

## Processing Spanish Copulas: Evidence from the Visual World Paradigm

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The expression of location with copular verbs in Spanish has received some attention in syntax-semantics (Brucart, 2012; Leonetti, 1994; Zagana, 2012), acquisition (Arnaus Gil, 2013; Bel, 2013; Cuza & Guijarro-Fuentes, 2021; Sera, 1992; Sera et al., 1999), and psycholinguistics grounds (Dussias et al., 2014; Leone-Fernández et al., 2012); but none of these studies provide a unifying account that can explain the linguistic, developmental, and processing behavior of this structure. The present study attempts to fill this gap by asking whether recent theoretical proposals (Fábregas et al., 2023; Perpiñán et al., 2020) can be corroborated with eye-tracking data from two different bilingual populations, Spanish-dominant and Catalan-dominant speakers.

Spanish locative constructions select a different copula depending on the ontological category to be located: individuals –including objects– and places are located with *estar* (1a), whereas eventive subjects are located with *ser*; both copulas are translated as *to be* in English. This exceptional contrast poses difficulties for the theoretical explanations of the copulas as well as its acquisition (Pérez-Leroux et al., 2010).

- (1) a. Pedro {está/ \*es}            en Roma.  
      Pedro is<sup>estar</sup>/ is<sup>ser</sup>        in Rome  
      ‘Pedro is in Rome.’  
      b. El concierto {es/ \*está} en el teatro.  
         the concert is<sup>ser</sup>/ is<sup>estar</sup> in the theater  
         ‘The concert is in the theater.’

Previous semantic explanations based on the dichotomous Individual-Level (IL-*ser*) vs. Stage-Level (SL-*estar*) aspectual distinction (Arche, 2006; Luján, 1981) have proven insufficient to explain why eventive subjects select *ser*, and not *estar*, the locative copula. Perpiñán et al., (2020) suggested that, in addition to the IL-SL alternance, another aspectual dimension is needed: that of dynamicity, i.e., the distinction between events [+dynamic] and states [-dynamic]. Under this view, *ser* is considered the default copula, and *estar* is only specified for SL predicates, which include the location of individuals. Considering these theoretical issues, we question whether we would find a psycholinguistic connection of the (un)markedness of *ser* and *estar* in locative constructions in an anticipatory visual paradigm. If Perpiñán et al. (2020) are on the right track, we would expect that Spanish *ser* would not block any possible reading except for that of the location of objects.

This linguistic contrast can also be the focus of crosslinguistic influence (CLI) in L2 learners and bilingual speakers if their two languages do not completely overlap (Perpiñán & Marín, 2021). A case in point is that of Catalan, which has the same two copulas *ser* and *estar*, with a slightly different distribution: *ser* is considered the prototypical verb for locative constructions whereas *estar* adds an aspectual contribution such as duration (GIEC, 2016, p. 872). Nonetheless, copula *estar* in Catalan is gaining ground in the locative context to *ser* (Sanz & González, 1995; Solà, 1994). Thus, Catalan *ser* can combine with both objects and events, whereas Catalan *estar*, when available as a locative, is restricted to non-eventive subjects. Given these differences, we further question whether Catalan-Spanish bilinguals will show signs of CLI from Catalan in their processing of Spanish locative constructions. The research on the processing of locative copulas in Spanish is very scarce (Dussias et al., 2014; Leone-Fernández et al., 2012, using ERP signatures) and no studies have addressed the topic with eye-tracking. In addition, this study is novel for investigating bilingualism effects, usually neglected in anticipation processes (Desideri & Bonifacci, 2018; Foucart et al., 2014).

In a Visual Word Paradigm (VWP), we explore whether Catalan-Spanish bilingual speakers are able to associate the locative reading after hearing the (event or object) subject

and the copular verb (*ser* or *estar*). Two groups of Spanish-Catalan bilingual speakers (25 Catalan-dominant and 28 Spanish-dominant), grouped according to their result in the *Bilingual Language Profile* (Birdsong et al., 2012), performed a VWP eye-tracking task with printed words using a Tobii Pro T60XL. Participants heard aural copular sentence stimuli while looking at 2 words on the screen expressing a location (target for locative readings) or a property (target for non-locative readings). After that, they were asked to respond an aural question that assessed attention. With a Latin Square design, the task had 2 conditions: type of copular verb (*ser* and *estar*) and type of subject (event and object) as in (2a-d;  $k = 8$ ;  $8 \times 2 \times 2$ , a total of 32 experimental items, distributed in two lists). Anticipatory eye gazes to words on screen were computed during the region of interest -in bold in (2a)-; an adverbial adjunct was embedded for a broader region of interest. Our prediction was that participants would anticipate the location in the expected combinations ((2a) and (2d)), i.e. more looks to the target word on screen expressing location; no anticipation was expected in the two remaining conditions. As for language dominance, we hypothesized that Catalan-dominants would also anticipate locations with *ser* and objects (condition 2c), showing traits of CLI in processing.

Overall, we found that locative *ser* with objects is blocked in Spanish-dominants bilinguals (anticipatory looks to the non-locative word in condition (2c) are significantly more frequent, which means that Spanish-dominant speakers clearly reject a locative reading in *object+ser* constructions, Fig.1). With events, anticipatory processing emerges, as expected, in constructions with *ser* (2a), and no anticipation is attested with *estar* (2b). Contrary to our predictions, locative *estar* with objects (2d) does not show any anticipatory pattern, either (Figure 1 red line). Catalan-dominant bilinguals, on the other hand, presented a significantly higher number of anticipatory looks to the locative word ('*taberna*') in *object+ser* constructions (2c), and no anticipatory looks in *event + ser* (2a), indicating CLI from the broader Catalan copula *ser*. In turn, they clearly anticipated locatives with *estar*.

## (2) Auditory Stimuli (example)

- a. EVENT + SER (LOCATIVE) On screen: *taberna* (target) | *empezar* (competitor)  
El chef sostiene que el banquete *es* | **afortunadamente en** | la *taberna* como había previsto.
- b. EVENT + ESTAR On screen: *taberna* (competitor) | *empezar* (target)  
El chef sostiene que el banquete *está* afortunadamente por *empezar* tal como había previsto.
- c. OBJECT + SER On screen: *catalán* (target) | *taberna* (competitor)  
El chef sostiene que el menú *es* afortunadamente en *catalán* tal como había previsto.
- d. OBJECT + ESTAR (LOCATIVE) On screen: *taberna* (target) | *catalán* (competitor)  
El chef sostiene que el menú *está* afortunadamente en la *taberna* tal como había previsto.

To summarize, our psycholinguistics results are compatible with Perpiñán et al. (2020) with respect to their analysis for Spanish *ser*, but not for *estar*, since our Spanish-dominant participants did not show a preference for locative readings with *estar*, unlike our Catalan-dominant bilinguals. Finally, resorting to anticipatory processing data has allowed us to find out nuances and different degrees of sensitivity to (non-)eventive copular locative sentences in Spanish that can be more difficult to identify from offline data; on the other hand, studying (proficient) bilinguals has shown CLI between large overlapping linguistic systems.

Figure 1: El menú es en catalán (competitor: *taberna*) vs. El menú está en la *taberna* (competitor: *progreso*). Spanish-dominant vs. Catalan-dominant speakers' gazes to target (over 0).

