

## Article

# Aspectual *se* and Telicity in Heritage Spanish Bilinguals: The Effects of Lexical Access, Dominance, Age of Acquisition, and Patterns of Language Use

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**Abstract:** While differences in the production and acceptability of aspectual inflectional morphology between Spanish–English heritage and monolingually raised speakers of Spanish have been argued to support incomplete acquisition approaches to heritage language acquisition, other approaches have argued that differences in access (e.g., lexical access) to representations for receptive and productive purposes are at the core of some of the unique characteristics of heritage language data. We investigate these issues by focusing on the effects of lexical access, dominance, age of acquisition and patterns of language use in heritage Spanish–English bilinguals. We study aspectual *se* in Spanish, which yields telic interpretations, in expressions such as *María se comió la manzana* ‘María ate the apple (completely)’ and *María ate the apple* (where completion may not be reached). Our results indicate that *se* generates telic interpretations for the heritage and monolingually raised group with no group effect. Heritage speakers showed no English effects in terms of lexical access, age of acquisition, patterns of language use or dominance. This suggests that the heritage group did not differ from their monolingually raised counterparts and showed no evidence of incomplete acquisition of telicity.

**Keywords:** heritage Spanish; telicity; lexical access; dominance; age of acquisition



**Citation:** Martínez Vera, Gabriel, Julio César López Otero, Marina Y. Sokolova, Adam Cleveland, Megan Tzeitel Marshall, and Liliana Sánchez. 2023. Aspectual *se* and Telicity in Heritage Spanish Bilinguals: The Effects of Lexical Access, Dominance, Age of Acquisition, and Patterns of Language Use. *Languages* 8: 201. <https://doi.org/10.3390/languages8030201>

Academic Editor: Alejandro Cuza

Received: 29 June 2023

Revised: 9 August 2023

Accepted: 15 August 2023

Published: 29 August 2023



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## 1. Introduction

Multiple hypotheses have been put forth to account for diverging properties found in receptive and productive data of adult heritage speakers when compared to data from monolingual speakers or speakers who are dominant in a language (Montrul 2002, 2006, 2008; Montrul and Perpiñán 2011; Polinsky 2011; Kupisch and Rothman 2018). These hypotheses attempt to provide an account for the abundant evidence of variability and crosslinguistic influence in heritage speakers’ grammars (Putnam and Sánchez 2013; Pérez Cortés et al. 2019; Sánchez 2019). Several factors have been explored as possible explanations for the divergence, among them, the age of acquisition of the socially dominant language (Montrul et al. 2008; Flores et al. 2017; Giancaspro 2019), dominance in the socially dominant language (Birdsong 2014; Gertken et al. 2014; Amengual 2023), and patterns of language use that favor the use of the socially dominant language (López-Beltrán and Carlson 2020; Jiao et al. 2020; Goldin et al. 2023).

Notably, many heritage language acquisition hypotheses have focused on the lack of availability of input in the heritage language as one of the main sources for the emergence of different patterns in heritage speakers’ data (Montrul 2002, 2004; Polinsky 2006; Montrul

et al. 2008). Under the assumption that input is lacking, variability and divergence between heritage speakers and other groups of dominant speakers of the same language have been interpreted as resulting in what has been referred to as ‘incomplete acquisition’ (Montrul 2002, 2004, 2008; Polinsky 2006; Montrul et al. 2008) or ‘differential acquisition’ (Kupisch and Rothman 2018) of the heritage language. In contrast, other studies have posited a process of restructuring that accounts for new representations in heritage grammars (Polinsky 2011; Scontras et al. 2015). While these two approaches have been very prominent in the field, alternative views to these two accounts, however, focus on other possible causes of variability and divergence and present a more complex picture of the factors involved in shaping heritage language grammar.

In that vein, work on the role of the frequency of activation of the heritage language (Putnam and Sánchez 2013) for receptive and productive purposes (Pérez Cortés et al. 2019) has emphasized the need to find more fine-grained accounts for variability in heritage language data. Recent studies have turned their attention to the role that differences in the lexical frequency of nouns and verbs (Giancaspro 2019; Hur 2020; Hur et al. 2020) play on the stability of certain aspects of heritage grammar. Heritage speakers who exhibit variability in their productive data and acceptability judgments tend to have difficulties accessing low-frequency lexical items in the language. These low access levels have been found to correlate with innovative forms (Giancaspro 2019; Hur 2020), particularly in nominal and verb inflection (Hur et al. 2020; López-Otero 2020; López-Otero 2022; Goldin et al. 2023). Beyond inflection, Montrul’s (2014) and Hur’s (2020) work on differential object marking have opened the path to examining the effect of linguistic factors such as lexical access (Bialystok et al. 2008a, 2008b; Gollan et al. 2011, 2012), language dominance (Birdsong 2014; Gertken et al. 2014; Amengual 2023), and patterns of language use (Bedore et al. 2012; De Carli et al. 2015; Giancaspro 2019; Kastenbaum et al. 2019) on other aspects of the heritage language (Flores et al. 2017; Giancaspro 2019; Montrul et al. 2008; Montrul and Foote 2014; Dubiel and Guilfoyle 2021; Wiener and Tokowicz 2021). The expression of telicity in Spanish as conveyed by verbs with the clitic *se* in sentences such as (1) is one of such aspects:

- |     |                                     |    |             |     |          |
|-----|-------------------------------------|----|-------------|-----|----------|
| (1) | María                               | se | comió       | la  | manzana. |
|     | María                               | CL | eat-3.S.PST | the | apple    |
|     | ‘María ate the apple (completely).’ |    |             |     |          |

Verbal expressions such as the one in (1) convey a sense of total consumption of the object, a matter to which we will return. Since the expressions involve a morphological marker, the lexical meaning of the verb, and a sense of the whole internal argument being affected by the action conveyed by the event, they can be located at the interface of lexical semantics, syntax, and clausal-level semantics. Note that, while in Spanish the clitic *se* is present, it is absent in the English equivalent:

- (2) Maria ate the apple.

Given this difference in the morphological configuration of both languages and the abundant literature on how such differences favor cross-linguistic influence from socially dominant languages into heritage languages (Montrul 2002, 2004, 2008; Polinsky 2006), we focus on the development of semantic knowledge in heritage Spanish by concentrating on the aspectual *se*, the verbal meaning and the verb–theme relation in connection to the expression of telicity.

Our study investigates the acceptability of telic and atelic interpretations by Spanish heritage speakers and monolingually raised speakers of the two languages for comparison. We further focus on levels of lexical access (Gollan et al. 2012; Bialystok et al. 2008a, 2008b) in the heritage and the socially dominant language. We look at dominance, age of acquisition (Giancaspro 2019; Montrul and Foote 2014), and patterns of language use (Bedore et al. 2012; De Carli et al. 2015; Kastenbaum et al. 2019) effects on adult heritage language development.

This paper is organized as follows. Section 2 discusses our theoretical assumptions with regard to verb meaning and aspectual *se*. Section 3 discusses lexical access, dominance, age of acquisition, and patterns of language use. Section 4 concentrates on our methodology. Section 5 presents our results. Section 6 is the discussion. Section 7 is the conclusion. In Appendix A, we include our experimental items.

## 2. Telicity

Telicity arises in English, in cases such as (2), *Maria ate the apple*, in the combination of the verbal predicate and the theme. The predicate *eat the apple* is, in general, telic, since the theme, which has a fixed quantity, undergoes change until it is completely consumed. If additional cues (e.g., contextual cues) are given, the predicate may not be telic, e.g., if the theme is not completely consumed. Telicity in Spanish may be computed similarly, e.g., the predicate *comer la manzana* ‘eat the apple’ is telic, like its English counterpart, unless there are cues that suggest otherwise. However, Spanish has other means to directly affect the calculation of telicity, such as aspectual *se*, as in (1), *María se comió la manzana* ‘Maria ate up the apple’ (see [Martínez Vera 2022](#) for a recent overview). Aspectual *se* has been analyzed as a telicity marker, i.e., if it is present, the predicate must be telic. Thus, the predicate *comerse la manzana* ‘eat up the apple’ must be telic. This is in contrast to *comer la manzana* which, as stated above, has some flexibility to be interpreted as atelic.

We define telicity building on [Beavers’s \(2011\)](#) Figure/Path Relation (FPR) as implemented by [Martínez Vera \(2022\)](#) (see also [Martínez Vera 2021](#)).<sup>1</sup> The FPR combines three aspects to account for aspectual classes. Transitive change-of-state predicates denote events such that subevents are mapped into parts of the theme, and subevents are mapped into parts of the scale of the verb. The sum of all subevents constitutes the event (we assume that events have at least two subevents). Thus, *eat the apple* (2) and *comer la manzana* (1) include a verb (*eat/comer*) with a scalar meaning, i.e., they include a scale which indicates degrees of consumption; the theme is *the apple/la manzana*, which has different material parts ([Link 1983](#)). These predicates denote an event that describes the consumption of the theme.

Telicity depends on the theme and the scale, i.e., the former must have a fixed quantity and the latter must be bounded (the scale is bounded if it is closed, i.e., the scale has a maximal degree to be reached) for a predicate to be telic. This is stated in (1) ([Beavers 2011](#), p. 352); a predicate is thus telic if there are distinguishable subevents in the event.

### (3) Telicity

A predicate  $\psi$  is telic if and only if for any event  $e$   $\psi$  describes,  $\psi$  does not describe any subevent of  $e$ .

The final subevent is key to determine if the whole theme has reached a specific (i.e., the maximal) degree in the scale. Subevents where some of the theme has reached some degree are indistinguishable. If the maximal degree is reached, the predicate is telic; it is atelic otherwise. In this approach, in out-of-the-blue cases, *eat the apple* (1) and *comer la manzana* (2) are telic if no subpart of the theme equals the whole theme, and the scale includes the maximal degree of consumption. Similarly, in out-of-the-blue cases, *widen the path* and *ensanchar el camino* are atelic, because, regardless of the quantity of the theme, the scale lacks a maximal degree of width. Thus, the lexical meaning of the verbs as tied to the scale (in addition to the theme) is key.

[Martínez Vera \(2022\)](#) enriches this setup by incorporating the mereological notion of cover, which allows one to be explicit about the whole theme participating in the event. The cover makes it possible to pick out different parts (subgroupings) of the theme.<sup>2</sup> It is determined contextually, i.e., specific subgroupings may vary in context. For example, the cover for *the apple* in (2) would pick different subgroupings of material parts of the theme. Note that the cover may be non-maximal, i.e., it must not be the case that all parts of *the apple* are considered (see [Martínez Vera 2022](#), p. 165). In this regard, [Brisson \(1998\)](#) further establishes that covers may be a good fit for the theme. A cover is a good fit for the theme

when all parts of that individual are picked out. As a result, a maximal interpretation arises. The notion of (non-)maximal cover would apply cross-linguistically (it thus applies in English and Spanish in our discussion), but may be instantiated differently.

This is the case of aspectual *se* in Spanish for [Martínez Vera \(2022\)](#), because it morphologically instantiates the need for a maximal interpretation. Predicates such as *comerse la manzana* ‘eat up the apple’ (1) are telic ([Sanz 2000](#); [Basilico 2010](#); [Campanini and Schäfer 2011](#); [MacDonald 2017](#)).<sup>3</sup> Thus, in Spanish, there are morphological means (namely, aspectual *se*) that impose specific requirements: the theme and the scale must be maximized. English, in contrast, lacks these means.<sup>4</sup> The maximization of the theme means that the whole theme (i.e., the theme with a fixed quantity) must participate in the event. Non-maximal interpretations are thus excluded. As for the scale, maximizing it means that it must be bounded (i.e., the maximal degree is reached).

- (4) *Maximization in expressions with aspectual se*  
An expression with aspectual *se* and predicate  $\psi$  that takes theme  $x$  and describes event  $e$  is true if and only if (i) the whole of  $x$  (as picked out by the cover) participates in  $e$ , and (ii) the scale  $s$  associated with  $\psi$  in  $e$  is bounded.

If the theme and the scale are maximized, the predicate will be telic, which falls under the definition of telicity in (3), i.e., telicity follows from maximization. Thus, *comerse la manzana* ‘eat up the apple’ (2) is telic, because aspectual *se* requires that the themes have a fixed quantity and that the scale be bounded.<sup>5</sup> This means that in Spanish, the sentential meaning of these predicates is calculated in the interaction of lexical means, i.e., the verb, aspectual *se*, etc., as they appear in relevant morphosyntactic configurations (see, e.g., [MacDonald](#) for a syntax for aspectual *se*). Importantly, aspectual *se* is key here in that it imposes particular semantic requirements in connection to maximization and telicity as established in the lexicon—here is where our main focus lies. In contrast, no such mechanism is available in English, so the calculation of telicity is not mediated by requirements imposed by an element such as aspectual *se*, as anticipated above for *eat the apple* (1). Throughout this paper, we use singular themes with the definite article which have a fixed quantity, thus mainly concentrating on the scalar (bounded vs. unbounded) properties of the verb.

