



Lexical stress awareness and orthographic stress in Spanish



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ABSTRACT

This work aims to study whether prosody is related to reading acquisition. In particular, the study focuses on lexical stress, and on the awareness of lexical stress measured by the ability to detect the loudest syllable in a pseudoword. The hypothesis is that stress awareness may play a role in the acquisition of word reading in Spanish. A cross-sectional study was carried out with 233 children from 3rd to 6th grades. Cognitive and phonemic awareness skills were tested. A lexical stress awareness task and a reading aloud task were also used. Results highlight the relevance of prosodic knowledge in learning how to read the Spanish written words. In all grades, lexical stress awareness appears to be related to stress reading errors. On the contrary, phonemic awareness is not related to stress errors, except in 4th grade. These data are discussed considering that, apart from phonological awareness, prosodic (lexical stress) awareness would also be relevant in reading acquisition.

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1. Introduction

Most models of reading acquisition consider that word reading entails using different kind of information, mainly of grammatical, semantic, orthographic, and phonological nature. However, in alphabetic systems, phonological processing plays a particularly important role especially in early stages of reading and writing acquisition (Caravolas et al., 2012; Defior, Martos, & Cary, 2002; Share, 2004). Most studies on the influence of phonological awareness on reading acquisition have focused on the importance of phonemes or other sublexical units such as syllables or intrasyllabic units. In contrast, other aspects of phonology necessary to correctly talk, write, and read, as stress or intonation have received much less attention. The present study focuses on these other aspects of phonology, namely prosody, and on its relationship with reading acquisition in Spanish. In the light of previous research on the role of phonological awareness (henceforth PA), this study argues that awareness of prosodic aspects of language may also be a relevant factor for reading acquisition.

1.1. Defining prosody

There is not a single definition of prosody. Some proposals refer to prosody as an abstract organization of speech, while others emphasize the phonetic realization of suprasegmental features (Cutler, Dahan, & Donselaar, 1997). According to the first approach, prosody can be

defined as a phonological subsystem that represents speech into hierarchically arranged units (Nespor & Vogel, 2007). This prosodic hierarchy includes units such as the syllable, the phonological word, or the utterance (Hayes, 1995). The second approach refers to prosody as the realization of prosodic features, such as stress, intonation, and timing (Dowhower, 1991). Prosody is also referred as suprasegmental phonology – opposite of segmental phonology – as prosodic units and features are realized across more than one single phoneme.

Stress is one of the main prosodic features. Two varying perspectives are lexical and metrical stress. Lexical stress refers to the relative prominence of syllables within a word, while metrical stress refers to sequences of strong and weak syllables, i.e., the rhythmic pattern that occurs across multiple syllables. In stress-timed languages, as English, stress is also the rhythmic unit. In syllable-timed languages, as Spanish, the rhythmic unit is the syllable. However, it has been proposed that stress is the basis of rhythm in all languages, and that there is a continuum from more to less stress based languages (Arvaniti, 2009; Dauer, 1983). If stress were necessary for rhythm perception in all languages it would have the potential to affect literacy acquisition (see the next section). This research focuses on lexical stress in Spanish.

In some orthographies, such as Greek or Spanish, lexical stress is represented by a stress mark (Defior, Jiménez-Fernández, & Serrano, 2009). This mark consists of an acute accent placed over the stressed vowel (e.g., *cajón* [drawer]). There are clear rules¹ for the use of this stress mark in Spanish: The mark should be on all words stressed on the antepenultimate syllable or *proparoxytones* (e.g., *lá-ti-go* [whip]),

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¹ There are exceptions and particularities (Real Academia Española, 2009).

on those stressed on the penultimate syllable or *paroxytones* when the word ends in a consonant other than *n* or *s* (e.g., *más-til* [flagpole]), and on words stressed on the last syllable or *oxytones* when the word ends in a vowel or in consonants *n* or *s* (e.g., *ru-bí* [ruby]; *ca-jón* [drawer]) (Real Academia Española, 1999). In reading, words without the stress mark can be read following general implicit rules: Words should be read as oxytones when ending in a consonant other than *n* or *s*, and as paroxytones in all other cases.

This study analyses the role of lexical stress awareness in reading acquisition and in learning this stress mark.

1.2. Prosody and reading acquisition

Wood, Wade-Woolley, and Holliman (2009) proposed that sensitivity to prosody is connected to literacy acquisition through several possible pathways. One of them considers that children are born with a periodicity bias (Cutler & Mehler, 1993), which helps them to learn the speech rhythm. Once learnt, children can use rhythm for segmenting the speech stream and learning vocabulary (Nazzi, Bertoncini, & Mehler, 1998), which in turn promotes the development of PA. Therefore, the children more sensitive to the speech rhythm would have more PA skills and then better literacy acquisition.

In a second and third pathways, speech rhythm sensitivity (henceforth, SRS) is directly linked to phoneme and rhyme awareness. One of the rhythm's prosodic features, stress (see the previous section), may facilitate the identification of phonemes (Kitzen, as cited by Holliman et al., 2014) and then phoneme awareness. Moreover, rhythm perception requires awareness of the peak of loudness associated with the vowel, which is the natural boundary between the onset and the rime. As a consequence, rhythm would facilitate the isolation of the rime, and then rhyme awareness, which is important for reading in English.

