant graphemes. He read by syllables, predominantly via phonological route, and slowly[23], at an average of 20.94 words per minute. Concerning reading comprehension, he partly identified the central ideas that bring unity and meaning to the text, with the help of the guiding questions present in the protocol. These results characterize the alphabetic reading level.

CHILD 3 (C3)

In the assessment of the phonological processing skills, regarding the assessment of phonological awareness, she had a satisfactory performance in syllabic and phonemic awareness, considering her age and grade in school. The results agree with the alphabetic writing hypothesis, according to the expected for her age. In the phonological working memory assessment, her results fell short from the expected in the pseudowords subtest, while in the direct and inverted order digit subtests her results were in the average. In the assessment of access to the mental lexicon, her naming time for colors and objects was in the average, while for letters and numbers was above the average, considering her age group.

Her oral reading fluency and reading comprehension were assessed with a text suggested by the test for third graders. She decoded vowel and consonant graphemes, characterized by global reading, with a predominance of the lexical route, although she resorted to the phonological route at times. Her reading speed was normal[23], at a rate of 89.03 words per minute. Regarding reading comprehension, she partly identified the central ideas that bring unity and meaning to the text, with the help of the guiding questions present in the protocol. These results characterize the alphabetic-orthographic reading level.

The reference values used in the table are related to the minimum values expected for the alphabetic writing hypothesis since, based on their age and grade in school, all the children should be already in this writing phase, having mastered reading and writing.

In summary, the table below shows each child's skills as expected and below the expected.

Chart 1. The children's performance in the phonological processing and reading skills.

Child	Skills as expected	Skills below the expected
C1	Syllabic awareness; Phonological working memory (direct order digit subtest).	Phonemic awareness; Phonological working memory (pseudowords and inverted order digit subtests); Rapid automatic naming; Reading
C2	Phonemic awareness; Phonological working memory.	Rapid automatic naming; Reading.
C3	Phonemic awareness; Phonological working memory (direct and inverted digit subtests); Rapid automatic naming.	Phonological working memory (pseudowords); Reading.

Discussion

This case study[15] was conducted to characterize the reading and phonological processing performance of three children who attended Portuguese-English bilingual schools and had learning difficulties. In this regard, many studies seek to understand how bilingualism affects the development of metalinguistic skills but few of them approach this context in children with school difficulties. Each child's assessment revealed similarities and differences, which will be discussed below.

Since C1 was born in France, her linguistic development occurred in this language, considering her an early and simultaneous bilingual. Although she was exposed to Portuguese from birth, her first words were acquired in French. Thus, she needed more time to acquire linguistic skills in Brazilian Portuguese, particularly due to the interference of a third language (English) while she was learning to read and write. Nonetheless, she is considered bilingual because she did not effectively use English.

C2 and C3 phonological awareness results, especially at the phoneme level, agree with studies that verified that bilingual children can have better performance in some phonemic awareness skills than their monolingual peers[2,9]. This finding may be related to the hypothesis that the auditory-perceptual experience of the sounds of two languages enables better use of the phonological awareness skill[2]. The phonemic awareness performance of Brazilian children has been commonly inferior to that of children from other countries, whether bi- or monolingual[8,24]. This may be associated with the method with which they are taught to read and write or with the phonic strategies not addressed in Brazilian schools. In this regard, the National Literacy Plan (PNA, in Portuguese), regulated by Decree no. 9,765, makes clear the need to stimulate the metaphonological skills, especially phonemic awareness, in the process of teaching to read and write[25].

Concerning the phonological working memory, C1 had performance below the expected in the pseudowords and inverted digit subtests; C2 had a performance in the average expected for his age; and C3 had performance below the expected only in the pseudowords subtest. Studies that assessed bilingual children's working memory in L1[9,26] verified a positive effect of bilingualism on this skill. However, this may not occur in bilingual children with learning problems because their functioning may be different in L1. Therefore, future quantitative studies of bilingual children with school difficulties may clarify this issue, as this is an important skill in the process of learning to read and write.