In a previous study on aspectual *se* with change-of-state and psychological verbs with inchoative interpretations among heritage speakers and second language (L2) learners of Spanish, [García-Tejada et al. \(2023\)](#) found that heritage speakers outperformed L2 speakers in the acquisition of *se* with change-of-state verbs even at similar proficiency levels. They further found that in both groups, higher proficiency correlated with higher accuracy.

In the current study, we expect to expand on [García-Tejada et al.’s \(2023\)](#) findings regarding the effects of age of acquisition, such that later onset of bilingualism among heritage speakers will pattern with more monolingual-like performance. We explore the role of lexical access, dominance, and use patterns, although with *se* not as a marker of inchoativity, change of state, or associated with psychological states, but as a marker of telicity. We turn to these issues in the next section.

### 3. Lexical Access, Dominance, Age of Acquisition, and Patterns of Language Use

#### 3.1. Lexical Access

Lexical access refers to the ability with which a speaker can retrieve lexical items from the lexicon. A speaker with a high level of lexical access, therefore, should be able to retrieve lexical items quickly. Lexical access is key in bilingual studies, as bilinguals have been shown to have more difficulty with it due to having both languages co-activated in the mind, resulting in competition between lexical items ([Abutalebi and Green 2007](#); [Bialystok et al. 2008a, 2008b](#); [Kroll et al. 2014](#)). For instance, [Gollan et al. \(2011\)](#) propose the Frequency-Lag Hypothesis in this regard. They found that bilinguals’ lexical access is affected differently in production and comprehension, with the former being driven more by semantic constraints and the latter being driven more by frequency. Age of acquisition

can also be a factor that affects bilingual lexical access, such that words that are acquired earlier can typically be accessed more quickly (Montrul and Foote 2014). Importantly, some research suggests that heritage speakers' language experience has a greater influence on heritage language acquisition and lexical access than age of acquisition alone (Montrul and Foote 2014; Kim and Kim 2022).

Previous research has established a connection between lexical access and heritage speakers' proficiency in their heritage language (Montrul and Foote 2014; Wiener and Tokowicz 2021). Building on previous works, we measure lexical access by means of the Multilingual Naming Test (MiNT) (Gollan et al. 2012), which has been shown to correlate well with both self-reported and objective measures of language proficiency.

### 3.2. Dominance

Dominance usually refers to the relative weight of two (or more) languages in a bilingual (or multilingual) language user. It involves different dimensions and domains, which range from linguistic competence, production, and processing, as well as contexts of language use and language attitudes (Birdsong 2014; Gertken et al. 2014). It is also thought to govern bilingual lexical memory representations (Heredia 1997), to determine the language of mental calculations (Tamamaki 1993), and to impact syntactic processing (Rah 2010). Dominance is gradient (i.e., non-categorical), as it can only truly be assessed and analyzed in comparison with the bilingual's other language (Birdsong 2014; Gertken et al. 2014). While often conflated with proficiency, proficiency represents only a single aspect of dominance whereas dominance encompasses proficiency as well as a variety of extra-linguistic variables. Shea (2019) highlights this distinction mentioning that assessing language dominance is difficult, as it also encompasses the context of language acquisition and use, the very factors that distinguish heritage speakers and second language learners.

The current work uses the Bilingual Language Profile (BLP), which is a commonly used, open-access self-reported measure of language dominance (Birdsong et al. 2012). As Gertken et al. (2014) indicate, the BLP fulfills both practical and theoretical objectives and has been validated against other measures of language dominance, such as The Language Experience and Proficiency Questionnaire (LEAP-Q) (Marian et al. 2007), the Bilingual Dominance Scale (BDS) (Dunn and Fox Tree 2009), and the Self-Report Classification Tool (SRCT) (Lim et al. 2008). We have opted to use the BLP due to its strong reliability as a self-reported language dominance measure.

### 3.3. Age of Acquisition and Patterns of Language Use

Age of acquisition refers to the age at which someone is first exposed and begins to acquire a language. Early age of acquisition has often been assumed to be one of the key contributors to heritage speakers' linguistic development (Montrul 2002; Montrul et al. 2008). Studies of heritage language proficiency have frequently included age of acquisition as a variable. Many studies have shown a correlation between age of acquisition and monolingual-like language use (Montrul et al. 2008; Silva-Corvalán 2014; Gharibi and Boers 2017). Other studies, however, have begun to include patterns of language use as a potential alternative or complement to age of acquisition. While age of acquisition focuses on the earliest years of acquisition, patterns of language use allow us to measure the potential impact of current language use. Indeed, in their (2012) study of bilingual preschool children, Bedore et al. (2012) found that patterns of current language use accounted for more of the variance in language dominance than did age of first exposure. Likewise, Kastenbaum et al. (2019) found that patterns of language exposure significantly affected performance on lexical access tasks in adults. Similarly, It has also been found that continued language practice is a major factor influencing high bilingual proficiency, irrespective of age of acquisition (De Carli et al. 2015). Finally, Giancaspro (2019) found that heritage speakers' Spanish proficiency was more predictive of monolingual-like use of subjunctive than age of acquisition of English.

In addition to language dominance, we use the BLP to gather information on extralinguistic variables that may shape the heritage speakers' language experiences and patterns of language use (see Section 3.2 for general information about this test and why we chose it for this purpose).

#### 4. Research Questions and Variables

Given the difference between Spanish and English, this study aims to explore what happens in the mind of heritage speakers that have one language in which a morphological marker such as the clitic *se* is used as an indicator of telicity and another in which telicity is calculated in connection to the scalar meaning of the predicate. We posit the following research questions:

1. Are the heritage speakers' telicity interpretations sensitive to the presence of *se* in Spanish? Are their interpretations sensitive to the boundedness of scalar verbs in English?
2. Do levels of lexical access, language dominance, age of acquisition, and patterns of language use affect the interpretation of telicity/maximization indicators (maximizers) in English and Spanish among Spanish heritage speakers?

For our first research question, we hypothesize that the heritage speakers will show variability in their telicity interpretations in Spanish. This hypothesis is consistent with proposals on heritage language showing signs of variability due to reduced input (Montrul 2002 et seq.) or lack of opportunities to activate the heritage language for production or comprehension purposes (Putnam and Sánchez 2013). Additionally, the acquisition of aspectual differences is one area of the heritage speaker's grammar that has been shown to differ from that of their monolingually raised counterparts. (Montrul 2002, 2004, 2008; Montrul and Perpiñán 2011; Miller and Cuza 2013; Cuza and Miller 2015). With regard to English, we hypothesize that heritage speakers do not show signs of variability and perform similarly to monolingually raised English speakers given that the heritage speaker's dominant language is almost always English. To the best of our knowledge, no previous studies have found differences between adult heritage speakers and monolingually raised speakers of English regarding their semantic knowledge of aspectual issues.

Furthermore, for the remaining research questions, we hypothesize that lexical access, dominance, age of acquisition, and language use patterns affect the interpretation of telicity/maximization indicators in both languages. We consider these extralinguistic factors to be proxies for language activation (Putnam and Sánchez 2013). If lexical access is a predictor of telic/atelic interpretations, we expect heritage speakers with higher scores on the English MiNT to be sensitive to the scalar meaning of the verb as an indicator of telicity/maximization in English. We also expect heritage speakers with higher scores on the Spanish MiNT (i.e., greater lexical access in Spanish) to be more sensitive to *se* as a marker of telicity/maximization in Spanish. Regarding dominance, we expect Spanish dominance to correlate with less sensitivity to the scalar meaning of the verb in English, as posited in the previous literature. Conversely, we expect English dominance to correlate with less sensitivity to *se* as a telicity/maximization indicator. In terms of age of acquisition, we expect an early age of acquisition of English to favor sensitivity to the scalar meaning of the verb in English and disfavor sensitivity to *se* as a telicity marker. Patterns of more frequent English use are expected to favor sensitivity to the scalar meaning of the verb in English. Frequent use of Spanish is expected to favor telic interpretations of predicates with *se* in Spanish. In addition, we also further explore how the heritage speakers' atelic/telic interpretations compare to those of monolingually raised speakers of Spanish and English to further our understanding of the role of some of the independent variables.

#### 5. Materials and Methods

##### 5.1. Tasks

A vocabulary test (MiNT) was used to measure lexical access in English and Spanish and a background questionnaire (BLP) was used to measure dominance and to collect

data about the participants' linguistic experience, age of acquisition and identity, as well as their self-rated proficiency in all their languages. The data from the MiNT and BLP are complementary. Together they provide a well-rounded description of the participants' linguistic backgrounds and patterns of language use.

#### 5.1.1. Multilingual Naming Test (MiNT)

The Multilingual Naming Test (MiNT) (see Section 2) tested the participants' ability to retrieve a lexeme in 25 s or less. The test contained 68 pictures of various objects presented one at a time on a computer screen. The participants had to type the name of the object in a text box and click on the arrow mark to move forward. The items became progressively more difficult (i.e., less frequent). Bilingual participants did the MiNT in both English and Spanish.

MiNT score results were calculated following the binary principle of correct = 1/incorrect = 0. The number of correct namings was taken for the overall MiNT score. A higher score suggests greater lexical access, whereas a lower score suggests restricted lexical access. We use MiNT scores as a proxy for language proficiency in the two languages.

#### 5.1.2. The Bilingual Language Profile (BLP)

The measure of language dominance, age of acquisition and patterns of language use in the study was the Bilingual Language Profile (BLP), a questionnaire which encompasses the data on the participants' linguistic practices with information on the extra-linguistic factors conditioning their language use (Birdsong et al. 2012; Olson 2023). The BLP contained four blocks of questions: language history, language use, language proficiency and language attitudes. In particular, there were questions about the participant's experience with (each of) their language(s), age of acquisition of a given language, daily language, self-assessment of their language proficiency, and questions highlighting whether the participants would prefer to be identified as native speakers of a given language. The participants filled in the questionnaire before starting the main experiment.

To move forward, the participants had to enter their answer to the question on the page and click on the arrow mark. The accepted answers were a number, e.g., the number of years spent in a Spanish- or English-speaking classroom, or a phrasal response, e.g., 'all my life' for the questions asking to define stages in life when a language was used.

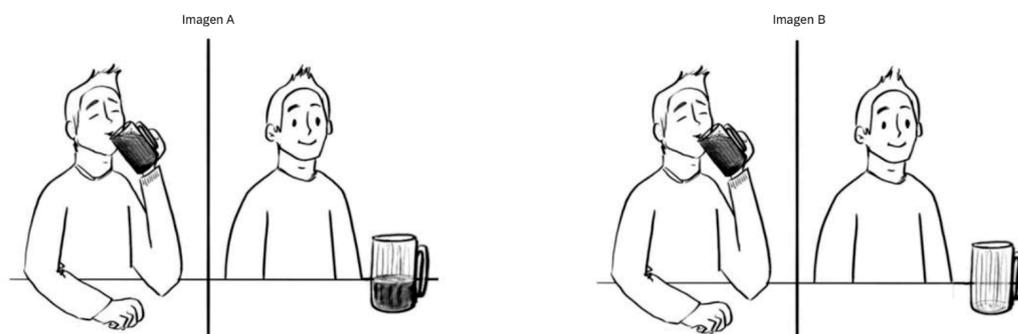
At the stage of data analysis, each response was assigned a numeric value, and a total BLP score was calculated for each participant. Bilingual dominance was calculated by subtracting the BLP score a participant had in one language from the score they received in the other.

The general analysis of the background data of our participants prompted the creation of the following variables: language dominance (per BLP), and age of acquisition. We understand language dominance as patterns of language use calculated by BLP. The variable age of acquisition states the age of first meaningful exposure to the language, the time when a participant started acquiring it. These variables are included in the statistical analysis in the main experiment.

#### 5.1.3. Experimental Task

*Procedure.* After providing their background information, the participants were directed to the main experiment, a picture selection task. The experiment started with a demonstration video explaining the task and showing how to navigate through it. This was followed by a few training items prompting the participants to use all the navigation keys as demonstrated in the video. To move through this first experiment, the participants had to press an arrow icon at the bottom of the screen. Each new screen presented two pictures to choose from. The participants were prompted to click on the 'sound' icon to hear the target sentence and make their picture choice afterwards. To select a picture, they had to click on it.

The pictures demonstrated a complete vs. incomplete activity, and the order of picture presentation was controlled for. See Figure 1 for a sample from the experiment.



**Figure 1.** Sample picture for a selection task. Image A illustrates an atelic activity, Image B illustrates a telic activity.

Upon hearing the target sentence *The dad drank the beer*, the participants had to decide which picture was a better match for the sentence.

