Original

Effects of suprasegmental awareness on learning to read in the first school years☆

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ABSTRACT

One of the most relevant contributions of research in recent years on learning to read has been the knowledge of the importance of phonological awareness in the literacy process. Recently it has been observed that other skills such as suprasegmental phonology may also be a relevant factor in reading learning. However, most of the studies carried out in this sense have been done in languages with rhythmic structures different from Spanish, which does not allow us to know the impact that prosodic skills have on our language. The present study is carried out with the purpose of studying the effects that suprasegmental awareness has on the acquisition of reading at the beginning of compulsory schooling in alphabetic systems. A quasi-experimental design of comparison between groups with pre-test and post-test measures is used. In the study, 438 students between 7 and 8 years of age participate. The results point out that suprasegmental phonology constitutes a relevant factor in the learning of reading, which is why its integration in classroom practices is suggested.

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Efectos de la conciencia suprasegmental en el aprendizaje de la lectura en los primeros cursos escolares

RESUMEN

Uno de los aportes más relevantes de la investigación en los últimos años sobre el aprendizaje de la lectura ha sido el conocimiento de la importancia que tiene la conciencia fonológica en el proceso de alfabetización. Recientemente se ha observado que otras habilidades como es el caso de la fonología suprasegmental puede ser también un factor relevante en el aprendizaje lector. Sin embargo, la mayoría de los estudios realizados en este sentido se han efectuado en lenguas con estructuras rítmicas distintas al español, lo que no permite conocer el impacto que las habilidades prosódicas tienen en nuestra lengua. Con el propósito de estudiar los efectos que la conciencia suprasegmental tiene en la adquisición de la lectura al inicio de la escolaridad obligatoria en sistemas alfabéticos se efectúa el presente trabajo. Se emplea un diseño cuasi- experimental de comparación entre grupos con medidas pretest y postest. En el estudio participan 438 estudiantes con edades comprendidas entre los 7 y los 8 años. Los resultados señalan que la fonología suprasegmental constituye un factor relevante en el aprendizaje de la lectura por lo que se sugiere su integración en las prácticas del aula.

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Introduction

The importance that speech processing skills have in the process of reading acquisition has been demonstrated in studies carried out in recent decades, and it is one of the fundamental references for the treatment of reading difficulties (Bar-Kochva & Nevo, 2019; Gutiérrez-Fresneda et al., 2020). Most of the research that

has analysed reading learning has focused on segmental phonology (González et al., 2017; Gutiérrez, 2016; Vibulpatanavong & Evans, 2019). However, it has been observed that the mastery of other skills should also be taken into consideration in learning to read, such as suprasegmental awareness, because it has been proven that students with reading difficulties also have limitations in the mastery of suprasegmental phonology (Jordán et al., 2019; Patscheke et al., 2016; Politimou et al., 2019). The concept of suprasegmental phonology or prosody refers to the acoustic patterns that occur in the relationship between the phonemes that make up words and which generate different prosodic features such as accent, intonation and rhythm of speech (Llisterri et al., 2016).

Prosodic awareness may be related to phonological awareness since the perception of phonemes is easier in stressed syllables (Cai et al., 2017; Wood & Terrell, 1998), hence the importance that lexical accent may have in oral language and in the reading of words, since there is always one syllable that stands out from the others (which facilitates its recognition), which is the one that receives the accent, so there could be a direct relationship between syllabic awareness and the assignment of the accent (Calet et al., 2016).

Spanish is considered a transparent orthographic code given its correspondence between the spelling and the sounds that represent it. However, it has a particular characteristic that is not found in other languages, such as the use of the accent mark that orthographically marks the stressed vowel of some words, which allows us to distinguish the meaning from those that are only differentiated by the pattern of accentuation (e.g. público, publicó). Studies carried out in alphabetical systems such as ours show that the accent mark influences the process of accessing the lexicon from very early stages (Gutiérrez, 2003; Jordán et al., 2019).