A Dutch study, in its turn, observed that the effects of bilingualism sometimes disappeared when the differences in the language or memory skills were considered. This study was carried out in 294 Dutch children aged 4 to 7 years, divided into three groups: bilingual children that studied in a school where English was used since kindergarten; bilingual children raised in a bilingual environment, as one of the parents spoke native English; and the control group, comprising monolingual children exposed only to occasional stimuli in English, such as music. The findings revealed that no significant differences were found between the groups in the rhyming and phoneme manipulation skills. As for initial identification and phoneme deletion, bilingualism had little effect on both. Hence, learning two languages simultaneously neither impairs nor benefits the child's development in terms of phonological awareness[27].

Regarding the performance of access to the mental lexicon, the naming time of C1 and C2 was above the expected for their age and grade in school, according to the instrument used for each one. On the other hand, the naming time of C3 was according to the expected. Some studies verified rapid naming deficits in L1 in bilingual children, which indicated slower access to the lexicon, especially in the processing of visual and phonological information, as a consequence of immersion in L2[28]. Another factor that may have influenced C3's better performance is that she had an adequate reading speed for her grade in school – which has been described in the national literature concerning the relationship between rapid naming speed and reading, even in monolingual children[29].

Portuguese and English are respectively characterized as semitransparent and opaque languages. This means that the first one has graphemes that directly correspond to the phoneme and vice-versa, although this is not a direct relationship for all phonemes and graphemes. In contrast, this relationship does not occur in the second one. It is a characteristic that may cause some difficulties when children are learning to read and write, given the complex orthographic rules and irregular writing. This corroborates studies stating that the more

complex the language is, the more difficult it is to acquire reading[10,11,13].

Even though this study did not intend to assess L2, children who have reading difficulties in L1 are believed to show the same difficulties in learning to read in L2 as well[10]. Moreover, English, to which the three children were exposed, is considered one of the most opaque languages[30]. Hence, a phoneme may be represented by various graphemes, while a grapheme may have various phonemes. This complex relationship between phonemes and graphemes causes certain difficulties when learning languages with such characteristics[10,11]. Thus, a child who already has reading difficulties in L1 (in this case, Brazilian Portuguese) may also have reading difficulties in L2 (English), as it is a structurally and phonologically more complex language.

Regarding reading comprehension, it was observed in this study that C1 did not understand the text she read, while C2 and C3 partially understood it. In this regard, a study verified that exposure to reading in L2 is predictive of reading comprehension in this second language[31]. Although the said study assessed the students in L1 (Turkish) and L2 (German), this finding is important to emphasize that the children in this study were required to read more in L2 (English) than in L1 (Portuguese). Therefore, failure in reading comprehension may result from scarce reading in Portuguese – which deserves greater stimulation so we can understand the actual failure in this process.

Given the above, it is important to highlight that this case report brings up a qualitative look at children who have bilingual learning and present with learning difficulties. Quantitative studies analyzing the linguistic behavior in reading and writing and comparing the performance in L1 and L2 may help understand this group in Brazil, restating the effects of bilingualism on the reading and phonological processing skills in a context of learning difficulties. Hence, a detailed speech-language-hearing assessment may help outline intervention strategies in clinical and educational settings for this population.

Conclusion

This case study characterized the behavior of three bilingual children concerning the manifestations of reading and phonological processing in Brazilian Portuguese. There were varied changes in phonological awareness, phonological working memory, and access to the mental lexicon, as well as impaired reading level and comprehension among the children. The speech-language-hearing assessment is essential in this sense because, not only the skills must be outlined, but also each child's educational aspects must always be considered in their reality. Therefore, the attentive look of the speech-language-hearing therapist can broaden their practice and provide better conditions to analyze such a public, which has written language learning complaints in the field of bilingualism.

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