

A comparison between portuguese pre-readers versus beginning readers phoneme analysis ability: effects of portuguese orthographic structure?

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Analysis of cluster onsets into their component phonemes is a difficult task for English speaking pre-reading children (Treiman, 1990; Treiman and Zukowski, 1991; 1996) and even for beginning readers (Bruck and Treiman, 1990; Caravolas and Bruck, 1993). This difficulty is apparent in a variety of phonological tasks: phoneme detection, isolation, deletion, and same-different tasks.

On the other hand growing empirical evidence shows that oral and orthographic language inputs have important effects on the development of phonological awareness (Campbell and Sais, 1995; Caravolas and Bruck, 1993; Cossu, Shankweiler, Liberman, Katz and Tola, 1988; Manrique and Signorini, 1994; Treiman and Zukowski, 1991; Wimmer and Hummer, 1990).

The results that will be presented are part of a study examining this question in the context of Portuguese in which Non-readers and Beginning readers were asked to detect phonemes that constitute or not an entire onset.

The following are aspects of Portuguese phonology and orthography relevant for the interpretation of the results to be presented.

1 – Oral Portuguese has clear syllabic boundaries detected even by illiterates (Morais, Content, Cary, Mehler and Segui, 1989)

2 – Consonant clusters have only two consonants. They are not very frequent. Their overall frequency is about 3.8% and their frequency in word initial position is 4.4%. In the majority of cases (95%), consonant clusters consist of stop + liquid, the liquid /r/ having 69% of the occurrences on its own. /f/ plus liquid (/l/ or /r/) is another type of syllable onset with a percentage of occurrences of about 6% (Vigário and Falé, 1994; D'Andrade and Viana, 1994). In the spoken language, a phonetic short [e] vowel, a schwa, is sometimes introduced as a support between the two consonants of a cluster (Andrade, 1994).

3 – The Portuguese orthography may be considered as relatively transparent on the reason of its highly predictable grapheme-phoneme relationship (Viana, Andrade, Oliveira e Trancoso, 1991). It has a dominant CV structure. Data obtained by Vigário and Falé (1994) from the analysis of a written corpus of 7109 syllables in polysyllabic words, show that the CV syllabic structure represents 60% of the totality of Portuguese syllable types in initial, medial and final position. The frequency with which the CV structure occurs in initial position is 46%.

The combination of these aspects of the spoken language would probably render initial cluster consonants more accessible than single consonants followed by a stressed vowel.

METHOD

Subjects

Two groups of children were tested in two different moments of the school year.

A Group of Non-Readers, $n = 40$, mean age = 6.4 (age range 5.10 – 7.2), was assessed just at the beginning of school year when all the children could not yet read. They only knew the vowel graphemes and one or two consonants that were part of their own names.

A Group of Beginning-readers, $n=30$, mean age = 6.5 (age range 6.0 – 7.0), was assessed after three months of reading instruction when all the children already knew about half of the letters of the alphabet and could spell simple bisyllabic CVCV words. The school attended by these children used a phonics based approach to reading instruction.

Detection Task

An onset detection task, the odd-one-out detection (Bradley and Bryant, 1983) was given to the subjects of both groups in two conditions.

Condition 1: The target was the initial phoneme of a single-phoneme onset (the child had to detect C in CVC as in *ver – vive – toque – vale*).

Condition 2: the target was the initial phoneme of a cluster onset (the child had to detect C in CCVC as in *flôr – classe – clube – clique*).

The instruction was the same in both conditions. The experimenter produced the set of words and called the child' attention to the fact that one of the words did not begin like the other three. The child was then invited to repeat the words and to find the odd word.