A pioneering work examining the relationship between prosodic awareness and reading skills is that of Wood and Terrell (1998). These authors investigate the relationship between accent awareness at the metric level and word recognition in students with reading problems. They employ a task consisting of listening to a sentence that is read by the adult along with two other sentences, one of which has the same sequence of tonic and atonic syllables as the first sentence read. The participant must choose the sentence that has the same pattern of intensity and intonation as the first one. Readers with difficulties are found to perform significantly lower than control students of the same age, concluding that prosodic awareness is associated with reading skills.

In a study with Spanish schoolchildren in the first levels of education Defior et al. (2006) prove that the complexities of the Spanish alphabet code are relatively easy to acquire, unlike words with an accent mark. The results show that from very early on there is a ceiling effect when reading words that present some phonological complexity such as those containing contextual graphemes.

In work with students of different languages (Cai et al., 2017; Xie & Myers, 2017) it is also observed that suprasegmental skills are related to segmental phonology since sensitivity to the rhythms of speech helps to identify the relevant parts of words, which in turn facilitates access to learning to read. Veenendaal et al. (2015) argue that prosody is related to the decoding process since a melody is generated during reading that favours awareness of the rhythm of speech and perception of the limits of words. Hence the importance that suprasegmentary phonology can have in the first phases of learning to read given the links with the decoding of words.

Relationships have also been found between suprasegmental skills and reading in expressivity, intonation and rhythm (Benjamin & Schwanenflugel, 2010) revealing that readers with greater mastery of prosodic skills such as accent and pause achieve better results in reading comprehension (Gutiérrez, 2018; Miller & Schwanenflugel, 2008; Whalley & Hansen, 2006). Along these lines, Calet et al. (2016) state that two levels of suprasegmental skills can be distinguished: those in charge of identifying the accent and

manipulating the accented syllables in words, at a lexical level; and those focused on perceiving intonation, rhythm and pauses during reading, at a metric level.

Studies to date have shown that prosodic skills are related to learning to read, but the vast majority of the studies have been conducted in English, a language in which prosodic skills differ in the segmentation of the speech chain from Spanish (Alexander & Nygaard, 2019; Bar-Kochva & Nevo, 2019; Cai et al., 2017). Our language marked by syllabic rhythm requires a differentiated study, however, there is little research carried out with representative samples that allow us to recognise the influence that suprasegmental skills have on the initial learning of reading in Spanish. With this objective, the present study is proposed, which aims to analyse the effects that suprasegmental phonology presents in the first stages of the reading process in alphabetic systems. For this purpose, the degree of reading acquisition is compared in two samples of schoolchildren between 7 and 8 years of age, one receives intervention in the process of learning to read through instruction in suprasegmental skills and the other follows the usual programme of teaching to read. The hypothesis is that students belonging to the group receiving instruction in suprasegmental awareness will perform better in learning to read.

Method

Participants

The study involves 438 students aged between 7 and 8 (M = 7.48, SD = 0.56), of whom 48.6% are boys and 51.4% girls, who belong to four public and state-subsidised schools, of which two schools are assigned to the experimental group (220 students) and the other two to the control group (218 students), with one state-subsidised school and one public school in the experimental group, the same distribution as in the control group. The allocation of schools to the different treatment levels was done randomly before evaluating the student body. In each study group, Spanish-speaking subjects were chosen who did not present physical, psychological or sensory alterations. The participants have acquired a degree of mastery of the processes of grapheme-phoneme correspondence that allows them to decode both frequent and unknown words through the use of the two lexical access routes, although accuracy was not always carried out properly. A wide diversity of reading types was observed; syllabic, hesitant and even more expressive. Of the 220 experimental participants, 45.7% were male and 54.3% female, while 218 participants in the control group 46.2% were male and 53.8% were female. The contingency analysis (Pearson's chi-square) between condition and sex did not show statistically significant differences (χ^2 = 0.74, p > .05). All of them share the characteristic of being located in a medium level socio-cultural context.

Instruments

In order to evaluate the dependent variables under study, six evaluation instruments are used with psychometric guarantees of reliability and validity.