*Items.* Experimental tokens were declarative matrix sentences describing a telic vs. atelic activity. Following common practice in the semantic literature about lexical aspect, the items were all in the simple past. We further selected verbs frequently used in the discussion of scalar meaning (i.e., indicating change), such as eat, drink, etc. (see Kennedy and Levin 2008; Beavers 2011; Pedersen 2015; Martínez Vera 2022). Based on the notion of telicity/maximization, the English items manipulated the scalar verbs varying in whether they were bounded or unbounded.

- |     |    |                           |                                 |
|-----|----|---------------------------|---------------------------------|
| (5) | a. | The dad drank the beer.   | (bounded scalar verb, telic)    |
|     | b. | The dad widened the path. | (unbounded scalar verb, atelic) |

The Spanish items manipulated the use of predicates with or without *se*, (6), with (6b) allowing an atelic interpretation.

- |     |    |                            |                                    |
|-----|----|----------------------------|------------------------------------|
| (6) | a. | El papá se tomó la cerveza | (with <i>se</i> , telic)           |
|     | b. | El papá tomó la cerveza    | (without <i>se</i> , $\pm$ atelic) |

The presence of *se* in the Spanish examples in (6) is crucial because it imposes a restriction whereby the maximum degree of consumption needs to be reached (so that the whole theme is consumed). Total consumption is required in (6a), but not in (6b).

The full token set contained 12 items targeting telic interpretations and 12 items targeting atelic items, intermingled with 24 distractors. The total number of sentences was 48 in each language, English and Spanish. The bilingual group did the task in both languages. The order of the languages in the bilingual part of the experiment were counterbalanced such that half of the participants completed the English tasks first and the other half of participants completed the Spanish tasks first. Stimuli within tasks were randomized. A male Spanish heritage speaker was the voice used in the recordings of the English and Spanish tokens. The speaker was instructed to use a neutral intonation for all recordings and read the tokens from a computer screen. All the tokens were recorded and then normalized using Praat, i.e., the volume of all recordings was equalized and any interference or static noises which may have occurred during recording were removed.

#### 5.1.4. Participants

Three groups of participants completed the experiment: Spanish heritage speakers ( $n = 23$ ) (HS), Spanish monolingually raised speakers ( $n = 19$ ), and English monolingually raised speakers ( $n = 30$ ). For ease of presentation, hereafter we refer to these two groups as monolingual Spanish speakers (MSS) and monolingual English speakers (MES), respectively. The participants' gender, age, and, in the case of the heritage speakers, age of acquisition of English are given below in Table 1. Heritage speaker participants were

recruited from college heritage Spanish classrooms from the Chicagoland area. Heritage speakers are all born or have resided since an early age in the Chicagoland area and are predominantly speakers of Mexican Spanish. Spanish monolingually raised participants are predominantly Latin American Spanish speakers residing in the Chicagoland area and were recruited via word of mouth through mutual connections of researchers, members of the community in Chicago, and the heritage speaker participants themselves. English monolingually raised speakers are predominantly Midwestern/Chicago speakers of English and are all from the Chicagoland area. They were recruited via word of mouth, similarly to the Spanish monolingually raised speakers. The age ranges are more varied for the monolingually raised participants as they were all members of the community and were same-aged peers or sometimes older speakers (i.e., parents), though most were college-aged. The Spanish monolingually raised speakers in particular are used as a baseline for the college-aged Spanish heritage speakers and are necessarily older due to being their parents' generation. Information about the participants' language backgrounds, ages, self-rated proficiency, usage, and linguistic attitudes was gathered using the BLP. The data generated by the BLP led to the exclusion of three English monolingually raised participants, six Spanish monolingually raised participants, and three Spanish–English heritage speakers. Of these exclusions, eleven were made on the basis of age of acquisition, and one was excluded for responding that they had taken 100 years of English classes. An additional six English monolingually raised speakers were excluded for completing the MiNT task in Spanish.

**Table 1.** Participant information (F = female).

Group	N	Age	AoA (English)
English monolinguals	30 (F = 14)	18–62 (M = 35.73)	n/a
Spanish monolinguals	19 (F = 19)	30–57 (M = 42.63)	n/a
Spanish heritage speakers	23 (F = 19)	18–30 (M = 20.04)	0–13 (M = 4.04)

### 5.1.5. Statistical Analysis

We analyzed the data from the experimental task by using generalized linear mixed models (GLMM) in R (R Core Team 2021) with the *glmer* function from the *lme4* package (Bates et al. 2015). The GLMMs included response (telic interpretation = 1, atelic interpretation = 0) as the dependent variable and condition as independent variable. In the English task, the condition contrasted bounded vs. unbounded scalar verbs (e.g., *eat* vs. *widen*). In the Spanish task, on the other hand, it contrasted the presence or absence of *se* (*comer* 'eat' vs. *comerse* 'eat up'). Furthermore, additional models were run in order to explore effects and interactions of other variables including age of onset of acquisition of English and Spanish, MiNT dominance, BLP dominance, MiNT scores in Spanish and English, as well as the responses to all the questions of the BLP. These additional variables were standardized. All models included random intercepts for each subject as well as for each test item.

## 6. Results

### 6.1. The MiNT and BLP Results

In this section, we present descriptive statistics for four variables under examination: the MiNT scores in Spanish and English as well as two variables derived from the BLP questions: language dominance and use of Spanish with family. These results are provided for Spanish heritage speakers, monolingually raised English speakers, and monolingually raised Spanish speakers in Table 2 (for simplicity, we will use the term 'monolingual' in what follows to refer to monolingually raised speakers).

**Table 2.** MiNT scores.

English Monolinguals	Spanish Monolinguals	Spanish Heritage Speakers	
English MiNT scores	Spanish MiNT scores	English MiNT scores	Spanish MiNT scores
Range = 56–68/68; M = 63.7/68; SD = 2.57	Range = 50–63/68; M = 58.5/68; SD = 3.59	Range = 49–68/68; M = 58.9/68; SD = 4.54	Range = 37–61/68; M = 50.1/68; SD = 6.22

With the exception of two participants, all bilingual participants had a higher productive vocabulary size in English. Spanish MiNT scores ranged between 37 and 61 out of 68, whereas English scores ranged between 49 and 68 out of 68. Of the two participants who were not dominant in English at the time of completing the task, one obtained the same MiNT scores in both Spanish and English (52 out of 68), while the other participant scored higher in Spanish than in English (61 vs. 49).

BLP dominance results confirm that monolingual speakers are dominant in their native languages while some degree of variation exists in the heritage speakers group. Nevertheless, only four heritage speakers had scores indicating dominance in Spanish, with BLP scores of 2.91, 11.99, 63.66, and 84.14. Table 3 shows the three groups’ BLP score ranges, averages, and standard deviations (recall that BLP scores range from –218 to 218). In this study, negative values indicate dominance in English while positive values indicate dominance in Spanish.

**Table 3.** BLP scores.

English Monolinguals	Spanish Monolinguals	Spanish Heritage Speakers
Range = –215 to –110; M = –178; SD = 26.6	Range = 20.6 to 202; M = 111; SD = 55.1	Range = –87.5 to 84.1; M = –31; SD = 41.5

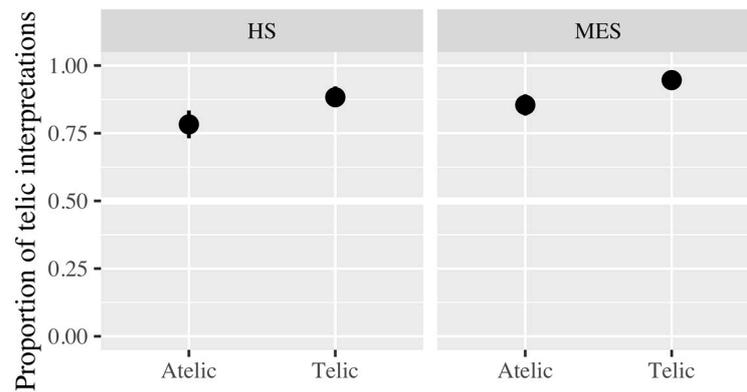
Finally, the results from the question targeting language patterns with family members can range from 0 to 100 in each of the languages spoken by the participant, yet the sum of their responses across languages cannot exceed 100. Overall, the responses to this question are consistent with the findings presented above: monolingual speakers show a strong preference for their native language while the heritage speaker group is characterized by their variability. However, results suggest that the heritage speakers in this study prefer to use Spanish with their family, as shown in Table 4.

**Table 4.** Language spoken with family.

English Monolinguals	Spanish Monolinguals	Spanish Heritage Speakers	
English scores	Spanish scores	English scores	Spanish scores
Range = 50 to 100; M = 95/100; SD = 14	Range = 30 to 100; M = 82.1/100; SD = 23.1	Range = 0 to 90; M = 34.1/100; SD = 21.1	Range = 10 to 100; M = 65.9/100; SD = 21.1

6.2. Picture Selection Task: English

Overall, participants interpreted most of the test items as telic across conditions (i.e., bounded vs. unbounded scalar verbs, e.g., *eat* vs. *widen*) and groups. However, group and condition effects were found: monolinguals had more telic interpretations than heritage speakers ( $\beta = 1.06$ ,  $SE = 0.44$ ,  $z = 2.43$ ,  $p = 0.015$ ) and the condition featuring bounded scales generated more telic interpretations ( $\beta = 1.05$ ,  $SE = 0.40$ ,  $z = 2.60$ ,  $p = 0.01$ ), as we expected (see Figure 2). An additional GLMM run by using heritage speakers data only confirmed that the condition predicts their interpretations ( $\beta = 0.80$ ,  $SE = 0.33$ ,  $z = 2.43$ ,  $p = 0.02$ ). Figure 2 and Table 5 show these effects by presenting the proportions of telic interpretations across groups and conditions.

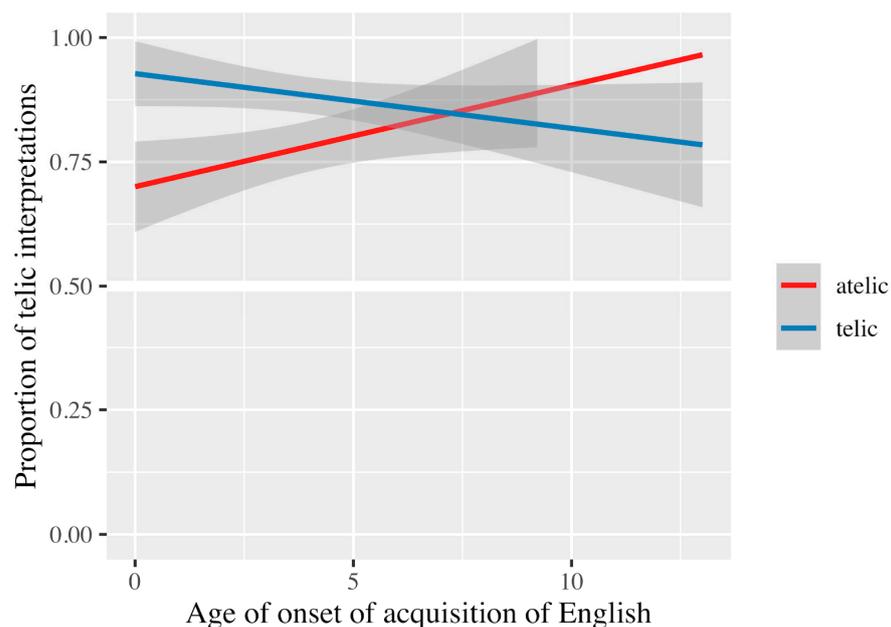


**Figure 2.** Telic interpretations in the English task across conditions by Spanish heritage speakers (HS) and monolingual English speakers (MES).