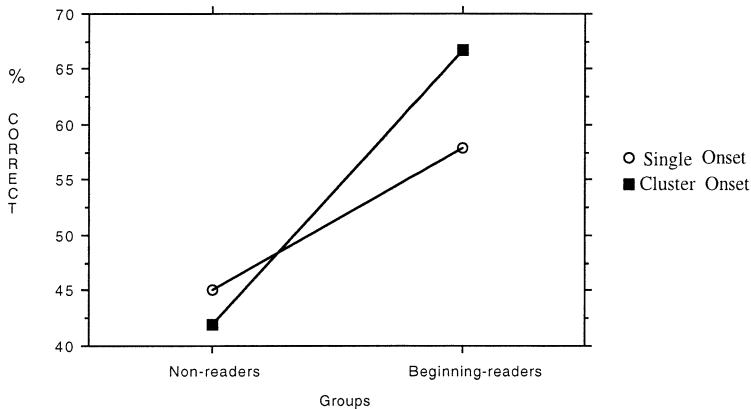
Three practice trials with corrective feedback were given prior to the experimental trials of condition 1 and 2, respectively. Within each trial, the position of odd-one-out was partially randomised. Task order was balanced across the subjects of both groups.

RESULTS AND DISCUSSION

Prior to the phonological tests, the children were administered the Raven Progressive Matrices (PM 47). No difference was found between the two groups in the PM 47 scores ($F(1,68) = < 1$).

Detection Task

Figure 1 shows the mean percentage of correct detection per Group (Non-readers and Beginning-readers) and Condition (detecting C in CVC and C in CCVC)



Analysis of variance, taking Condition (Detection of C in CVC vs. Detection of C in CCVC) and Group (Non-Readers vs. Beginning-Readers) as main factors revealed a significant effect of Group ($F(1, 68) = 9.10, p = .003$), a non-significant effect of Condition ($F(1,68) = < 1$) but a significant Group \times Condition interaction ($F(1,68) = 4.42, p < .05$), showing that: (1) performance of Non-readers did not differ across conditions ($F(1,39) < 1$) and that: (2) Beginning-readers performed better at detecting C in CCVC than C in CVC ($F(1,29) = 6.63, p = .015$).

Non-readers

Non-readers performed equally poorly in both conditions, though above the chance level (25%). Initial consonants of the cluster onset were not more difficult to access than single consonants followed by a vowel. This is a different result from those obtained in a wide variety of tasks with English speaking children (Treiman and Bruck, 1990).

The possibility that the observed absence of difference across the two conditions could be a consequence of the task memory load, can be ruled out. Recently Vale and Cary (*in preparation*) tested a group of illiterate adults ($n = 15$, mean age 54.8) and a group of kindergarteners ($n = 25$, mean age 5.9) in the same task and conditions, but this time with a reduced memory load as each trial had only 3 items (*ver – toque – vale* vs. *flor – classe – clube*). The pattern of results is quite similar to the present one: although illiterates outperformed kindergarteners ($F(1, 38) = 11.3, p < .001$) neither Condition (Detection of C in CVC vs. Detection of C in CCVC) nor Condition \times Group were significant ($F(1,38) = 2.37, p = .306$ and $F(1,38) = 1.07, p = .131$, respectively)

Beginning-readers

Beginning-readers performed significantly better at detecting C in CCVC than C in CVC. This difference in performance could be interpreted as a combined effect of awareness of the phonological particularities of oral language and by orthographic knowledge. Portuguese

beginning-readers do not treat clusters as single units because they probably use the schwa between the two consonants to separate them (Andrade, 1994).

In order to examine this idea we assessed the children's spellings of some of the words of the phonological test. A few days after the detection experiment, 28 of the 30 Beginning-readers were asked to write under dictation 10 CCVC words (like *classe* or *cruz*) and 10 CVC words (like *sol* or *mar*). Table 1 presents the percentage of onset spelling types for CCVC and CVC words, together with some illustrative examples.

Spelling types	CC%	CC Onset Word Examples			C Onset Word Examples	
		Cruz	Classe	C %	Mar	Sol
Correct Spelling	20.0	<i>cruz</i>	<i>clasi</i>	84.6	<i>mar</i>	<i>sol</i>
Phonol. Spelling	48.6	<i>corus</i>	<i>relási</i>	0.0		
First C only	17.1	<i>crus</i>	<i>e</i>	0.0		
Incorrect Spelling	12.8	<i>cor</i>	<i>oatitrot</i>	15.4	<i>mar</i>	<i>sol</i>

In 136 of the 280 cases, that is, in 48.6% of the spellings of CC onsets, an additional grapheme "e" was introduced between the two consonants of the CC onset. This constitutes a reliable translation of the phonology of the language, although corresponding to the transformation of the first consonant of the cluster onset into a CV syllable.