Test for the Evaluation of Phonological Awareness (*PECO*) (Ramos & Cuadrado, 2006). This test assesses phonological knowledge at syllabic and phonemic level through three types of tasks: identification, addition and omission in which the position of the syllable or phoneme in the word is considered (beginning, middle or end). This test includes three subtests with syllables and phonemes (identification, addition and omission activities), with a total of 30 items (15 of syllables and 15 of phonemes). The maximum score that can be obtained is 30, one point for each correct answer. The reliability, measured through Cronbach's alpha coefficient, is

.80. The results were indicated through the composite reliability index (CR = .78), the average variance extracted (AVE = 63.48%), the McDonald's *omega* coefficient (Ω = .87), with appropriate goodness-of-fit indexes, $\chi^2 = 1248.52$, $df = 187$, RMSEA = .038, SRMR = .041, CFI = .93 and TLI = .95, indicating that the test is reliable.

Accent Awareness. A specific test is used to evaluate the degree of prosodic sensitivity similar to that designed by Calet et al. (2016) consisting of two parts, one of words and the other of pseudo-words. With respect to the words, 40 stimuli are included, 20 words with an accent mark and another 20 without an accent mark, taking into account that they have the same accentuation and syllabic structure, all of them bisyllabic and trisyllabic and considering that they do not exist in Spanish with another pattern of accentuation (example: balón - papel). The pseudo-word task is also composed of 40 stimuli equivalent to the words with respect to the number of syllables, accentuation and syllabic structure (example: dilás - minel). The maximum score was 40, with one point being awarded for each correct answer. The reliability of the test is satisfactory, for the words it is .91 and for pseudo-words .93. The results show that the reliability is high (CR = .89), the average variance extracted is greater than .50 (AVE = 57.46%), McDonald's *omega* coefficient (Ω = .86), with optimal variant adjustment indices, $\chi^2 = 2546.86$, $df = 254$, RMSEA = .043, SRMR = .046, CFI = .95 and TLI = .96, which shows the reliability of the test.

Non-linguistic rhythm. The Stamback (1984) scale of rhythmic structures is used. It is a task that consists of repeating the sounds by clapping according to the pattern previously heard which is presented to them using a computer. The sounds include both rhythms with short intervals of time (followed by ●●) and with spacing between them (● ●). This task consists of 21 items, with two points are awarded if the answer is correct on the first attempt and one point if the answer given is correct on the second attempt. The maximum score is 42. Cronbach's alpha statistic for this task is .93. A confirmatory factorial analysis is performed through the composite reliability index (CR = .92), the average variance extracted (AVE = 56.61%), the McDonald's *omega* coefficient (Ω = .87), with satisfactory goodness-of-fit indices, $\chi^2 = 2137.64$, $df = 156$, RMSEA = .042, SRMR = .044, CFI = .91 and TLI = .93, which shows that the test is reliable.

Reading words. To measure the mastery of reading words, a list of 100 high-frequency words is designed according to Martínez and García (2004) with the aim of reading aloud as many of them as possible during a minute. The score for this task is established by the number of words read properly during the 60 seconds. Cronbach's alpha statistic is .86. The results show through the composite reliability index (CR = .87), the average variance extracted (AVE = 58.42%), the McDonald's *omega* coefficient (Ω = .84), with good indexes of goodness of fit, $\chi^2 = 1458.41$, $df = 273$, RMSEA = .040, SRMR = .042, CFI = .92 and TLI = .94, indicating that the test is reliable.

Sentence comprehension. A test is designed consisting of eleven sentences in which the arrangement of the punctuation marks alters their meaning (for example. Eso sólo Manuel lo hace; Eso, Manuel sólo lo hace). The student must read each sentence and then explain what is indicated in each case. A point is awarded for each correctly understood sentence. Present a Cronbach's alpha statistic of .83. The results show through the composite reliability index (CR = .84), the average variance extracted (AVE = 53.76%), the McDonald's *omega* coefficient (Ω = .88), with satisfactory goodness-of-fit indices, $\chi^2 = 1623.29$, $df = 291$, RMSEA = .039, SRMR = .043, CFI = .91 and TLI = .93, indicating that the test is reliable.

