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Reading Competency, Speech Rate and Rhythm

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Abstract

Background: There is increasing evidence defining reading competency in terms of accuracy, speed and prosody, as well as interest in gaining better understanding of the interrelation as a function of prosodic features. This study aims to analyze the relationship between reading competency, in terms of accuracy and speed of written word recognition, and two attributes related to prosody in oral reading of texts: speech rate and rhythm. **Method:** Oral reading of a narrative text by 141 third and fourth grade Spanish-speaking students was analyzed using an automated acoustic speech procedure and their reading competency was assessed. **Results:** Reading proficiency was associated with a lower proportion of the number and duration of pauses and greater regularity of syllable intervals, resulting in a higher rate of speech and higher regularity of rhythm. The reading experience improves rhythmic reading with some independence from the levels of automation achieved in written word recognition. **Conclusions:** The results suggest that when there is greater reading competence there is greater speed and rhythmic expressiveness; this improves with reading experience when a sufficient level of automation has been achieved in reading access.

Keywords: Reading, reading fluency, prosody.

Resumen

Competencia Lectora, Fluidez y Ritmo. **Antecedentes:** cada vez más evidencias define la competencia lectora en términos de precisión, velocidad y prosodia; así hay interés en comprender esa relación en función de los rasgos prosódicos que se consideren. Este estudio analiza la relación entre precisión y velocidad de reconocimiento de la palabra escrita y dos atributos relacionados con la prosodia en la lectura oral de textos: la velocidad y el ritmo del habla. **Método:** se analizó la lectura oral de un texto narrativo de 141 estudiantes de habla hispana de tercer y cuarto grado de primaria mediante un procedimiento acústico automatizado del habla, evaluada su competencia lectora. **Resultados:** la competencia lectora se asocia con una menor proporción en el número y duración de las pausas y con una mayor regularidad de los intervalos silábicos, lo que produce mayor tasa de habla y una mayor regularidad del ritmo. La experiencia lectora mejora la lectura rítmica con cierta independencia de los niveles de automatización alcanzado en el reconocimiento de la palabra escrita. **Conclusiones:** los resultados sugieren que cuando hay una mayor competencia lectora hay mayor velocidad y expresividad rítmica; que mejora con la experiencia lectora cuando se ha logrado un nivel suficiente de automatización en el acceso lector.

Palabras clave: lectura, fluidez en la lectura, prosodia.

Reading fluency has been associated with the accuracy and speed with which we identify written words, which involves automating the processes that grant access to the word (Castles et al., 2018). However, expressive or prosodic reading could constitute a main characteristic of reading fluency (Whalley & Hasen, 2006), impacting reading comprehension (Álvarez-Cañizo, et al., 2020; Benjamin & Schwanenflugel, 2010; Veenedaal et al., 2016) and even predicting it (Kuhn et al., 2010).

Reading fluency understood in terms of speed, accuracy and prosody in written word recognition (Álvarez-Cañizo et al., 2018; Calet, 2013; Hudson et al., 2009; Kuhn et al., 2010) could facilitate word integration syntagmas and sentences required for reading comprehension (Benjamin & Schwanenflugel, 2010; Calet et al., 2013; Kuhn & Stahl, 2003; Miller & Schwanenflugel, 2006; Schwanenflugel et al., 2017).

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Prosodic features include numerous variables that involve suprasegmental phonological elements and materialize from certain acoustic parameters such as intensity, duration and frequency from which suprasegmental features such as pitch, melody, intonation, pauses, rhythm, speech rate and timbre of the voice result (Llisterri et al., 2005; Schawanenfluge et al., 2015; Shattuck-Hufnagel & Turk, 1996).

Usually readers with high levels of reading fluency show higher levels of rhythmic ability during reading, as well as an adequate speech rate which makes it possible to anticipate the reader's lexical knowledge (Schwab, 2015). Rhythm allows us to observe the temporal organization of reading, beyond speed, and shows the capacity of the reader to use this variable to make her or his reading seem expressive, at the same time allowing listeners to easily segment the text into units of meaning (Cutler et al., 1997; Cuenca, 2000). On the other hand, the speech rate (number of sounds that a speaker can make in a unit of time including pauses) is strongly determined by the number and duration of the pauses, and is a measure of the strength of the automation process. It is not by chance that beginning readers have longer reading times (Miller & Schwanenflugel, 2008); so do dyslexics (Suárez-Coalla et al., 2016).