**Table 5.** Means and averages per condition.

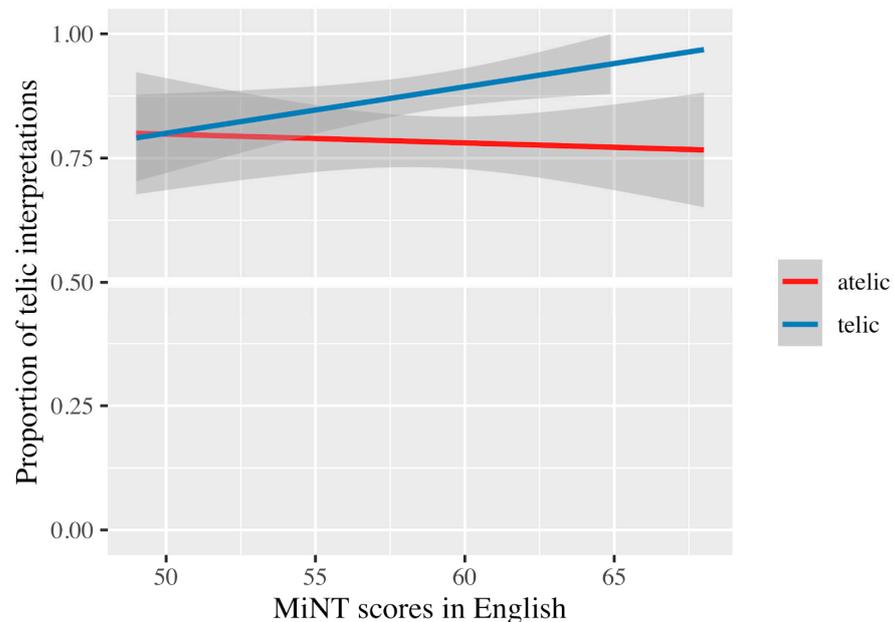
Condition	Spanish Heritage Speakers	Monolingual English Speakers
Bounded scalar verb	M= 0.88; SD= 0.32	M= 0.88; SD= 0.32
Unbounded scalar verb	M= 0.78; SD= 0.41	M= 0.86; SD= 0.35

Among the heritage speakers, there were no effects of age of acquisition of Spanish ( $\beta = -0.07$ ,  $SE = 0.20$ ,  $z = -0.34$ ,  $p = 0.74$ ). However, despite not finding a significant effect of age of acquisition of English ( $\beta = 0.40$ ,  $SE = 0.24$ ,  $z = -1.69$ ,  $p = 0.09$ ), a GLMM found an interaction between condition and age of acquisition of English among the heritage speakers ( $\beta = 0.53$ ,  $SE = 0.26$ ,  $z = 2.07$ ,  $p = 0.04$ ), which suggests that heritage speakers' telicity interpretations differ across conditions as their age of acquisition of English varies. Specifically, the heritage speakers who acquired English earlier in life are more likely to assign telic readings to the boundedness of the scale condition, which is expected to be interpreted as telic, as opposed to the heritage speakers who started learning English later in childhood, who assigned more telic readings to test items presenting unfixed quantity themes than to the test items featuring fixed quantity themes. This is shown in Figure 3.



**Figure 3.** Telic interpretations in the English task as a function of age of onset of acquisition of English among Spanish heritage speakers.

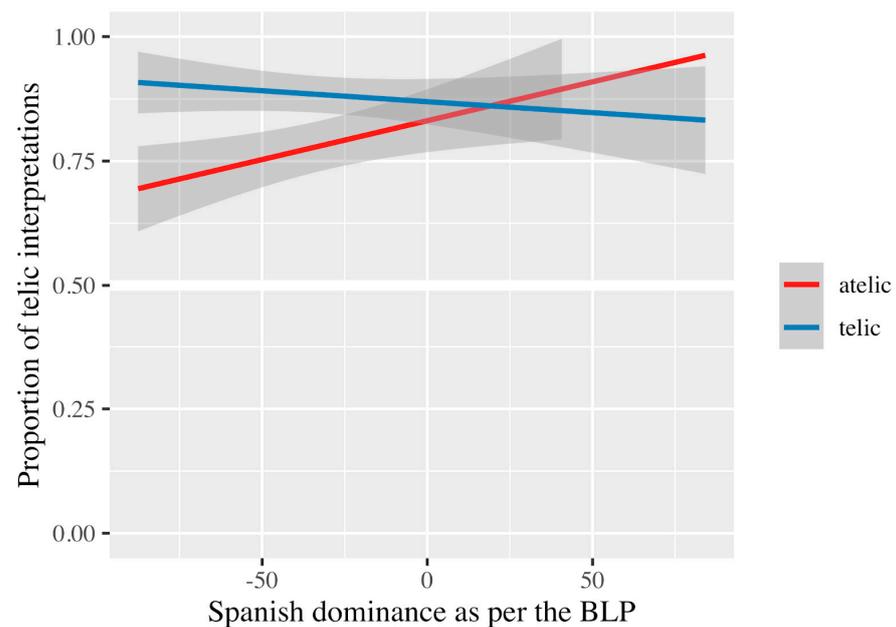
Furthermore, while English MiNT scores per se did not yield significant effects ( $\beta = -0.57$ ,  $SE = 0.22$ ,  $z = -0.26$ ,  $p = 0.80$ ), an interaction between condition and English MiNT scores suggests that higher English MiNT scores increased the likelihood of a telic interpretation of items with predicates expected to be telic ( $\beta = 0.53$ ,  $SE = 0.26$ ,  $z = 2.07$ ,  $p = 0.04$ ), whereas that was not the case for test items belonging to the other condition. This is shown in Figure 4.



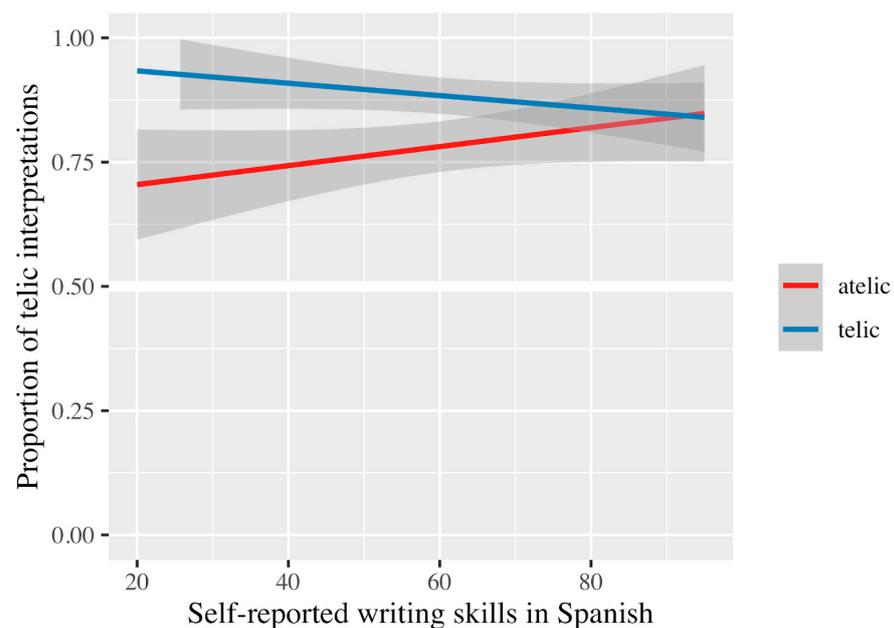
**Figure 4.** Telic interpretations in the English task by Spanish heritage speakers according to English MiNT scores.

Regarding dominance as determined by self-reporting in the BLP, we found that the results from the English-language picture selection task presented a marginal effect of Spanish dominance ( $\beta = 0.44$ ,  $SE = 0.24$ ,  $z = 1.86$ ,  $p = 0.06$ ), which could suggest that balanced and more Spanish-dominant heritage bilinguals assign more telic readings than their English-dominant counterparts regardless of condition. Additionally, an interaction between BLP dominance scores and condition indicates that the more dominant in Spanish participants were, the more likely they were to select images conveying atelic interpretations for items with predicates expected to receive telic interpretations ( $\beta = -0.62$ ,  $SE = 0.25$ ,  $z = -2.50$ ,  $p = 0.01$ ) (see Figure 5).

Other effects were found in the English task such as interactions indicating an increase in telicity interpretations in predicates with a bounded scale among participants who reported more frequent use of English with friends ( $\beta = 0.59$ ,  $SE = 0.25$ ,  $z = 2.32$ ,  $p = 0.02$ ). Noteworthy is the interaction between self-reported writing skills in Spanish and condition, which points out the decreased likelihood of telic interpretations of predicates with a bounded scale among heritage speakers who self-reportedly have better writing skills in Spanish ( $\beta = -0.51$ ,  $SE = 0.24$ ,  $z = -2.12$ ,  $p = 0.03$ ) as seen in Figure 6.



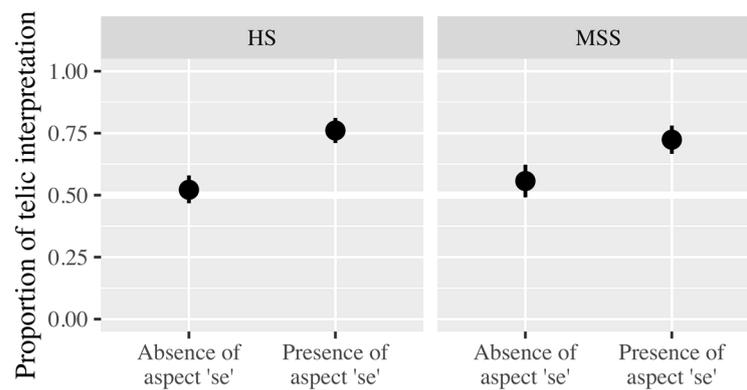
**Figure 5.** Telic interpretations in the English task by Spanish heritage speakers according to Spanish dominance in the BLP.



**Figure 6.** Telic interpretations in the English task by Spanish heritage speakers as a function of self-reported writing skills in Spanish.

### 6.3. Picture Selection Task: Spanish

As in the English task, telic interpretations were more frequent across groups and conditions (presence or absence of *se*, e.g., *comerse* ‘eat up’ vs. *comer* ‘eat’) in the Spanish task. A condition effect shows that *se* generates telic interpretations ( $\beta = 1.25$ ,  $SE = 0.49$ ,  $z = 2.57$ ,  $p = 0.01$ ). On the other hand, there were no differences between the two groups in terms of the effect of *se* ( $\beta = 0.06$ ,  $SE = -0.20$ ,  $z = 0.30$ ,  $p = 0.77$ ). This is shown in Figure 7; see Table 6 as well in this regard (see below for discussion of *se* contributing telic interpretations with *comió* and *tomó*, but not with *leyó*).

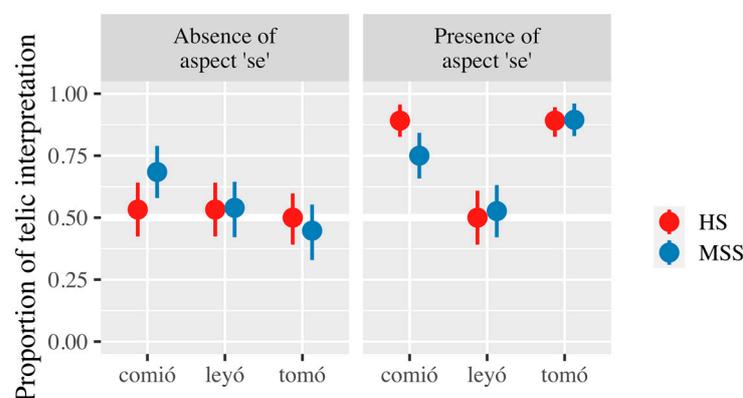


**Figure 7.** Telic interpretations in the Spanish task across conditions by heritage speakers (HS) and monolingual Spanish speakers (MSS).

**Table 6.** Mean scores for telic interpretations in the Spanish task across conditions by Spanish heritage speakers and monolingual Spanish speakers.

Condition	Spanish Heritage Speakers	Monolingual Spanish Speakers
Presence of <i>se</i>	M= 0.76; SD= 0.43	M= 0.72; SD= 0.45
Absence of <i>se</i>	M= 0.52; SD= 0.50	M= 0.56; SD= 0.50

We hypothesized that the absence of *se* could result in telic or atelic interpretations. In contrast, its presence would result in telic ones. It was surprising to see that *se* did not have a stronger effect on the preference for telic interpretations, especially among Spanish monolinguals. For that reason, we looked at the effects of the presence of *se* on the telic interpretation with two verbs of consumption (*comer* ‘eat’ and *tomar* ‘drink’) and on *leer* ‘read’, which is a verb that takes an incremental theme but has an unbounded scale—the theoretical literature has pointed out that these kinds of predicates would trigger telic interpretations in the presence of *se* (see [Martínez Vera 2022](#) and references therein). We ran a GLMM including response (telic interpretation = 1, atelic interpretation = 0) as dependent variable and group (heritage speakers vs. monolingual Spanish speakers), condition (presence or absence of *se*), and verb (*comió*, *leyó*, *tomó*) as independent variables, as well as participant and test item as random effects. This GLMM also explored interactions between all the independent variables. The GLMM confirmed that *se* does contribute to telic interpretations with these verbs ( $\beta = 1.86$ ,  $SE = 0.67$ ,  $z = 2.78$ ,  $p = 0.01$ ); see [Figure 8](#); see [Table 7](#) for additional details.