These data seem to indicate that Portuguese Beginning-readers' phonological awareness is influenced both by the dominant CV orthographic structure and by the clear syllabic boundaries which are quite salient in the production of isolated words. By the moment the child begins to be taught to read, he can think of phonemes as entities, but, according to what he already grasps from these aspects of the phonology of the language and from the dominant CV orthographic structure, he mentally represents first consonants of clusters as a C + schwa. And this entity shifts to something that phonologically ends up being a CV syllable, where V is a short vowel. This seems to lead to the better detection of C in CC than of C in CV. In the former condition the children had to detect a syllable that is a sound of an already known letter of the alphabet whereas in the later they had to detect a more abstract linguistic unit, a phoneme.

This question deserves further examination. However, the present data already suggest that specific phonological and orthographic Portuguese structures may influence the course of explicit phonological representations.

REFERENCES

- Andrade, A. 1994. Estudo Acústico de Sequências de Oclusivas em Português Europeu. *Actas do IX Encontro Nacional da Associação Portuguesa de Linguística*. Lisboa, APL/Colibri.
- Bradley, L.; Bryant, P. E. 1983. Categorizing sounds and learning to read: a causal connection. *Nature*, 301, 419-421.

- Campbell, R.; Sais, E. 1995. Accelerated metalinguistic (phonological awareness) in Bilingual children. *British Journal of Developmental Psychology*, 13, 61-68.
- Caravolas, M.; Bruck, M. 1993. The effect of oral and written language input on children's phonological awareness: a cross-linguistic study. *Journal of Experimental Child Psychology*, 55, 1-30.
- Cossu, G.; Shankweiler, D. P.; Liberman, I. Y.; Katz, L. E.; Tola, G. 1988. Awareness of phonological segments and reading ability in Italian Children, *Applied Psycholinguistics*, 9, 1-16.
- D'andrade, E.; Viana, M. C. 1994. Sinérese, diérese e estrutura silábica. *Actas do IX Encontro Nacional da Associação Portuguesa de Linguística*. Lisboa, APL /Colibri.
- Manrique, A. M. B.; Signorini, A. 1994. Phonological awareness, spelling and reading abilities in Spanish-speaking children. *British Journal of Educational Psychology*, 64, 429-439.
- Morais, J.; Content, A.; Cary, L.; Mehler, J.; Segui, J. 1989. Syllabic segmentation and literacy. *Language and Cognition*, 4, 57-67.
- Treiman, R.; Zukowski, A. 1991. Levels of Phonological Awareness. In S. Brady and D. Shankweiler eds. *Phonological Processes in Literacy – A Tribute to Isabelle Y. Liberman*. London, Lawrence Erlbaum.
- Treiman, R. 1990. Phonological awareness and its roles in learning to read and spell. In D. J. Sawyer; B. J. Fox eds. *Phonological Awareness in Reading – The Evolution of Current Perspectives*. Springer-Verlag Series in Language and Communication.
- Treiman, R. 1992. The Role of Intrasyllabic Units in Learning to Read and Spell. In P. Gough, L. Ehri; R. Treiman (Eds.), *Reading Acquisition*. New Jersey, Erlbaum.
- Treiman, R. and Zukowski, A. 1996. Childrens sensitivity to syllables, onsets, rimes and phonemes. *Journal of Experimental Child Psychology*, 61, 193-215.
- Viana, C.; d'Andrade, E.; Oliveira, L.; Trancoso, I. 1991. Ler PE: Um utensílio para o estudo da ortografia do portugueses. *Actas do VII Encontro da Associação Portuguesa de Linguística*. Lisboa, APL /Colibri.
- Vigário, M.; Falé, I 1994. A Síllaba no Português Fundamental: uma descrição e algumas considerações de ordem teórica. *Actas do IX Encontro Nacional da Associação Portuguesa de Linguística*. Lisboa, APL /Colibri.
- Wimmer, H.; Hummer, P. 1990. How first graders read and spell: doubts on the importance of the logographic stage. *Applied Psycholinguistics*, 11, 349-368.