Prosodic reading would emerge when word recognition skills have reached an adequate level of automaticity (Kuhn & Stahl, 2003; Miller & Schwanenflugel, 2008); although the automation itself would not necessarily mean prosodic reading (Cowie et al., 2002). Schawanenfluge et al., (2004) identified a positive relationship between decoding skills and the proper use of intonation and pause in a sample of second and third grade primary school children. Similar results were found by Miller and Schwanenflugel (2008) with first and second grade primary school children. Furthermore, Alvárez-Cañizo et al., (2018) working with third and fifth grade children found that higher accuracy and speed in reading facilitates prosodic reading. However, the relationship between automaticity and reading comprehension would tend to decrease in the more advanced courses, possibly because once automation is acquired other factors such as expressive reading would be more relevant (Schwanenflugel et al., 2006). The automaticity in the recognition of written words could be a prerequisite for expressive reading (Cowie et al., 2002) but not enough.

Therefore, reading difficulties in schoolchildren measured in terms of speed and accuracy in recognition of written words, would also be reflected in the prosodic skills. Some studies with dyslexics are proof of this; dyslexics read more slowly, make longer and more frequent pauses, and have less capacity for tone variation and word stress. This happens both in children (Alves et al., 2015) and adults who have that learning disorder (De Luca et al., 2013).

The characteristics of the orthographic system must be considered too, since they affect reading fluency and prosody, particularly in the first years of reading acquisition, which show specific features in each language and even in dialects of the same language. In so-called transparent systems such as Spanish where there is a correspondence between graphemes and phonemes, a better reading level is achieved more quickly (Cuetos & Suárez-Coalla, 2009; Seymour et al., 2003), having an impact on prosodic performance. In addition, Spanish unlike English, is a language with a syllabic rhythm (the length of its syllables maintains a certain isochrony or low variability in the distribution of its length) in which each word is accentuated and the rhythm is marked by the syllable (Nocetti, Pérez, & Figueroa Candia, 2019; Peppe et al., 2009; Prieto et al., 2012).

This study analyses the relationship between reading competency, measured in terms of accuracy and speed of recognition of written words within a phrase, as well as two factors related to prosody in oral reading: rhythm and speech rate. Using acoustic voice analysis and an innovative automated procedure with the recorded readouts, these variables have been studied in third and fourth grade primary schoolchildren. This is a valid and reliable procedure to quantify rhythm using sequential variability index and derived indexes to obtain the variability in syllabic intervals in reading. Given the Spanish language transparency, students in third and fourth grades are expected to have started reaching the necessary skills for fluency, hence this study´s grade choices.

Therefore, students with higher reading proficiency are expected to show lower levels in the rhythmic patterns of the syllabic intervals, i.e. higher syllabic isochrony, than the group with lower reading performance. This lower syllabic variability produces greater expressivity in oral reading and is an overall measure of the melodic organization of speech that contributes to text comprehension (Schwanenflugel & Benjamin, 2012). Accordingly, higher speech rates from more proficient readers, along with fewer and shorter pauses are expected too.

Finally, we assume an improvement in rhythmic indexes and speech rate according to the schooling level will be observed when the influence of reading competence (accurate and fast written word recognition) has been controlled.

Method

Participants

One hundred and fortyone grade primary school children from three private schools in Montevideo participated in this study. Sixty-four (31 boys and 33 girls) in third grade (Mage=9.01, SD=0.46) and seventy-seven (36 boys and 41 girls) in fourth grade (Mage=9.92, SD=.0.50). Participants come from a medium to low socioeconomic context and their mother tongue is Spanish. They had no sensory, cognitive or linguistic difficulties, nor reading difficulties according to school reports.

Instruments

We used the Reading Efficacy Test (TECLE) to assess reading competency (Cuadro et al., 2009). It includes, together with accuracy and speed, efficiency in written word recognition involving meaning in context. In terms of lexical quality proposed by Perfetti (2007) it involves fast and low resource identification of written words. TECLE assesses reading efficacy through 64 items, with a 5-minute time limit, it is a speed-reading test. Subjects must read each item, which presents an incomplete sentence and select the correct option out of four possible words (three are incorrect and one is correct). The respondent needs to be able to discriminate between subtle phonological, orthographic and semantic/syntactic changes in order to be able to answer adequately. Psychometric studies reveal this test is unidimensional, reliable (test-retest reliability of .88) and valid.