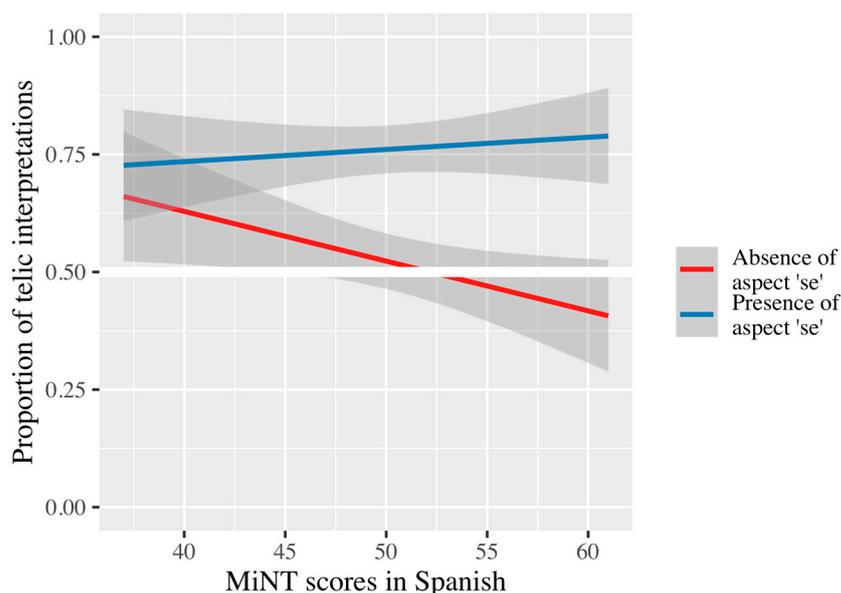
**Figure 8.** Telic interpretations across conditions, verbs, and groups.

**Table 7.** Means and averages across conditions, verbs, and groups.

Condition	Verb	Spanish Heritage Speakers	Monolingual Spanish Speakers
Presence of <i>se</i>	comió	M = 0.89; SD = 0.31	M = 0.75; SD = 0.44
	leyó	M = 0.50; SD = 0.50	M = 0.53; SD = 0.50
	tomó	M = 0.89; SD = 0.31	M = 0.90; SD = 0.31
Absence of <i>se</i>	comió	M = 0.53; SD = 0.50	M = 0.68; SD = 0.47
	leyó	M = 0.53; SD = 0.50	M = 0.54; SD = 0.50
	tomó	M = 0.50; SD = 0.50	M = 0.45; SD = 0.50

Even though *se* favors telic interpretations, its effect is weaker among the monolingual participants, as indicated by an interaction between presence of *se* and group ( $\beta = -1.21$ ,  $SE = 0.60$ ,  $z = -2.01$ ,  $p = 0.04$ ). Furthermore, a second interaction between presence of *se* and verb indicates that the presence of *se* does not increase the likelihood of assigning telic interpretations to predicates including the verb *leer* ‘read’ as often as to the two consumption verbs (*comer* ‘eat’ and *tomar* ‘drink’) ( $\beta = -2.01$ ,  $SE = 0.93$ ,  $z = -2.16$ ,  $p = 0.03$ ).

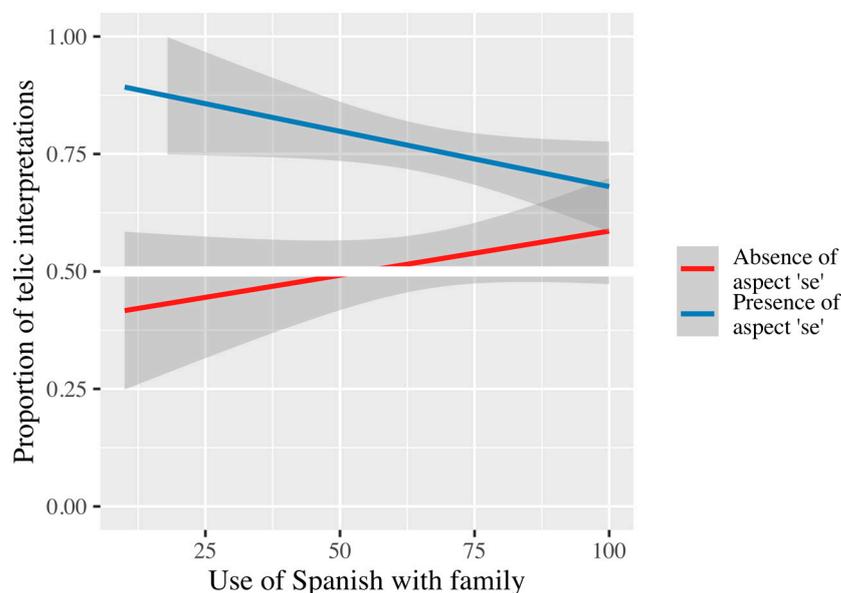
Unlike the case of the English task, there were no effects or interactions of age of acquisition of English. In terms of lexical access, a GLMM determined that high Spanish MiNT scores generate atelic interpretations in general regardless of the presence or absence of *se*. Furthermore, a marginally significant interaction between *se* and Spanish MiNT scores suggest that heritage speakers with stronger lexical access may interpret predicates without *se* as atelic more frequently than predicates with *se* ( $\beta = 0.38$ ,  $SE = 0.20$ ,  $z = 1.9$ ,  $p = 0.057$ ). This is shown in Figure 9.



**Figure 9.** Telic interpretations in the Spanish task as a function of condition (presence or absence of aspect *se*) and Spanish MiNT scores among Spanish heritage speakers.

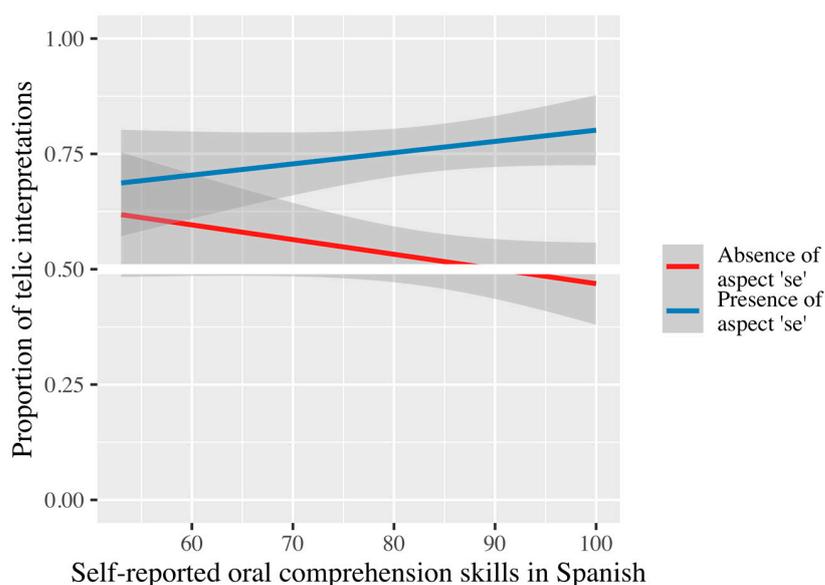
Unlike the results in the English task, there were no effects of dominance as measured by the BLP. Moreover, the participants’ self-reported perception of the amount of use of Spanish with family (measured as a percentage of weekly use of Spanish with their family in their responses to the BLP) shows an interaction between the condition (presence or absence of *se*) and the amount of Spanish spoken with family weekly on the telic interpretations of stimuli in the absent condition ( $\beta = -0.54$ ,  $SE = 0.21$ ,  $z = -2.62$ ,  $p = 0.01$ ). This suggests that participants who reportedly speak with their families in Spanish more frequently do not interpret *se* as a telicity marker as consistently as their counterparts who reportedly speak

less Spanish with their families, as shown in Figure 10 below. This unexpected finding may be the result of within-group variability: only two participants reported using Spanish with their family less than 50% of the time per week (one participant reported using Spanish with their family 10% of the week whereas another participant reported doing so 40% of the week). These two apparent outliers may account for this unpredicted interaction.

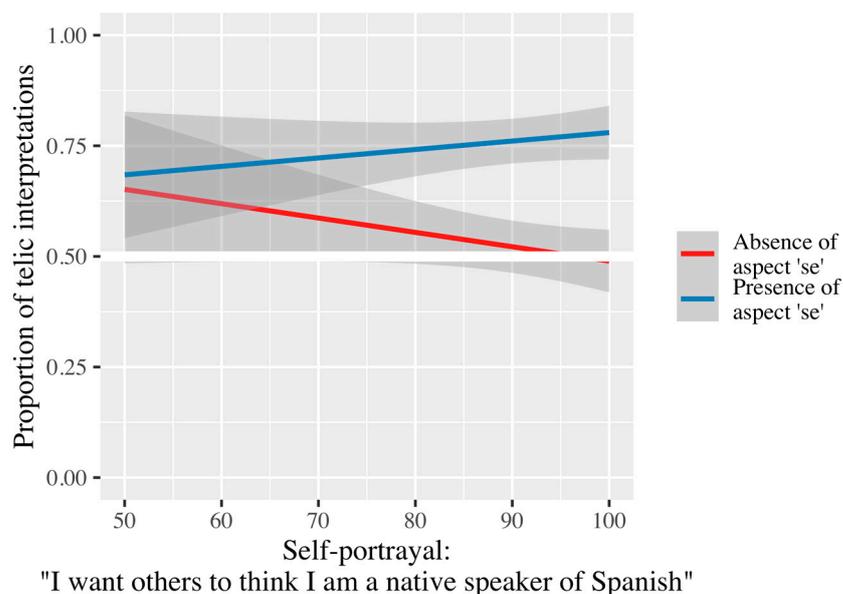


**Figure 10.** Telic interpretations in the Spanish task as a function of condition (presence or absence of aspectual *se*) and self-reported use of Spanish with family among Spanish heritage speakers.

At the same time, additional GLMMs found interactions between responses to specific questions of the BLP and condition (presence or absence of *se*): specifically, participants' perceptions of how well they understand Spanish (Figure 11) ( $\beta = 0.41$ ,  $SE = 0.20$ ,  $z = 2.08$ ,  $p = 0.04$ ), and their desire to be construed by others as native speakers of Spanish (Figure 12) ( $\beta = 0.38$   $SE = 0.20$ ,  $z = 1.92$ ,  $p = 0.054$ ) accounted for the proportion of telic interpretation in predicates with *se*. These interactions are shown in Figures 11 and 12 below, respectively.



**Figure 11.** Telic interpretations in the Spanish task as a function of condition (presence or absence of aspectual *se*) and self-reported oral comprehension skills in Spanish among Spanish heritage speakers.



**Figure 12.** Telic interpretations in the Spanish task as a function of condition (presence or absence of aspectual *se*) and self-reported desire to be construed as a native speaker of Spanish among Spanish heritage speakers.

To summarize, although results from the English task show that telic interpretations are more frequent across both groups, i.e., the Spanish heritage speakers and the monolingual Spanish speakers, telic interpretations are nevertheless more common among monolingual English speakers and in the bounded scalar verb condition. Additionally, a series of significant interactions suggests that extralinguistic factors affect the interpretations of the items in this task. Specifically, the patterns favoring English (e.g., earlier age of onset of acquisition of English, higher English MiNT scores, English dominance as per the BLP, lower self-ratings in Spanish writing skills) lead to a stronger contrast between telic interpretations with bounded scalar verbs and atelic interpretations with unbounded scalar verbs.

Results from the Spanish task present a higher number of telic interpretations across both groups and conditions (presence or absence of *se*). Contrary to the English task, no group effects were found; however, the presence of *se* generates more telic interpretations. Overall, and like in the English task, extralinguistic factors, particularly when they favor Spanish over English, impact the effect of the presence or absence of *se*. Specifically, higher Spanish MiNT scores as well as higher self-ratings of Spanish oral comprehension skills and positive identity as a Spanish (native) speaker lead to a clearer contrast between telic interpretations with predicates with *se* vs. atelic interpretations with predicates without *se*. Finally, we argue that the unexpected and inconsistent result yielded by the model exploring the effects of Spanish language use with family may derive from the fact that only two participants reported using more English than Spanish with their family. In other words, the lack of variability regarding use of Spanish with family among 21 out of the 23 heritage speakers in combination with only two heritage speakers who use more English than Spanish with their families do not allow us to confirm the interaction revealed by the inferential statistics: data from a group of heritage speakers presenting a more even distribution of Spanish use with family members would be necessary in order to further explore these effects.

## 7. Discussion

This study investigated the telic interpretations in sentences with predicates in the past tense in both Spanish and English by heritage speakers of Spanish in the United States and by two comparison groups of monolingually raised Spanish and English speakers,

respectively. In Spanish, we studied aspectual *se*, which yields telic interpretations, while in English we studied telic interpretations across two conditions: bounded vs. unbounded scalar verbs. We examined these phenomena in the two languages of heritage speakers in combination with how a series of extralinguistic factors may play a role in this regard.