In a fourth pathway, SRS is related to morphological awareness in at least two possible ways: On one hand, rhythm may be used as a clue that indicates whether a word is a compound word or two separate words (e.g., *snowman*; *snow, man*); on the other hand, the stress component may help children to learn morphological rules for stress assignment – for example, some suffixes of morphologically complex words indicate a change in the stress position (e.g., *grave* [serious], *gravedad* [seriousness]). In Spanish, lexical stress can also be used to differentiate similar words that are grammatically unequal (e.g., *bebe* [he/she drinks], *bebé* [baby]). Further to phonological or morphological awareness, Wood et al. (2009) considered the possibility that SRS can explain additional variance “...linked to the need of lexical stress to be assigned during the reading of polysyllabic words” (p. 19).

More recently, Holliman et al. (2014) tested Wood et al.'s (2009) model in children aged 5 to 7. They found that the model fitted much better if additional links were included: between vocabulary and morphological awareness, rhyme and phoneme awareness, and phoneme and morphological awareness. Moreover, the first step in the model was slightly different, as it was proposed that prosody exerts its role via vocabulary, and rhyme awareness. Links between prosody and phoneme awareness, and between prosody and morphological awareness were not significant.

Interestingly, although a direct link between prosody and literacy was proposed in the original Wood et al.'s (2009) model, it was not included in the new version. However, prosody is necessary for reading aloud, and it may actually be directly represented in the written script. This research further explores this possibility.

1.3. Empirical evidence

Wood and Terrell (1998) carried out the first study relating SRS with reading – using a metrical stress measure – in children with reading difficulties. Results showed that children with reading difficulties had problems on SRS compared to a control group of the same chronological

age and another control group of the same reading level and therefore younger. Later studies with typically developing readers have replicated the relationship between metrical stress and reading ability (Clin, Wade-Woolley, & Heggie, 2009; Whalley & Hansen, 2006).

At the word level, research suggests that there is a relationship between lexical stress sensitivity (henceforth, LSS) and literacy acquisition. Wood (2006) explored this relationship in English with a sample of 5 to 7 years-old children that had to recognize mispronounced (reversed stress) words (e.g., *sofa* as opposed to *sofa*). Results showed that LSS explained a significant part of writing performance after controlling for age, PA, or vocabulary. Later studies have shown a similar relationship with reading. Holliman, Wood, and Sheehy (2008) found that LSS predicted reading ability in children aged 5 and 6 years, regardless of variables such as age, vocabulary, or PA. More recently, Holliman, Wood, and Sheehy (2010) used an improved version of the task developed by Wood (2006); they also found that LSS predicted word reading regardless of variables such as age, vocabulary, PA, short-term memory, and non-linguistic rhythmic skills. However, when the sample was composed of children with reading difficulties, Holliman, Wood, and Sheehy (2012) found a different pattern or results. Once vocabulary and PA were both controlled for there were no LSS differences between a group of children with reading difficulties and a chronological control group (10 years old). Clearly, more research is needed in order to determine whether or not LSS makes a unique contribution to literacy acquisition.

Opposite to English, some languages like Spanish or Greek have an orthographic mark that explicitly indicates stress. These languages provide an excellent opportunity to study the role of LSS, since prosody is inherent to their orthographies. For this reason, it is possible that LSS makes a unique contribution just in these languages, and this may not be generalized to other orthographies. In any case, it would be a relevant finding that would contribute to better understand literacy development across languages (Share, 2008).

Some studies carried out in Spanish have suggested that LSS is linked to reading ability. Gutiérrez-Palma and Palma-Reyes (2007) measured LSS in Spanish children in 1st and 2nd grade of Primary Education. They used the task designed by Dupoux, Peperkamp, and Sebastián-Gallés (2001), which ask to discriminate between minimum pairs of pseudowords that include phonemic (*kúpi* vs. *kúti*) or prosodic contrasts (*mípa* vs. *mipá*). Children performing at a high level in the prosodic contrast task read more fluently and assigned stress more accurately in a pseudoword reading task than children with low performance. Afterward, Gutiérrez-Palma, Raya, and Palma (2009) partially replicated these results controlling phonological awareness. That study's results showed that, after controlling the influence of phonological awareness, participants performing at a high level at prosodic contrasts detection read texts faster and made fewer mistakes when assigning stress to pseudowords than children with low performance.

The above studies were limited to children up to 2nd grade of Primary Education, who are still in the initial stages of reading acquisition. Besides, only pseudoword reading was examined and no real-word reading aloud was assessed. More recently, Defior, Gutiérrez-Palma, and Cano-Marín (2012) have used a sample of more advanced readers (5th grade) to examine the relationship of prosodic skills and word reading and writing. Moreover, they have used a different task, which consisted of listening to three-syllable pseudowords (e.g., *páfica*, *nipora*, *zirotal*) and indicating the stressed syllable. This task involves explicitly thinking in word's stress, and then it could be considered a way to measure lexical stress awareness (henceforth, LSA) rather than LSS. In LSS tasks participants may process the overall stress pattern at the whole-word level without detecting the stressed syllable. Defior et al.'s (2012) results showed that LSA was related to reading and writing accuracy, regardless phonological awareness. Furthermore, reading and spelling errors were analyzed. Result showed that in reading, LSA was higher related to stress errors (e.g., *apóstol* [apostle] written as *apostól*) than to phoneme-to-grapheme errors (e.g., *apóstol* written as *abóstol*).

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