A short narrative text (about 90 words) from the PROLEC-R test (Cuetos et al., 2014) was chosen for the reading task to be used for the acoustic analyses. The content of the text was new to the participants (so previous knowledge would not influence results) and represents the variety of Spanish spoken in the River Plate area. In addition, the text is not phonetically balanced (so it is not constructed with attention to phonetic or phonological particularities), and syllables are accessible thanks to its low complexity. The intonation patterns (declarative, interrogative and exclamatory) can affect the rhythm with which students read aloud (Álvarez-Cañizo et al., 2018; Benjamin & Schwanenflugel, 2010). To control this, only the declarative intonation was used because it is the most frequent pattern. Finally, using the INFLESZ program, we proved that the text was appropriate for the students in this study (it corresponds to a simple text): Flesh-Szigriszt score (Szigriszt-Pazos, 1993) = 88.86 and Flech Fernández-Huerta score (Fernández-Huerta, 1959) = 73.27.

The recording of the reading task was done using a professional Fostex Fr-2LE with 24-bit resolution and 48 kHz sampling rate, using an AKG D 37005 microphone. All samples were edited using the Praat 6.0.3.6 (Boersma & Weenink, 2018) voice analysis program, which allows for acoustic analysis, articulatory synthesis, editing and manipulation of audio signals. Annex I shows the definition of the speech rate and rhythm parameters analyzed in this study.

Procedure

First, participants and their tutors, were informed about the study and asked for their consent if agreed. This was done following the protocols approved by the Bioethics Committees of the participating institutions.

Reading competency was assessed through the individual administration of TECLE (Cuadro et al., 2009).

The reading task was carried out under controlled conditions, it consisted of reading aloud and individually the text presented on a sheet of paper with Arial font, size 12 and double spacing, to facilitate reading.

Recordings were made by the same evaluator in a noise proof room, but not acoustically isolated, placing the microphone at 8 cm and an angle of approximately 45° from the mouth to avoid aerodynamic noise.

Data analysis

Based on the data obtained from Praat, the parameters relating to elocution speed and rhythm were analysed.

Speech rate assessment involves the detection of the syllable nucleus. The identification of syllables and pauses was performed automatically using the algorithm developed by De Jong & Wempe (2007, 2009) which analyzes intensity peaks preceded and followed by intensity drops of at least 2dB. This procedure has proven valid and reliable in fluency studies (Hilton et al., 2011) as it shows a high correlation in the results (between .88 and .90), using manual identification of the syllable nucleus by expert evaluators (De Jong & Wempe, 2009; De Looze et al., 2012). After the automatic identification of the syllable nucleus, each was verified using the broadband sonogram and spectrogram and corrected where needed. Pause identification was also carried out automatically and was defined as any segment without sound ≥ 300 ms. It has been proposed that the optimum pause is between 250 and 300ms (De Jong & Bosker, 2013). The Spanish phonological system contains a series of voiceless phonemes, such as /p t k t͡ʃ/. Their articulation involves an occlusion phase, that is acoustically absent of energy or silence. Given that this silence is intrinsic to those consonants, they should not be considered pauses.

Therefore, a minimum value of 300 ms was established as threshold for any silence to be considered as a pause in the automatic detection process in Praat. It is important to note that after the automatic detection, a personalized manual revision was performed to ensure the quality of this detection process.

The rhythm of speech was analyzed using variables related to rhythmic patterns (rhythmic metrics) of vowel and consonant intervals using the Sequential Variability Index (*Pairwise Variability Index*, PVI) (Low et al., 2000). PVI evaluates mean differences in duration between two successive segments or pairs, whether syllables, vowels or consonants. A script (Martínez-Sánchez et al., 2017) was used to automatically quantify the rhythmic metrics of the distance of the syllable intervals (d_1, d_2, d_3, etc.) considering: (1) dmean (mean duration), (2) standard deviation, (3) Varco S (coefficient of variation), (4) rPVI (Raw Index of Sequential Variability) and (5) nPVI (Standardized Index of Sequential Variability, used to control the impacts of speech rate variations on PVI). See table I for a description of the variables considered.