Reading comprehension. A task is designed based on the text comprehension test of the PROLEC-R test (Cuetos et al., 2007) with the difference that text punctuation intervenes in comprehension. The student must read a text composed of six sentences with the characteristic that punctuation marks intervene signif-

icantly in comprehension (for example: no, iré al cine; no iré al cine) and then answer six questions relating to the text. Two points are awarded for each correct answer. The Cronbach alpha statistic is .89. The results are indicated by the composite reliability index (CR = .83), the average variance extracted (AVE = 56.27%), the McDonald's *omega* coefficient (Ω = .83), with appropriate goodness-of-fit indices, $\chi^2 = 1846.37$, $df = 236$, RMSEA = .043, SRMR = .046, CFI = .92 and TLI = .95, indicating that the test is reliable.

Intervention programme

The programme for learning to read is composed of 40 sessions of 45 min duration which is implemented by the tutors who have been previously instructed. Its objective is to explicitly develop phonological awareness, decoding processes through dynamics of denomination speed, reading comprehension of syntactic and textual structures together with the development of prosodic skills, through both individual and group activities.

The session begins with proposals aimed at raising awareness of oral language by focusing on segmental phonology through lexical segmentation tasks, syllabic awareness and phonemic awareness through activities aimed at identifying, comparing, classifying, omitting and adding sound units of oral language by attending to the different intensity of the acoustic signals of the syllables in words, phrases and sentences.

The decoding processes are exercised by means of words and pseudo-words through the following sequence; silent reading on an individual level, reading aloud in pairs and overall reading of all students through the visualisation of the words on the digital board. The time intervals are reduced as the intervention programme progresses. In some words and pseudo-words the accent mark is present, which conditions the intonation of the word. In the first five sessions the lexical units are monosyllables and bisyllables and from the sixth session onwards trisyllabic and polysyllabic words are included. The syllabic structure is initially CV, VC and CVC and from the tenth session words with CCV structure are incorporated at the beginning, middle and end of the word.

Syntactic understanding is worked on by means of different types of sentences (interrogative, exclamatory, imperative and enunciative) in which intonation, rhythm and respect for punctuation marks are relevant to the proper understanding of the information (Ṁiguel está enfermo; "¿Miguel está enfermo?; Ṅo, puedo seguir; Ṅo puedo seguir). First, ten sentences are read individually then the task is repeated under the guidance of the teacher who marks the intonation and pauses of the sentences according to their type and the punctuation marks. Afterwards, the meaning is shared, encouraging reflection and highlighting the importance of respecting the punctuation marks during the reading.

Text comprehension is exercised by presenting pairs of texts in which the meaning of the sentences changes according to the types of sentences and the location of the punctuation marks. Both texts are read and then a series of questions are answered. This is done first individually, then in pairs they must elaborate two questions from each of the texts, and then in a small group they create a small summary of each type of text. Finally, each group puts together the summaries produced and reflects together on the differences between the texts, the importance of reading the text in a prosodic way and the relevance that punctuation marks have in written language. The final step is to read aloud the two texts together, guided by the teacher, paying attention to rhythm, expressiveness and intonation.

This type of activity was combined with three weekly dynamics aimed at explicitly exercising prosody through the techniques of: assisted repeated reading, choral reading, reading while listening, television programmes and reader's theatre.

