

# The role of syllabic structure in speech perception: Evidence from a stem completion task

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## INTRODUCTION

Which sublexical units are involved in speech segmentation and lexical access?

Different studies have shown that the speech segmentation strategies are not universal but language specific (Cutler, Mehler, Norris & Seguí; 1983, 1986). The results from these studies lead the authors to suggest that there could be different families of languages according to their phonological characteristics. Speakers of these groups of languages could use different speech perception routines to parse the speech signal. Speakers of languages with clear syllabic boundaries, such as French, Portuguese, Catalan or Spanish, would use a syllabic strategy. However, speakers of languages like English, with unclear syllabic boundaries, would use a different strategy.

In this study we want to assess which are the suprasegmental units that Spanish listeners use in speech segmentation. Specifically, we are interested in the role of syllabic structure in speech segmentation in Spanish.

Recent studies have observed syllabic effects in speech perception tasks in Spanish. (Bradley, Sanchez-Casas & García-Albea, 1993; Sebastián-Gallés, Dupoux, Seguí & Mehler, 1992; Pallier, Sebastián-Gallés, Felguera, Christophe & Mehler, 1994). All these studies have used a Phoneme Monitoring task. Sebastián-Gallés et al. (1992) observed that the syllabic effects obtained in Spanish depended in some extent on the task demands and subjects' strategies (i.e. the syllabic effect depended on the speed of subjects' responses).

The main goal of our study is to try to replicate the syllabic effects obtained in Spanish using a different paradigm, which allow us to solve some problems of the phoneme monitoring paradigm.

Some studies in memory research have developed a task, called Stem Completion (i.e. Warrington & Weiskrantz, 1970), that seems to be useful to study the role of sublexical units (Peretz, Lussier & Béland, Unpublished Manuscript). In the present study we have adopted this task in order to assess whether Spanish speakers use a syllabic strategy when they have to complete a given stem, that is, whether the syllabic value of the presented stems is used to report and retrieve words in stem completion (see procedure section). If that were the case, subjects will report more CVC.CV words than CV.CV words when they were required to complete a CVC stem, and the opposite case when they were required to complete CV stems.

## METHOD

### Subjects:

Thirty two Spanish native speakers were included in this experiment.

**Material:**

Ten quadruplets of bisyllabic words with different initial three phonemes CVC (stems) were selected. In each quadruplet the three initial segments of the four words were the same. Half of the words of each quadruplet had the syllabic boundary after the initial CVC and half after the initial CV. Half of the words were stressed on the first syllable and half of the words on the second one (see Table 1 for an example of the materials used in the experiment). Ten pairs (CV/CVC) of distractor stems, following the same criterium used with the experimental ones, were selected.

**Table 1. Example of the materials employed in the experiment.**

STEMS	STUDIED WORDS	STEMS	STUDIED WORDS
PI	PINO PINAR	PIN	PINZA PINTAR

Six bisyllabic filler words were presented at the beginning and at the end of words' lists, in order to avoid the Recency and Primacy effects.

**Procedure:**

The experimental session was divided in three phases:

1st phase (study phase): One list of words (20 experimental words + 6 filler words) was auditorilly presented. Subjects were required to repeat it out aloud and to study the words for later recall.

2nd phase (stem completion task: implicit memory task): Subjects were presented with one list of stems (20 experimental stems + 20 distractor stems) which did or did not correspond to the previous studied word's initial syllable. Subjects had to provide the first word, beginning with that segment, which came to mind. Subjects were told that this task was just a distractor task before the recall task.

3rd phase (cued-recall task: explicit memory task): Subjects had to retrieve the studied words in a cued-recall task. They were presented with the same 20 experimental stems (plus 6 stems corresponding to the filler words) than in the stem completion task.

**RESULTS AND DISCUSSION**

Three different types of data were considered for posterior analysis:

1. Studied words: Responses from the stem completion task to the experimental stems that were words studied in the previous phase.
2. Non-studied words: Responses from the stem completion task to the distractor stems.