Our first research question inquired about sensitivity to the conditions under examination in the two languages spoken by the heritage speakers. Specifically, for Spanish, we investigated whether heritage speakers are sensitive to the presence of *se* while, for English, we examined sensitivity to the boundedness of the scalar verb of the predicate. We hypothesized that heritage speakers would show signs of variability in Spanish, their heritage language, but not in their dominant language, English, following previous heritage language proposals (Montrul 2002, 2004, 2008; Putnam and Sánchez 2013, among others). Our results show that, across the two languages in the current study, telic interpretations are more frequent in both heritage speakers and monolingually raised speakers. The heritage speakers' interpretations were sensitive to the presence of *se* in Spanish and to the boundedness of the scalar verb in English. Nevertheless, group effects were found in the English task but not in the Spanish task. In the Spanish task, the presence of *se* generated more telic interpretations among the heritage speakers than among the monolingually raised Spanish speakers. These unexpected results do not support our hypothesis, but are not necessarily surprising.<sup>6</sup> Studies have shown that divergence between heritage and monolingually raised speakers, while common, is not inevitable (Łyskawa and Nagy 2020; Flores and Rinke 2020). In a similar vein, the comparison between heritage and monolingually raised children sometimes shows that the former may perform similarly to younger monolinguals, suggesting that they are actually not qualitatively different but may show a delayed pace of development in comparison to monolinguals (Rinke and Flores 2018; Rinke et al. 2019).

Furthermore, we found differences in English and Spanish across predicates. A key element in our approach lies in the scalar meaning of the verbal predicates in connection to telicity. Under the FPR model, introduced in Section 3, telicity of a given predicate is expected in cases without preamble if the relevant scale is bounded (i.e., the scalar verb includes a lexical maximum representing an absolute end, e.g., total consumption) and the whole theme participates in the event. If one of these components is absent, then the predicate is atelic. Our findings suggest that, given the option, in English, monolingual speakers will choose a telic interpretation of the predicate, regardless of the boundedness of the scale, which is a crucial distinction between the different scalar meanings tied to the relevant predicates. As for Spanish, we find ample variability in the cases without *se*: regardless of the boundedness of the scale, the predicate may be interpreted as telic or atelic. This suggests that further research is needed as to how to capture telicity within lexical aspect models such as the ones adopted in this paper. This is particularly necessary with regard to the variability that is found across English and Spanish. We do find confirmation with regard to the strong preference for telic interpretations in the presence of *se* in Spanish and consumption predicates, such as *comer* 'eat' and *tomar* 'drink', which is consistent with reports in the theoretical literature (see Martínez Vera 2022). As for *leer* 'read' (where there is an open scale and an incremental theme is present), it behaves differently when compared to consumption predicates in that the presence of *se* does not yield the same results. A suggestion in this regard is that this predicate does not involve aspectual *se*, but an agentive reflexive *se* instead, as discussed by Armstrong (2013).

Our second research question investigated the extent to which levels of lexical access, dominance, age of acquisition, and patterns of language use affect the interpretation of telicity/maximization indicators (maximizers) in English and Spanish among Spanish heritage speakers. We hypothesized that all the factors above predict the interpretation of the phenomena under examination. Specifically, following Putnam and Sánchez (2013), who claim that higher patterns of heritage language activation lead to stable representations, whereas restricted opportunities to activate the heritage language for production and comprehension purposes generate variability in the heritage language, we expected that stronger lexical access, as measured by MiNT in English and Spanish, would predict

greater sensitivity to the scalar meaning of the verb as a marker of telicity/maximization in English as well as to *se* as a marker of telicity/maximization in Spanish. We also expected dominance, as measured by the BLP, to predict the interpretation of the phenomena under examination in both languages. Specifically, we expected Spanish dominance to correlate with less sensitivity to the boundedness of the scalar verbs in English and that English dominance would correlate with less sensitivity to the role of *se* as a marker of telicity/maximization in Spanish. Furthermore, we predicted an early age of acquisition of English would increase the sensitivity to the boundedness of the scalar verbs in English and reduce the sensitivity to *se* as a telicity/maximization marker. Finally, we made similar predictions regarding patterns of language exposure and use: patterns favoring English would correlate with sensitivity to the scalar meaning of verbs in English whereas patterns favoring Spanish would emphasize the role of *se* as a telicity marker in Spanish.

Our results in the English task show that, despite telic interpretations being more frequent across groups and conditions, within-group variability among the heritage speakers can be predicted by some extralinguistic factors. Specifically, greater sensitivity to the boundedness of scalar verbs was predicted: earlier age of onset of acquisition of English, stronger lexical access in English (higher English MiNT scores), English dominance as per the BLP, and lower self-ratings in Spanish writing skills. Across these extralinguistic factors, participants favoring English showed a clearer contrast when assigning telic vs. atelic interpretations as a function of whether the scalar verb in the test item was bounded or unbounded. The Spanish task showed comparable results: telic interpretations were also more common in both groups and conditions under examination. Furthermore, lexical access in Spanish, as measured by the MiNT, and self-rated proficiency, particularly of Spanish oral comprehension, were found to predict the heritage speakers' sensitivity to *se* as a telicity marker in Spanish. These findings are consistent with previous studies documenting the predicting power of lexical access as measured by MiNT scores in the acquisition of Spanish as a heritage language (Gollan et al. 2012; Hur 2020; Hur et al. 2020; López-Otero 2020, 2022; Macbeth et al. 2022).

Overall, the results of the tasks in the two languages are modulated by the within-group variability in two phenomena: lexical access as measured by the MiNT in their respective languages and self-rated proficiency, albeit in different domains: lower self-ratings in Spanish writing predict more sensitivity to scalar meaning in English, while higher self-rated proficiency in oral comprehension in Spanish predicts more sensitivity to *se* as a telicity marker in Spanish. Furthermore, English results are accounted for by the age of onset of acquisition of English as well as BLP dominance, whereas the Spanish results are not. Given these findings, our hypothesis to our first research question is partially confirmed: lexical access predicts the heritage speakers' knowledge of telicity in their two languages; however, effects of dominance and of age of onset of acquisition of English are restricted to the results of the English task. Finally, we did not find that patterns of language use effects supported our hypothesis in either of the two languages.

## 8. Conclusions

This paper has addressed the interpretation of aspect in heritage Spanish–English bilinguals by focusing on the semantic properties of scalar predicates and aspectual *se* in connection to telicity. Our research shows that *se* generates telic interpretations for the heritage and monolingually raised group with no group effect, i.e., there are no signs of incomplete acquisition (Montrul 2002, 2006, 2008; Montrul and Perpiñán 2011). Furthermore, our research shows that lexical access predicts heritage speakers' knowledge of telicity in their two languages (Putnam and Sánchez 2013; Pérez Cortés et al. 2019; Sánchez 2019). However, effects of dominance and age of onset of acquisition of English are restricted to the results of the English task. We did not find patterns of language use effects. Our findings are more in line with studies that show that divergence between heritage and monolingually raised speakers, while common, is not inevitable (Łyskawa and Nagy 2020; Flores and Rinke 2020).

This study is not, however, without limitations: for example, our heritage speaker group is formed of only 23 participants. This number of participants may account for the unexpected effect found regarding their patterns of Spanish use with their family. That only two participants reported using more English than Spanish with their family leads us to think that this effect may have been caused by lack of within-group variability. This view is supported by the claim that heritage language use tends to be more frequent in inner versus outer circles (Gibbons and Ramirez 2004; Cuartero et al. 2023; López Otero et al. 2023). In other words, variability in patterns of language use and exposure occurs in outer circles (e.g., restaurants, stores, workplace, etc.) while in inner circle contexts (e.g., close family, partner, relatives) the use of the heritage language is more frequent. Further studies investigating the role of use of Spanish with family should analyze data from a group of heritage speakers presenting more evenly distributed patterns of use of Spanish with family.

**Author Contributions:** Conceptualization, G.M.V., M.Y.S., M.T.M., A.C. and L.S.; methodology, G.M.V., M.Y.S., M.T.M., A.C. and L.S.; statistical analysis, J.C.L.O.; writing—original draft preparation, G.M.V., J.C.L.O. M.Y.S., M.T.M., A.C. and L.S.; writing—review and editing, G.M.V., M.Y.S., M.T.M. and A.C.; supervision, L.S. All authors have read and agreed to the published version of the manuscript.

**Funding:** This research received no external funding.

**Institutional Review Board Statement:** The study was conducted in accordance with the Declaration of Helsinki, and approved by the Institutional Review Board (or Ethics Committee) of University of Illinois Chicago (protocol # STUDY2022-1166, date of approval 17 November 2022) for studies involving humans.

**Informed Consent Statement:** Informed consent was obtained from all subjects involved in the study.

**Data Availability Statement:** The IRB required data to be kept confidential.

**Acknowledgments:** We would like to thank our research assistants Citlaly Herrera, Mariela Rodríguez, Ana Rodríguez Gallego, Rosela Romero Cervantes Rodríguez and Jess Ward, as well as Zenia Zepeda for the illustrations used for our experiments. We would also like to thank our participants, as well as Kara Morgan-Short and Alan Munn.

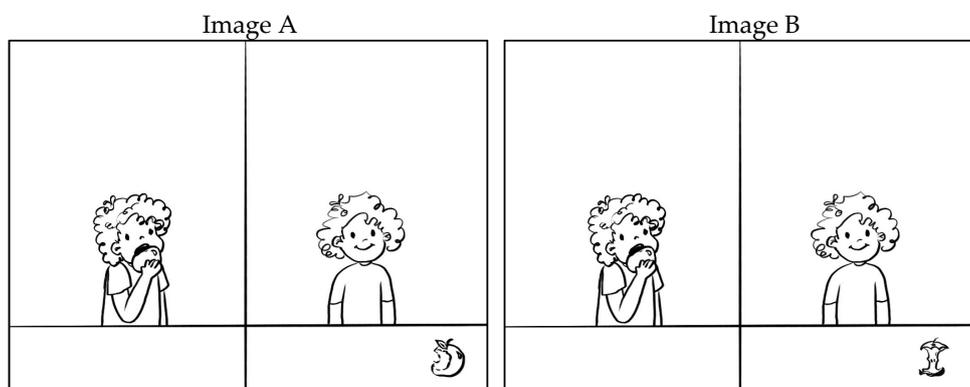
**Conflicts of Interest:** The authors declare no conflict of interest.

## Appendix A. Experimental Items

### English (Forced Choice Task)

**Condition:** bounded scalar verb

1. The boy ate the apple.



2. The dad drank the beer.

Image A



Image B



3. The teacher cleaned the table.

Image A



Image B



4. The boy ate the banana.

Image A

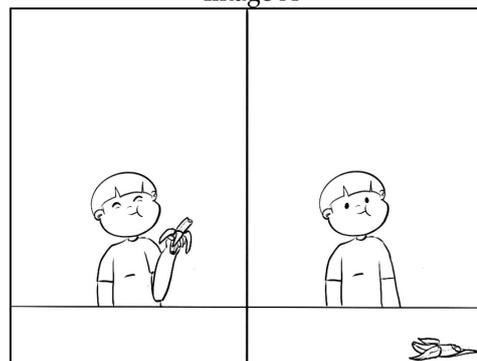
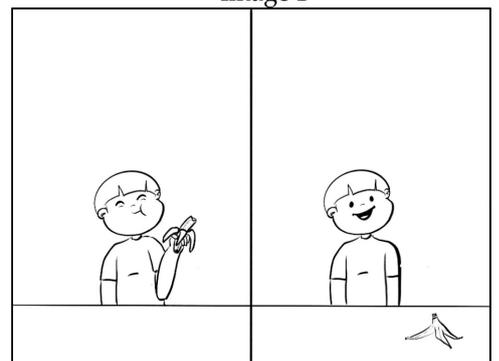
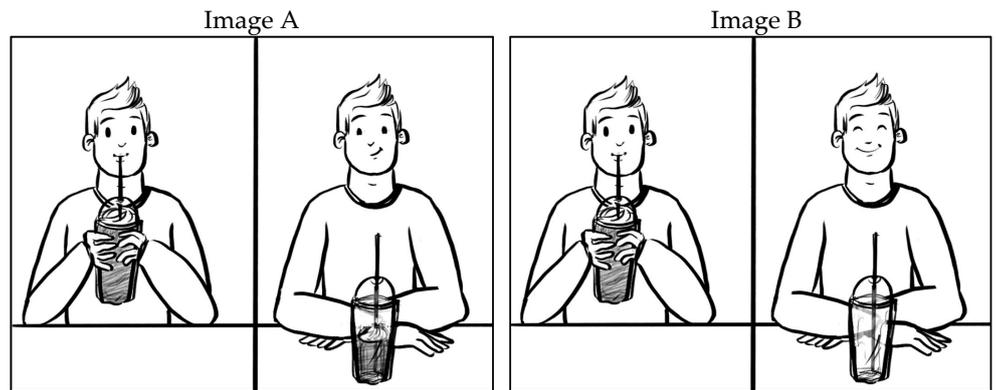