In the technique of assisted repeated reading, the student reads a fragment of a text repeatedly with the help of the teacher who offers him/her indications to model his/her expressiveness in reading. This dynamic is complemented by other modalities of reading such as choral reading, characterized by the simultaneous reading of the teacher and the student. This type of reading aloud is carried out both individually and in small and large groups. Changes were also introduced in the way of reading, varying the speed and tone and the expressiveness of the reading, sometimes faster with a loud voice, and sometimes slower with a lower tone. In the dynamic of reading while listening, fragments of audio stories were presented orally, which were later read collectively together with a new listening, paying attention to the prosody of the reading. In the technique of the television programmes, dialogues of famous people are shown through subtitles on the digital board, which are exercised in pairs and small groups until fluid reading is achieved, at which point they are staged in class. Through the dynamics of reader's theatre, the script of a story was read repeatedly and then performed in front of the class. The reading was done with the text in front of, paying attention to the accuracy, fluency, intonation, pauses and volume of the reading. At the same time, with the expressiveness, the transmission of emotions and attitudes of the characters was sought.

The participants in the control group read the same texts as the experimental students, exercising phonological awareness, decoding processes, speed of naming and syntactic and textual understanding. They read aloud in a large group so that each student read a paragraph, no feedback was given, and no emphasis was placed on any aspect, it was only corrected when a student made a mistake in evoking a word. This type of collective reading was combined with other individual and small group reading practices through the application of the unassisted repeated reading technique, characterised by re-reading fragments of a text repeatedly, the teacher's intervention being focused on aspects of accuracy and speed.

Procedure

Once the permissions of the educational centres to carry out the research have been granted and the parental authorisations have been obtained, the evaluation instruments are applied during school hours by previously trained researchers and the students are informed that their participation is voluntary and anonymous. This work follows the ethical values demanded in research with human beings, respecting the fundamental principles of the Declaration of Helsinki, the European Convention for the Protection of Human Rights and the UNESCO Universal Declaration of Human Rights.

Data analysis

The relevant tests of normality and homoscedasticity are carried out to ensure the homogeneity of the variance. The indices of asymmetry and kurtosis are calculated being, in general, close to zero and < 2, as recommended by Bollen and Long (1993), which indicates similarity with the normal curve and allows the use of parametric techniques. To determine the effect of the programme, descriptive analyses (mean and standard deviation) and variance analyses (ANOVA) are carried out with each of the scores obtained for the instruments used during the previous phase. Then, once the homogeneity of the two groups has been confirmed a priori, and to determine whether the change is significantly different in the participants of the experimental group compared to the participants of the control group, a multivariate analysis of covariance (MANCOVA) is carried out on the variables of the study. Finally, descriptive analyses and covariance analyses are performed on the post-test scores in order to analyse the impact of the programme

on each of the variables. To measure the reliability of the indicators, Cronbach's alpha statistic has been used, as well as the average variance extracted (AVE), the composite reliability (CR) and McDonald's omega (Ω). In addition, the χ^2 statistic is used along with the degrees of freedom and the following goodness-of-fit indices, approximation mean square error (RMSEA); comparative fit index (CFI); Tucker-Lewis index, (TLI) and standardised mean square residue (SRMR). SRMR index less than 0.05 indicates a good fit, and one between 0.05 and 0.08 is considered acceptable. On the other hand, an RMSEA less than 0.08 indicates an adequate fit (Bollen & Long, 1993). CFI (Bentler, 1990) and TLI (Tucker & Lewis, 1973) values greater than 0.90 are interpreted as an optimal adjustment. Similarly, the effect size (d de Cohen) is calculated (small < 0.50; moderate 0.50–0.79; large $\geq$ 0.80). These analyses are carried out with the SPSS 20.0 program.

Results

The results of the MANOVA pretest for the set of variables show that before the intervention there are no significant differences between experimental and control, $F(1, 74) = 1.43$, $p > .05$. However, the MANCOVA results of the post-test differences, using the pretest scores as covariates are significant $F(1, 74) = 2.48$, $p < .05$. These results indicate that the intervention programme has a positive effect. In order to analyze the change in each variable, descriptive and variance analyses are carried out, which are presented in Table 1.