Figure 1. Number of words retrieved in the 2nd phase (studied words)

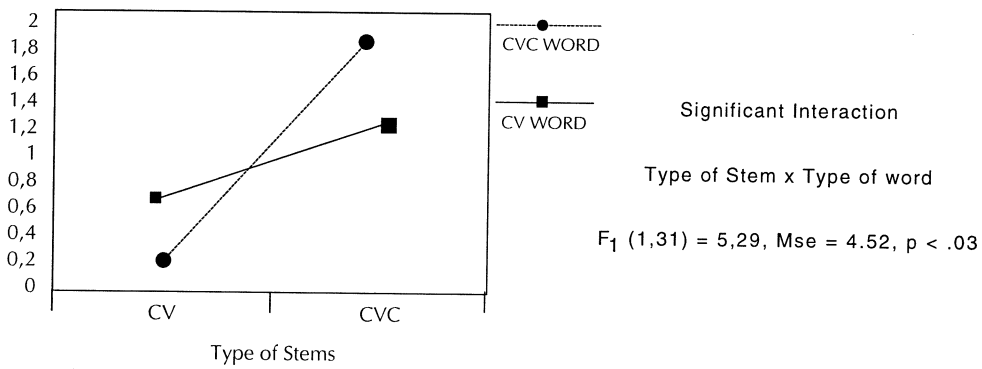


Figure 2. Number of words retrieved in the 2nd phase (non-studied words)

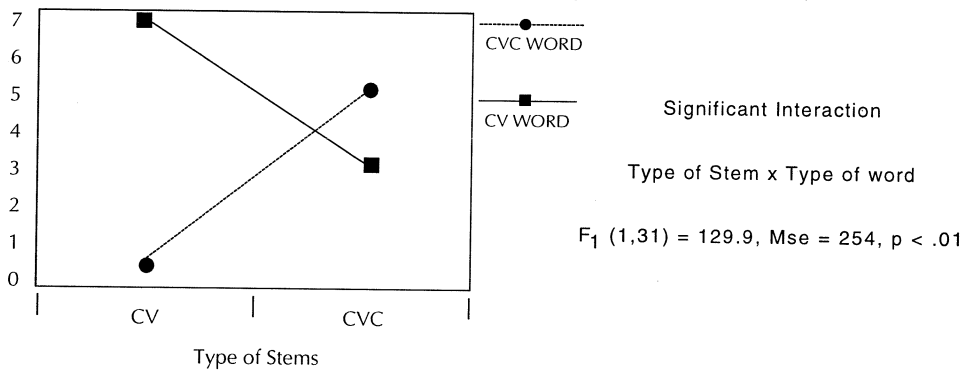
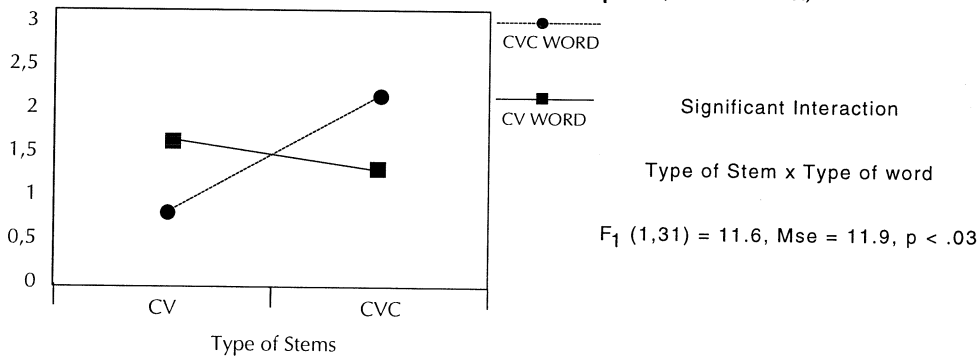


Figure 3. Number of words retrieved in the 3rd phase (cued-recall test)



3. Cued-recall: Responses to the experimental stems with studied words during the Cued-recall task.

The analyses of the three different type of data show a clear pattern of results. The interaction between the type of stem and the type of word factors reflects that subjects retrieved more CV words when they had to complete a CV stem than when they had to complete a CVC one, and that they also completed with more CVC words the CVC stems.

We think that this result can be interpreted as an evidence that subjects use the stem's syllabic value in order to complete it. This may suggest that Spanish speakers use the syllabic structure in lexical access.

It can be argued that the syllabic effect observed in the cued-recall task (explicit memory task) is due to some kind of specific strategic processes that subjects may have developed in that precise task. However, the fact that the syllabic effect also appears to be significant for the non-studied words suggests that the observed effects are due to a general lexical search and not to a specific memory or strategic processes.

## CONCLUSION

- a) The results observed in our study provide us a converging evidence about the important role of syllabic unit in speech segmentation and lexical access in Spanish. Given the intrinsic problems, discussed above, that phoneme monitoring task has, we think that it is necessary to have converging evidence from different experimental paradigms.
- b) Stem completion task appears as a useful paradigm to further study the different units involved in speech segmentation.

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