Table 1
Definition of parameters used

Measure	Description
Duration	Total duration of reading assignment (s.) (with pauses)
Number of pauses ≥300ms	no. of intersyllabic pauses with a duration of ≥300ms (n.)
Speech rate	No. of syllables / total reading time (syllables/s.)
Mean duration of the syllable	Speech time / no. of syllables (s.)
Mean duration of the syllable interval	Average duration of syllable intervals
ΔS	Standard deviation of the duration of syllable intervals
VarcoS	Coefficient of variation of syllable intervals duration
rPVI	Raw index of sequential variability of syllable intervals
nPVI	Normalized sequential variability index of syllable intervals

PVI is a variability index of the duration of intervals and, therefore, of the relative isochrony (periodicity) of rhythmic units. PVI and resulting indexes have been used to classify languages, as each language has its own rhythmic patterns. A more detailed PVI, the Standardized Index of Sequential Variability (nPVI), makes it possible to control the effect of variations in the speech rate, using the following formula (Figure 1):

$$nPVI = 100 \times \left[\sum_{k=1}^{m-1} \left| \frac{d_k - d_{k+1}}{(d_k + d_{k+1})/2} \right| / (m-1) \right]$$

Figure 1. Formula for the calculation of the Normalized Index of Sequential Variability of Syllable Intervals

In this formula, *m* represents the number of intervals and *d* their duration in *k* intervals. Each of these intervals can adopt values ranging from 0 (identical duration) to 2, (longest difference in duration). Under normal conditions, the distance between the syllable segments should be synchronous, resulting in the perception of speaking rhythmically. The values of the nPVI range from 0 (perfect isochrony) to 200. A high nPVI value shows, therefore, greater rhythmic variability.

Results

In order to explore the association between variables a Pearson correlation analysis was conducted. It showed significant correlations (all with a significance level < .001) between all variables in the study for both third and fourth grades (Table 2).

In third grade, the less time spent in oral reading task, the fewer the pauses (r^2 = -.95, p < .001), a higher speech rate (r^2 = .75, p < .001) and shorter duration of the syllable (r^2 = -.48, p < .001). Similarly, the greater the reading competency, the shorter the duration of syllable intervals (r^2 = -.56, p < .001), lower standard deviation (r^2 = -.60, p < .001) and coefficient of variation (r^2 = -.41, p < .001). Moreover, the indexes of sequential variability of syllable intervals are also lower: both the raw index rPVI (r^2 = -.59, p < .001) and the standardized nPVI (r^2 = -.44, p < .001). The same occurs in fourth grade, fewer pauses (r^2 = -.90, p < .001), higher speech rate (r^2 = .85, p < .001), shorter duration of syllable (r^2 =

-.72, $p < .001$). The greater the reading competency, the shorter average duration of the syllable intervals ($r^2 = -.68$, $p < .001$), lower standard deviation ($r^2 = -.61$, $p < .001$) and coefficient of variation ($r^2 = -.36$, $p < .001$). Similarly, the indexes of sequential variability of syllable intervals are also lower: raw index rPVI ($r^2 = -.59$, $p < .001$) and standardized nPVI ($r^2 = -.34$, $p < .001$).

The variance analysis considering grade (third, fourth) showed as expected an effect of grade, where children in the fourth grade performed better than those in the third grade in: TECLE test (F (1,111) = 15.42, $p < .001$, $\eta^2 = .12$), reading duration (F (1,111) = 8.13, $p < .01$, $\eta^2 = .06$), number of pauses (F (1,111) = 9.14, $p < .01$, $\eta^2 = .07$), speech rate (F (1,111) = 7.27, $p < .001$, $\eta^2 = .06$), mean duration of syllable (F (1,111) = 21.7, $p < .001$, $\eta^2 = .16$), mean duration of syllable intervals (F (1,111) = 24.94, $p < .001$, $\eta^2 = .12$), standard deviation of syllable intervals, ΔS (F (1,111) = 16.22, $p < .001$, $\eta^2 = .12$ and the rPVI raw index of sequential variability of syllable intervals (F(1,111)= 16.73, $p < .001$, $\eta^2 = .13$). No differences were found in the coefficient of variation of the syllable intervals (VarcoS), or in the Standardized Index of Sequential Variability of Syllable Intervals (nPVI).