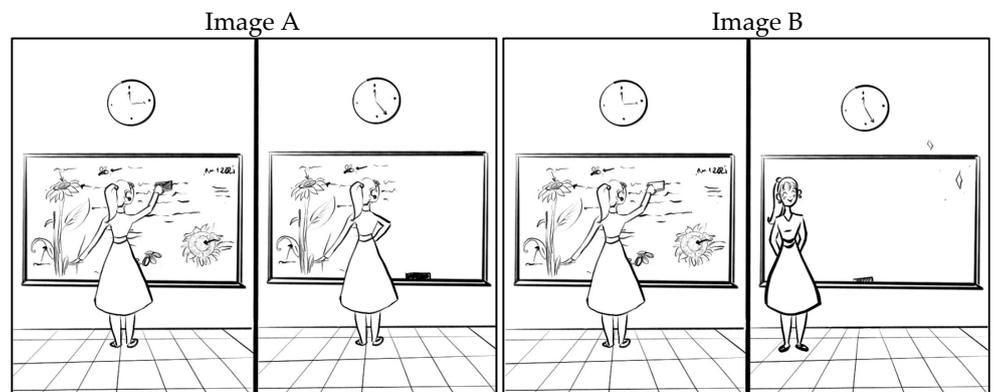
Image B



5. The dad drank the smoothie.



6. The teacher cleaned the blackboard.



7. The girl ate the apple.



8. The mom drank the beer.



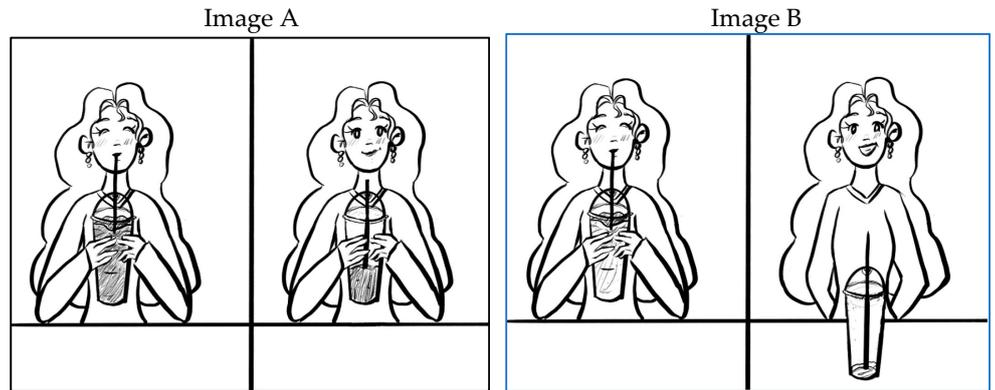
9. The student cleaned the table.



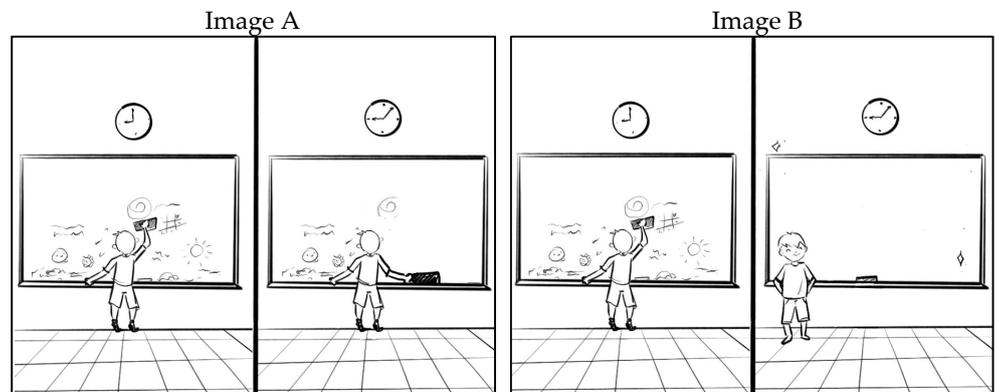
10. The girl ate the banana.



11. The mom drank the smoothie.

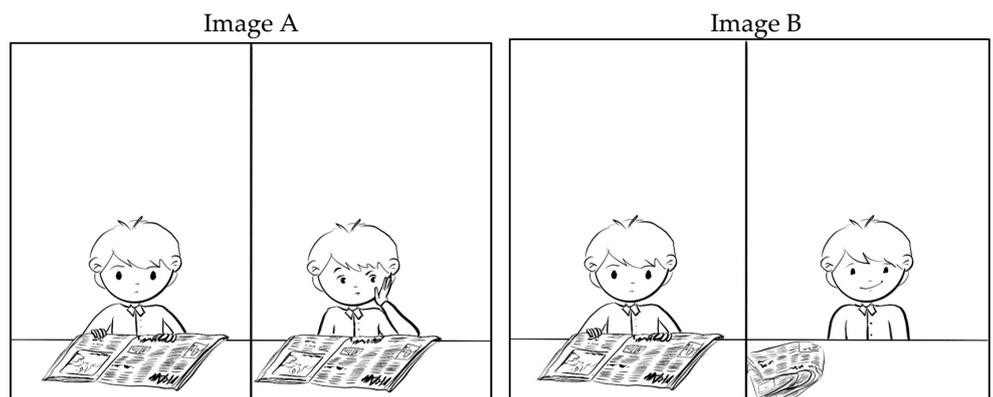


12. The student cleaned the blackboard.



**Condition:** unbounded scalar verb

1. The boy read the magazine.



2. The dad widened the path.

Image A

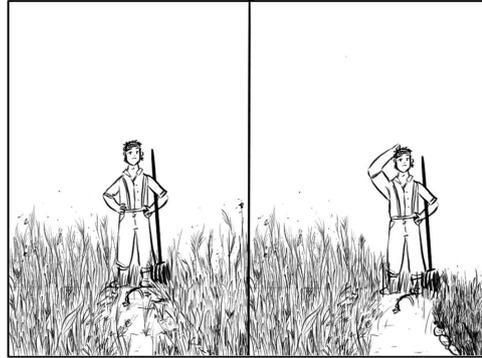
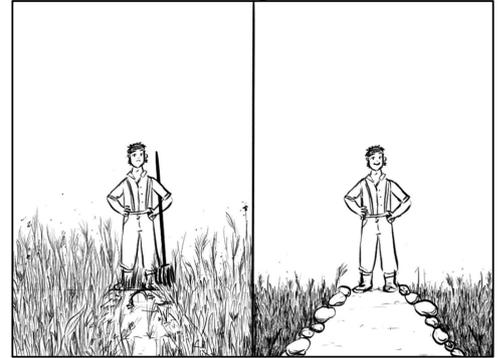


Image B



3. The teacher washed the car.

Image A

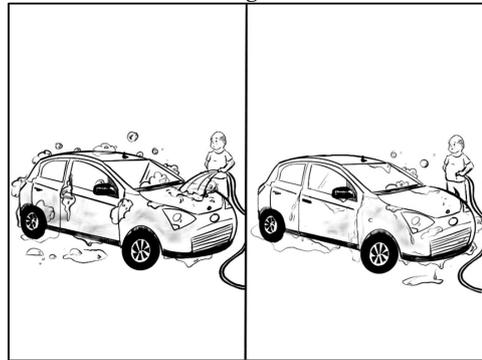
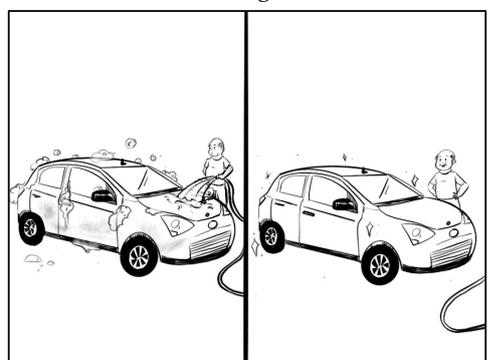


Image B



4. The boy read the newspaper.

Image A

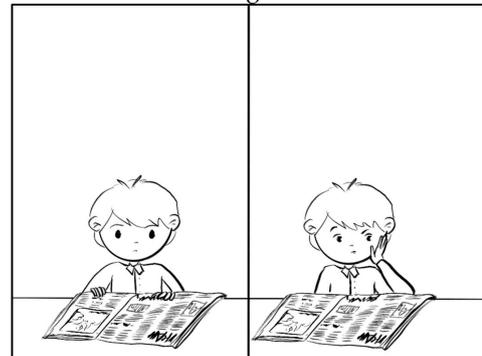
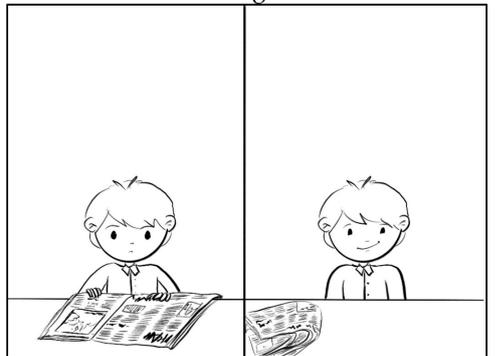


Image B



5. The dad widened the sidewalk.

Image A

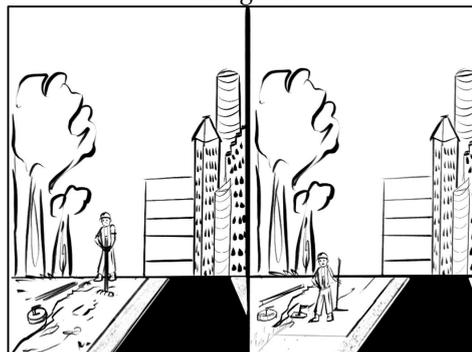
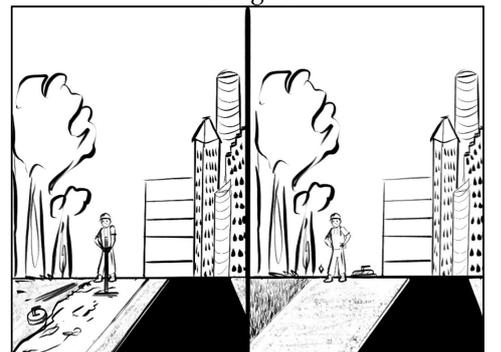


Image B



6. The teacher washed the truck.

Image A

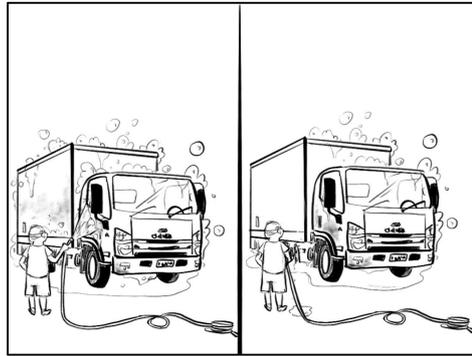
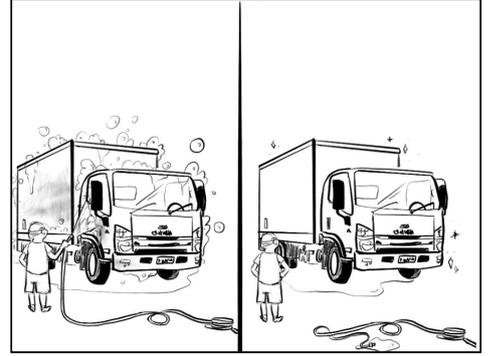


Image B



7. The girl read the magazine.

Image A



Image B



8. The mom widened the path.

Image A

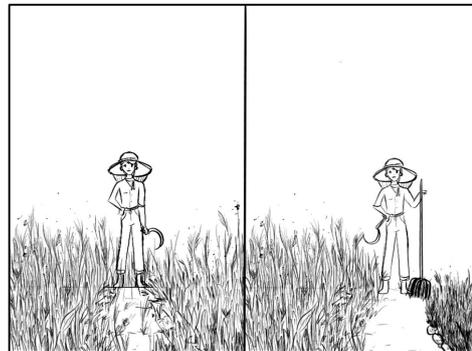
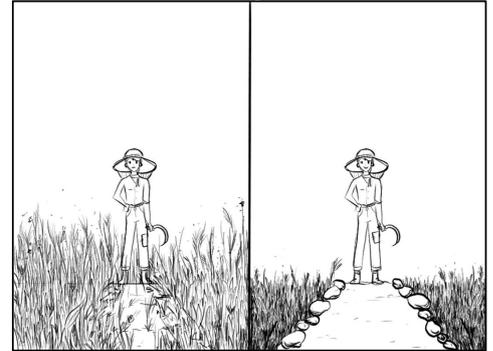


