



Processing Long Distance Dependencies in Spanish

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Abstract

This study uses long distance topic-clitic dependencies in Spanish to demonstrate a pre-verbal dependency formation effect that arises from the prediction of clitic pronouns.

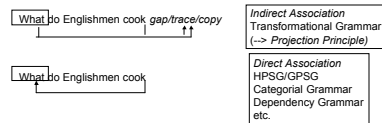
A controversial issue in research on the real-time construction of long distance dependencies is the question of whether a fronted phrase receives its argument role via direct association with a verb or mediated via argument positions. We investigate whether long distance dependencies are formed before the verb, focusing on overt elements in argument positions such as clitic pronouns in Spanish. This would support the use of intermediate argument positions projected by the verb.

Background

Filled Gap Effects in Head-initial Languages.

In studies on head-initial languages, it has been shown that long distance dependencies are created at the verb and that the parser slows down when there is a phrase filling the position posited for the gap (Stowe 1986, Clifton & Frazier 1989). Attempts have been made to explain whether the fronted phrase in these dependencies receives its argument role via direct association with the verb or through its argument positions but none of the theories have found decisive evidence for which of the two approaches is correct, because the slowdown effect is found post-verbally in head-initial languages.

(Pickering & Barry 1991, Sag & Fodor 1994, Bever & McElree 1988, MacDonald 1989, Gibson & Hickok 1993).



Pre-verbal Filled Gap Effects

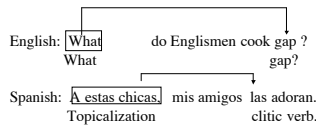
The way the previous theories could be disentangled would be searching for effects of dependency formation associated with argument positions that precede the verb. This filled gap effect would not be expected under the direct association theory.

Clitic Prediction Paradigm

In this study, we focus on clitic pronouns in Spanish and use a clitic prediction paradigm to search for pre-verbal dependency formation effects.

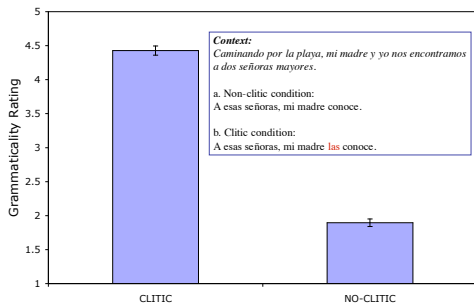
Why use Topic-clitic Dependencies?

The same way as English speakers predict a gap after processing a wh-phrase, we predict that once they have processed a fronted phrase, Spanish speakers could predict an upcoming clitic and interpret the dependency before encountering the verb that subcategorizes this fronted phrase.



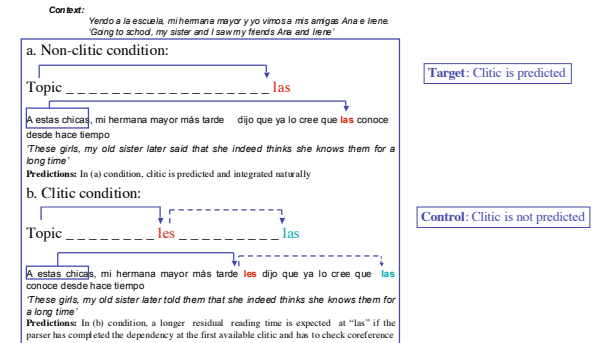
Off-line Tasks

We ran an off-line rating task to verify the predictability of the clitic after processing a fronted phrase. The test was given after the subjects did the self-paced reading task.



Design and Predictions

There was a manipulation of the clitic pronoun at the matrix verb to control for the effects expected at the embedded clitic.



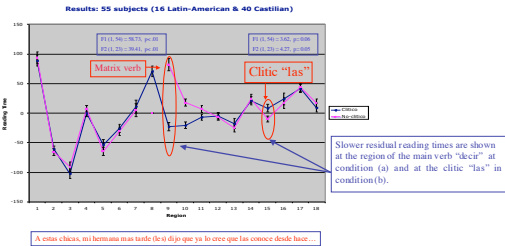
Procedure and Participants

56 native speakers of Spanish participated in the study, 16 students from the University of Maryland, College Park and 40 from the University of Deusto. We used the self-paced reading paradigm.

Materials

Experimental sentences consisted of 24 sets of sentences of the 2 conditions described above and 72 filler sentences. A context sentence preceded its item and was identical in both conditions. A yes/no question comprehension task followed each item.

Results



1 of 56 subjects was excluded for scoring below 80% accuracy on the comprehension questions (accuracy of the comprehension questions was high in general average 92%).

In the non-clitic conditions, there was a large slowdown at the main verb (region 9). In the clitic conditions, the effect at the most embedded clitic "las" (region 15) was significantly larger than at the no-clitic condition in (a).

Conclusion

The results from our experiment show effects of dependency completion at the most embedded clitic pronouns (las = region 15) in the clitic conditions. This supports the use of clitics as arguments that help to form a dependency before encountering the subcategorizing verb. Moreover, this effect shows the parser may not expect a clitic when it has already completed the dependency at the first available clitic (les = region 8) although it has recently activated the same referent.

An effect of clitic absence/presence was found at the main verb that could either mean the verb is highly predicted in (b) when preceded by "les" or that subjects are surprised when not encountering a verb with this verb in particular.

The goal of this study was to look for a pre-verbal dependency completion effect in a head-initial language by taking advantage of clitic pronouns in Spanish. In the case of topic-clitic dependencies in Spanish, the parser can interpret the dependency at a position prior to the verb through an argument position (e.g. clitic pronoun) projected by this verb. Finally, whether the referent for the clitic has been recently accessed makes a difference in clitic processing. The contrast shown at the clitic "las" for both conditions reflects the expectancy for a clitic once the fronted phrase has been processed.

Acknowledgements

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