To determine if significant differences between third and fourth grade on the prosodic variables at these levels of schooling were not dependent on reading competency (TECLE), the effect of these variables was controlled for by performing a covariance analysis (ANCOVA). In order to meet the ANCOVA assumptions the covariate, TECLE, which correlates with the variables that measure prosody ($p < .001$) was typified. The factor (grade) does not affect the covariate (TECLE) ($F = .0012$, $p = .091$) and the regression slopes are homogeneous where the interaction effect has an associated statistic ($F = .084$, $p = .77$) therefore meeting all the assumptions. Significant differences were found in the variables used to measure prosodic features between grades: speech rate (F= 16.01, $p < .001$), mean duration of a syllable ($F = 28.09$, $p < .001$), mean duration of syllable intervals (F(1,111) = 24.94, $p < .001$), standard deviation of syllable intervals ΔS ($F = 27.45$, $p < .001$), and in the indexes of sequential variability of syllable intervals: raw index rPVI (F= 26.73, $p < .001$) and standardized nPVI ($F = 4,62$, $p < .001$). No significant differences were found in the coefficient of variation of syllable intervals (VarcoS), ($F = 3.43$, $p = .067$).

Discussion

The aim of this study was to analyze the relationship between reading competency, measured in terms of speed and accuracy in lexical access, and the prosodic aspects in terms of speech rate and rhythm, in the oral reading of texts in Spanish in third and fourth grade children using an automated procedure of acoustic speech analysis. This analysis allows to quantify rhythm and obtain information regarding variability of syllabic intervals in reading. This is relevant for Spanish as it is a syllable-timed language where every word is stressed and where rhythm is marked by the syllable (Peppe et al., 2009).

Oral reading is considered a phonetic task which entails not only articulating adequately the segmental components of the text but also organizing them using acoustic resources in prosodic units of different extensions. Results show, in first place that Spanish speaking schoolchildren with better reading competency, measured in terms of accuracy and speed in the recognition of written words have more pronounced prosodic features in oral reading compared to those with poorer reading performance.

More competent readers make fewer pauses and show a more rhythmic oral reading both in third and fourth grade, shown by results obtained using the Pairwise Variability Index (PVI) and resulting indexes for syllable variability (nPVI), all of which are relative isochrony (periodicity) indexes of rhythmic units of speech.

Prosodic reading of expert readers is related to an adequate use of punctuation marks regarding use and duration of pauses (Alvarez-Cañizo et al., 2018; Benjamin et al., 2010). Moreover, higher speech rate and shorter syllable duration are indicators of an adequate speed and an utterance similar to that of spontaneous (unforced) speech and, at the same time indicate the strength of the automation process (Kuhn et al., 2010). Similar results have been found using spectrographic studies in Anglo-Saxon and Germanic languages (Kuhn et al., 2010) where expert readers show better

Table 2
Intercorrelations for eleven measurements of reading competency, overall oral reading time, rhythm, speech rate as a function of grade (third and fourth)

	1	2	3	4	5	6	7	8	9	10
1. TECLE	1	-.69**	-.70**	.71**	-.68**	-.68**	-.62**	-.36**	-.60**	-.34*
2. Duration	-.76**	1	.90**	-.86**	.72**	.80**	.79**	.50**	.79**	.55**
3. N° pauses	-.76**	.95**	1	-.86**	.74**	.77**	.75**	.48**	.75**	.52**
4. Sp. Rate	.75**	-.88**	-.86**	1	-.87**	-.84**	-.78**	-.46**	-.78**	-.49**
5. Dmean Syllable	-.48**	.57**	.55**	-.74**	1	.90**	.81**	.45**	.79**	.44**
6. Dmean Syllab Int.	-.57**	.65**	.61**	-.67**	.80**	1	.87**	.42**	.86**	.42**
7. ΔS	-.61**	.72**	.66**	-.65**	.71**	.85**	1	.81**	.98**	.77**
8. Varco_S	-.41**	.49**	.43**	-.36**	.29*	.28*	.74**	1	.78**	.92**
9. rPVI	-.59**	.75**	.70**	-.69**	.71**	.86**	.95**	.65**	1	.81**
10. nPVI	-.44**	.60**	.55**	-.46**	.29*	.30*	.64**	.81**	.72**	1

Note: TECLE= reading competency; Duration= duration of reading; N° pauses= number of pauses; Sp. rate = speech rate; D_{mean} Syllable= mean duration of the syllable; D_{mean}. Syllab Int. = mean duration of the syllable intervals; ΔS = standard deviation of syllable intervals; Varco S= syllable interval variation coefficient; rPVI = Raw index of sequential variability of syllable intervals; nPVI = Normalized sequential variability index of syllable intervals.
The intercorrelations for third grade students (n=53) are presented above the diagonal, while the intercorrelation for fourth grade students (n=62) are presented below the diagonal. All coefficients are significant.
** Correlations are significant at the .01 level (bilateral)

performance in prosodic features such as pauses, intonation and speed than beginning readers. Novice readers have longer reading times with many long and imprecise pauses (Miller & Schwanenflugel, 2008); characteristics also identified in dyslexics (Suárez-Coalla et al., 2016).