Changes in segmental phonology

The changes in the scores obtained in the PECO test are analysed. The MANOVA pretest does not show significant differences between experimental and control, $F(1, 74) = 2.53$, $p > .05$, however, the results of the MANCOVA post-test, $F(1, 74) = 1.82$, $p < .05$, confirm significant differences between both conditions. In the *syllabic consciousness* variable, higher increases are obtained in the experimental ones ($M = 0.77$, $SD = 0.53$) compared to those obtained by the control group ($M = 0.30$, $SD = 0.45$), the ANCOVA post-test highlights statistically significant differences between conditions, $F(1, 74) = 7.59$, $p < .01$ being the effect size small ($d = 0.48$). In the analysis of *phonemic awareness* a larger increase is observed in the experimental ($M = 1.21$) than in the control group ($M = 0.64$), and the post-test ANCOVA highlights statistically significant differences between conditions, $F(1, 74) = 9.73$, $p < .001$. The effect size is moderate ($d = 0.73$). This indicates an improvement in the capacity to become aware of the minimum units of words attributable to the intervention programme.

Changes in suprasegmental skills

Changes in scores obtained in the accent awareness and non-language rhythm tests are analysed. The MANOVA pre-test does not show significant differences between experimental and control groups, $F(1, 74) = 3.41$, $p > .05$, however, the results of the MANCOVA post-test, $F(1, 74) = 2.56$, $p < .05$, confirm significant differences between both conditions. In the analysis of each variable it ratifies differences in the *awareness of the accent in words*, in which an improvement is observed in the students of the experimental group ($M = 0.94$) to a greater extent than in those of the control group ($M = 0.27$), and the ANCOVA post-test highlights statistically significant differences between conditions, $F(1, 74) = 7.35$, $p < .001$. The effect size is large ($d = 0.83$). In the *pseudo-word accent awareness* variable, similarly higher increases are achieved in the experiments ($M = 0.87$, $SD = 0.36$) compared to those obtained by the control group ($M = 0.21$, $SD = 0.43$), with the post-test differences being significant, $F(1, 74) = 6.78$, $p < .001$, and the effect size large

Table 1
Means and standard deviations in segmental phonology, suprasegmental skills, decoding process and reading at syntactic and textual level and results of the analysis of variance and covariance for the experimental and control group

| | Experimental Group (n=220) | | | | | | Control Group (n=218) | | | | | | Experimental - Control (n=438) | | | | |
| | Pre | | Post | | Post-Pre | | Pre | | Post | | Post-Pre | | Anova Pretest | | Anova Postest-Pretest | Ancova Postest-Pretest | |
Variables	M	SD	M	SD	M	SD	M	SD	M	SD	M	SD	F (1, 74)	d	F (1, 74)	F (1, 74)	d
Segmental Phonology																	
C. Syllabic	2.75	.46	3.52	.51	.77	.53	2.78	.65	3.08	.34	0.30	.45	3.58	0.37	6.48**	7.59**	0.48
C. Phonemic	2.54	.37	3.74	.42	1.21	.62	2.52	.71	3.16	.57	0.64	.53	5.72	0.54	7.83***	9.73***	0.73
H. Suprasegmental																	
A. Awareness in words	2.83	.53	3.77	.63	.94	.65	2.85	.34	3.12	.36	0.27	.38	2.83	0.81	6.42***	7.35***	0.83
A. A. in pseudo words	2.64	.42	3.51	.43	.87	.36	2.63	.51	2.84	.48	0.21	.43	4.36	0.84	9.28***	10.78***	0.86
Non-linguistic pace	2.72	.39	3.58	.43	.86	.47	0.75	.42	3.31	.34	0.44	.37	3.37	0.34	3.24***	4.73***	0.23
Decoder process																	
Reading words	2.26	.37	3.12	.37	.86	.37	2.23	.41	2.64	.41	0.41	.26	6.48	0.52	8.59**	9.54**	0.57
Reading processes																	
Prayer reading	2.15	.34	3.56	.52	1.41	.41	2.18	.52	2.67	.26	0.49	.52	14.32	0.83	17.46***	25.65***	0.86
Reading texts	2.08	.51	3.38	.41	1.20	.62	2.21	.24	2.65	.52	0.44	.38	11.52	0.67	12.73***	14.37***	0.73

*p < .05 **p < .01 ***p < .001.