As students are more accurate and quicker in word recognition, they make shorter pauses and their intonation is more similar to that of adult readers (Schwanenflugel et al., 2004); which is congruent with previous studies that suggest a possible causal relationship between prosodic reading and reading skills (Miller & Schwanenflugel, 2008). Or more precisely, accurate and fast reading seem to free resources which in turn enables prosodic reading (Alvarez-Cañizo et al., 2018; Calet et al., 2013).

In addition, when analyzing the oral reading of a text based on the duration of the syllable intervals, the variation coefficient (VarcoS) and the sequential variability of the syllable intervals (nPVI), an improvement was observed from the third to the fourth grade in speed and rhythmic expressivity. This is consistent with an improvement in the reading competency test (TECLE), and therefore in the accuracy and speed in the recognition of written words. The percentage by which pauses are reduced between third and fourth grade participants would indicate that when schooling progresses, as there is greater automation, there is possibly a greater resource availability for the use of pauses linked to punctuation marks.

Similar results were found by Alvarez-Cañizo et al. (2018), comparing children of the third and fifth grade with a sample of adults, in that the expressivity of reading is closely linked to reading experience. Similarly, Calet et al. (2013) based on a study of 174 Spanish children in the second and fourth grades of primary school, found that automatic reading is relevant in both grades as a predictor of reading comprehension, but is more significant in the second grade, while prosodic aspects such as intonation is the highest predictor in fourth grade. Rasinsky, Blachowicz and Lems (2006) analyzed the correlation between reading comprehension and fluency in third, fifth and seventh grade students of primary education, looking at prosodic reading; the results indicate that fluency or prosody is a significant variable in higher levels.

Students as the reading experience increases show variation in the prosody through a differentiated use of appropriate pauses and rhythmic patterns. In this study we assumed that fluent reading entails accuracy, speed and prosody as its basic components (Alvarez-Cañizo et al., 2018; Calet, 2013; Hudson et al., 2009; Kuhn et al., 2010). The results analyzed regarding rhythm and speech rate of oral reading of a text, controlling for reading competence (TECLE), suggest that at these levels of schooling, the differences analyzed in prosody are partially independent from automation in written word recognition. In line with Cowie et al (2002) and Marciarille-Levaseru et al (2004), when certain levels of accuracy and speed have been reached, prosody becomes less dependent on automation. This is consistent with the idea that automaticity in recognition of written words would be a prerequisite for expressive reading (Cowie et al., 2002) but not sufficient.

This is particularly relevant regarding the importance of considering the adequate use of pauses, that constitute the suprasegmental features of prosody in reading when a certain level of automation in recognition of written words has been achieved.

In this study spontaneous speech measurements were not taken to assess speech rhythm and oral reading rhythm. These types of measurements could provide additional information about the relationship between rhythm and reading competency. Notwithstanding, the differences found between oral reading and spontaneous speech prosody (Khun et al., 2010) make it necessary to study both phenomena independently.

The results obtained are interesting not only not only because in Spanish-speaking countries there is little work on prosody using automated acoustic analysis procedures (Calet et al., 2017; De Mier, 2017) but also for theoretical and practical reasons. The contribution of prosodic aspects to reading and particularly to reading comprehension (Calet et al., 2013; Hudson et al., 2009; Kocaarslan, 2019; Miller & Schwanenflugel, 2008), render a failure in the acquisition of prosodic skills a considerable obstacle when learning how to read. Regarding practical implications, intensifying the teaching of suprasegmental features such as pauses or segmentation by means of oral reading becomes relevant to achieve efficient readers, which is not always considered in teaching practices (Baker, 2011; Borg, 2006). Moreover, it could have specific consequences for reading intervention in children with dyslexia. Considering children with dyslexia tend to stop their improvement in reading speed at a certain point (Shany & Share, 2010), intervening on the prosodic features of reading may allow them to improve reading fluency and therefore, reading comprehension.

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