(d = 0.86). In the *non-linguistic rhythm* variable, higher increases are also observed in the experimental ones (M = 0.86, SD = 0.47) compared to those of the control group (M = 0.44, SD = 0.37), being the size of the effect small (d = 0.23). This indicates an improvement in suprasegmental phonology skills attributable to the intervention programme.

Changes in the decoding process

Changes in word reading test scores are studied. The MANOVA pretest does not show significant differences between experimental and control groups, $F(1, 74)$ = 2.63, p > .05, however, the results of the MANCOVA post-test, $F(1, 74)$ = 1.37, p < .05, confirm significant differences between both conditions. In the analysis of the *word reading* variable, significant differences in favour of students in the experimental group (M = 0.86) are observed to a greater extent than in the control group (M = 0.41), and the ANCOVA post-test highlights statistically significant differences between conditions, $F(1, 74)$ = 9.54, p < .01. The effect size is moderate (d = 0.57), an improvement that is attributed to the implementation of the intervention programme.

Changes in reading processes at the syntactic and textual level

The MANOVA pre-test for the test variables shows that there are no significant differences in the pre-test phase between experimental and control groups, $F(1, 74)$ = 2.38, p > .05. However, significant differences are found in the post-test MANOVA, $F(1, 74)$ = 2.57, p < .01, as well as in the post-test MANCOVA, $F(1, 74)$ = 2.46, p < .01. As it can be seen in Table 1, in the *sentence reading* variable the experimental group obtains an improvement (M = 1.41), higher than the one obtained by the control group (M = 0.49). The results of the pre-test ANOVA show that in this phase there are no significant differences between experimental and control group, $F(1, 74)$ = 14.32, p > .05. However, the ANCOVA data of the post-test differences indicate significant results, $F(1, 74)$ = 25.65, p < .001. The size of the large effect (d = 0.86). The results of the pre-test ANOVA in the *reading of small texts* do not show differences between experimental and control, $F(1, 74)$ = 11.52, p > .05, however, the results of the post-test differences ANOVA, $F(1, 74)$ = 12.73, p < .05, and the post-test ANCOVA, $F(1, 74)$ = 14.37, p < .001, are significant. The effect size is moderate (d = 0.73). As can be seen, there is a greater increase in the experimental groups (M = 1.20) compared to the control groups (M = 0.44). These data indicate an improvement in the learning of reading attributable to the intervention programme.

Discussion

The aim of this study is to analyse the effect that the intervention of a programme focused on the development of suprasegmental skills has on the learning of reading in an alphabetical system such as Spanish, using measures of the different levels of prosodic and reading skills. The data collected reflect that training in these skills significantly improves the reading process at the beginning of compulsory schooling.

Analysing the results obtained, it is clear that the experimental group has substantially improved with respect to its counterparts in the ability to handle the minimum units that make up spoken language, which confirms the importance of segmental phonology in the initial phases of learning to read, which coincides with the contributions of previous studies (Gutiérrez-Fresneda, 2019; Míguez, 2018).

Beyond the relevance of phonological awareness in learning to read, which has been shown to be a relevant factor in the literacy process, this study shows the importance of the different prosodic skills once reading has been acquired. As can be seen through the data collected, the suprasegmental skill that is most strongly related to the reading of words is the awareness of accent, both in words and in pseudo-words, which is shown through the large size of the effect. This pattern of results confirms the prediction that the assignment of accent intervenes in the access to the reading system, which can be determined by the syllabic rhythm of our language, hence the suggestion to consider the syllabic component as a relevant aspect in the teaching of reading. In this sense, it would be interesting to pay attention in the didactic dynamics to the syllabic structure of the words, as well as to the lexical accent both in the development of the facilitating skills of reading, as is the case of segmental phonology, and in the exercise of prosodic skills. These postulates are in line with the assertions of other authors who highlight syllabic structure as one of the most influential variables in the initial phases of learning to read (Gutiérrez-Fresneda et al., 2020; Xie & Myers, 2017) together with the assignment of the accent of words in Spanish.

These contributions are in the same line of the model proposed by Wood et al. (2009) who point out the existence of a direct path from suprasegmental skills to reading skills, which is deduced due to the existing link between reading learning and accent awareness, so that the sensitivity to capture the pattern of accentuation of a stimulus would facilitate the recognition of words. This fact shows that suprasegmental skills are of great importance in the decoding process, thus confirming the importance that prosody can have in teaching the reading process in transparent languages such as Spanish. It is interesting to note that suprasegmental skills could play a facilitating role in the reading of words in Spanish, just as they do in English (Alexander & Nygaard, 2019; Cai et al., 2017; Whalley & Hansen, 2006). This situation would indicate that, as with phonological awareness, suprasegmental phonology could be a universally relevant factor in the process of reading acquisition, regardless of the linguistic rhythm of each language (syllabic rhythm of Spanish and accent rhythm of English).

Similarly, non-linguistic rhythm constitutes an influential factor in the acquisition of reading, a fact which could be in line with the contributions that musical learning presents in segmental phonology in the first school years (Patscheke et al., 2016; Politimou et al., 2019), which can be explained by the impact that the development of non-linguistic rhythm has on access to learning to read by favouring the segmentation of words in the flow of speech (González-Trujillo et al., 2014).

Efficiency in decoding is also favoured by the development of prosodic skills, which can be explained by the fact that once the grapheme-phoneme correspondence rules are automated, decoding becomes more efficient and cognitive resources are released that can be used for prosodic processing, hence the importance of encouraging decoding processes together with expressive reading practices in the early school years. These contributions coincide with the statements of other authors (Goswami et al., 2002; Kitzen, 2001) in pointing out that decoding is influenced by suprasegmental phonology, as well as sensitivity to the rhythm of speech. In fact, Miller and Schwanenflugel (2008) test the relationship between changes in intonation with comprehension skills and the use of pauses with decoding ability.

In the case of sentence comprehension it is observed that the mastery of suprasegmental skills is also a relevant factor since students with higher prosodic performance have better syntactic understanding which may be conditioned by the fact that most Spanish words are polysyllabic and an accent must be given when reading (Gutiérrez-Palma & Palma-Reyes, 2007; Gutiérrez-Palma et al., 2009). This fact reflects the importance of prosody in the realization of an adequate appropriation of the sentence in groups of words with meaning because in order to read with intonation, the syntactic roles must be assigned to the words in the sentence (Calet et al., 2016; Chafe, 1988; Kintsch, 1998).

In this sense, it can be deduced that prosodic reading practices make it easier for beginners to improve the processes of access to written language and to achieve the spelling skills that favour direct access to the representation of words. The mastery of suprasegmental skills can contribute to a better understanding due to the lesser sensitivity to semantic and grammatical conditioning factors of sentence cohesion. This situation in turn can have an impact on textual understanding since according to the theory of automaticity (LaBerge & Samuels, 1974), the more automated the reading processes at lower levels are, the more cognitive resources can be devoted to processing the representation of the information being read, which favours reading fluency (Jordán et al., 2019). This situation can be supported by the fact that suprasegmental skills help to identify the prosodic pattern of words, as well as by the lower number of pauses made, which would facilitate understanding at a syntactic and textual level.

In short, this study shows the importance that suprasegmental awareness has in the development of reading in the first school levels. It has been proven that prosodic skills are a relevant factor in that they favour automaticity in decoding, intervene in the facilitation of reading fluency and contribute to reading comprehension at an oral and textual level. On a practical level, the incorporation of prosodic skills in the teaching programmes is suggested, as they contribute to the acquisition of reading. A limitation of this study, and one that would be interesting to pay attention to, is that there is no follow-up to evaluate if the results are maintained in time, so in future studies it would be interesting to check if the effects of the interventions made show continuity at higher levels or if on the contrary, they lack continuity and fade away.

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