Image B



9. The student washed the car.

Image A

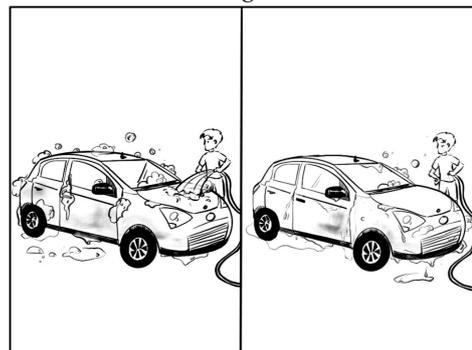
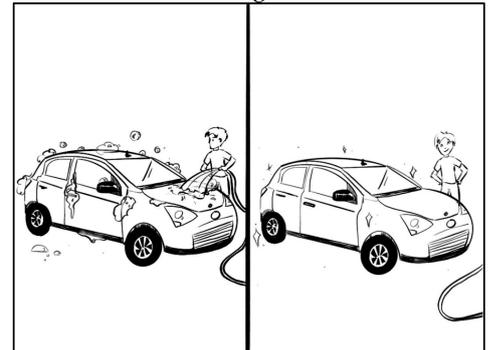
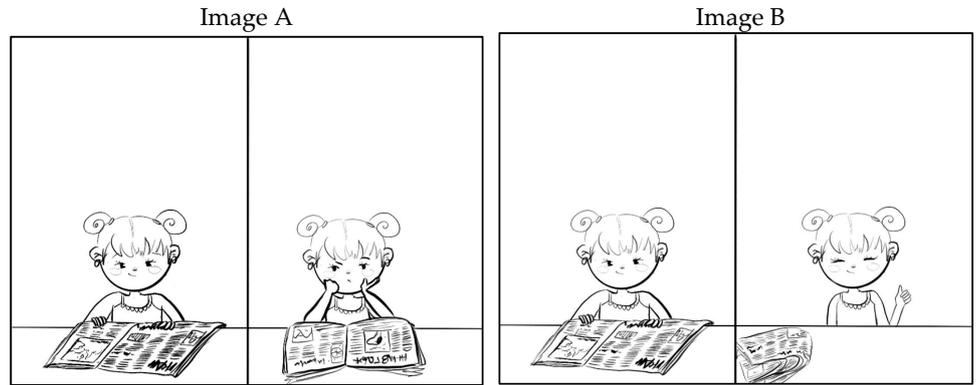


Image B



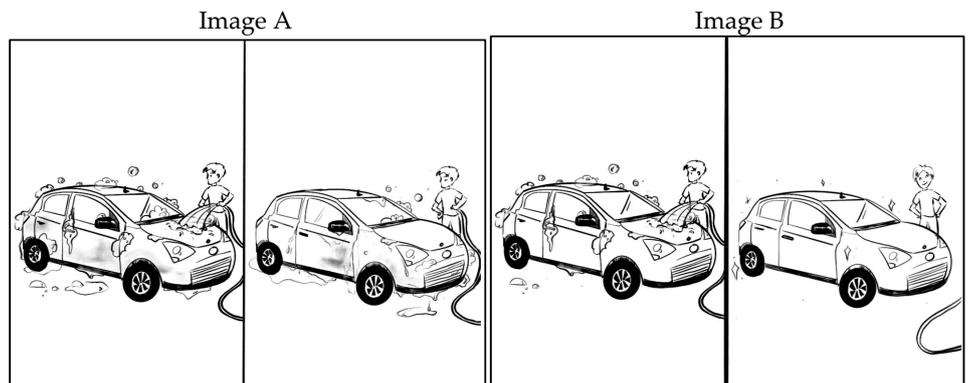
10. The girl read the newspaper.



11. The mom widened the sidewalk.



12. The student washed the car.



**Spanish (Forced Choice Task)**

**Condition:** presence of *se*

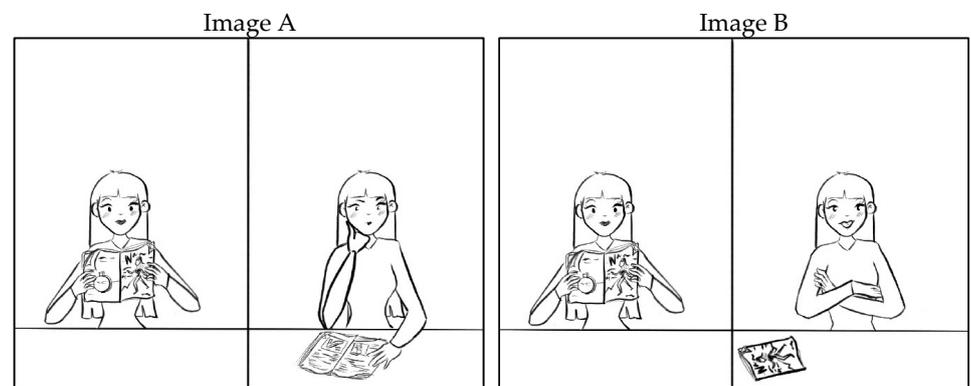
1. La niña se comió la manzana.



2. El papá se tomó la cerveza.



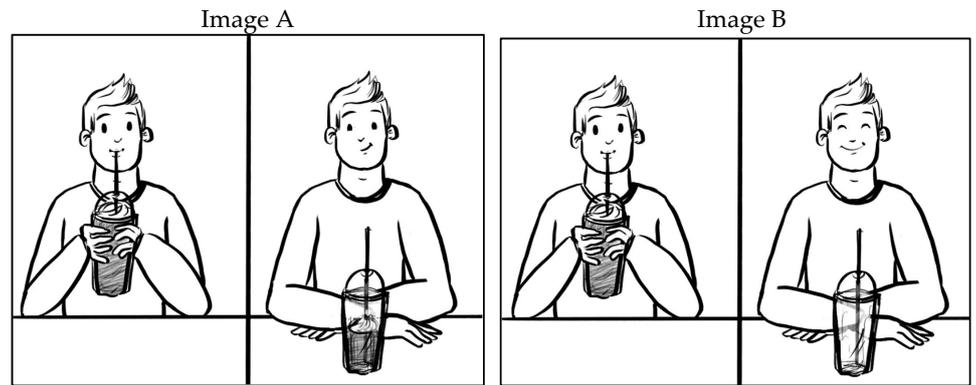
3. La profesora se leyó la revista.



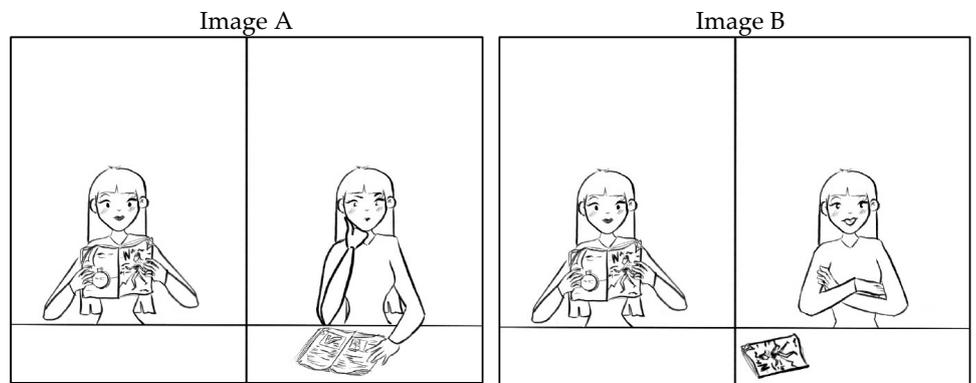
4. La niña se comió el plátano.



5. El papá se tomó el licuado.



6. La profesora se leyó el periódico.



7. El niño se comió la manzana.



8. La mamá se tomó la cerveza.



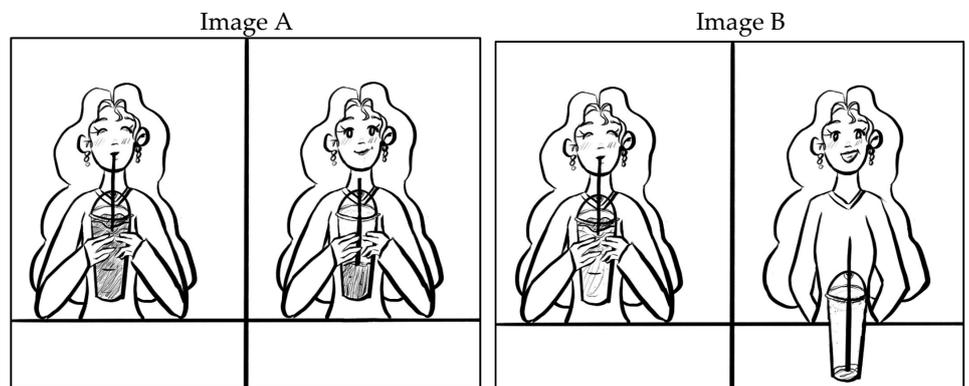
9. El estudiante se leyó la revista.



10. El niño se comió el plátano.



11. La mamá se tomó el licuado.

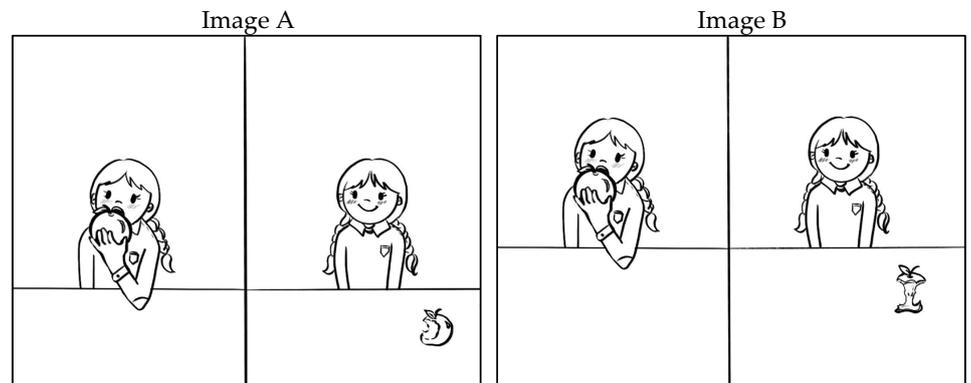


12. El estudiante se leyó el periódico.



**Condition:** absence of *se*

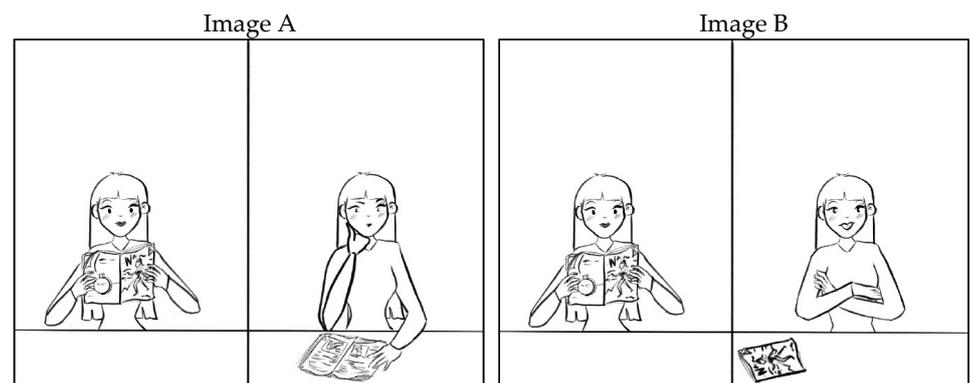
1. La niña comió la manzana.



2. El papá tomó la cerveza.



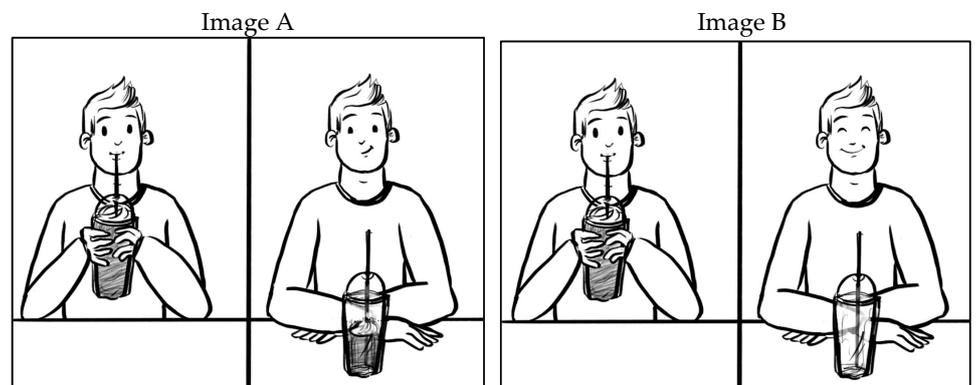
3. La profesora leyó la revista.



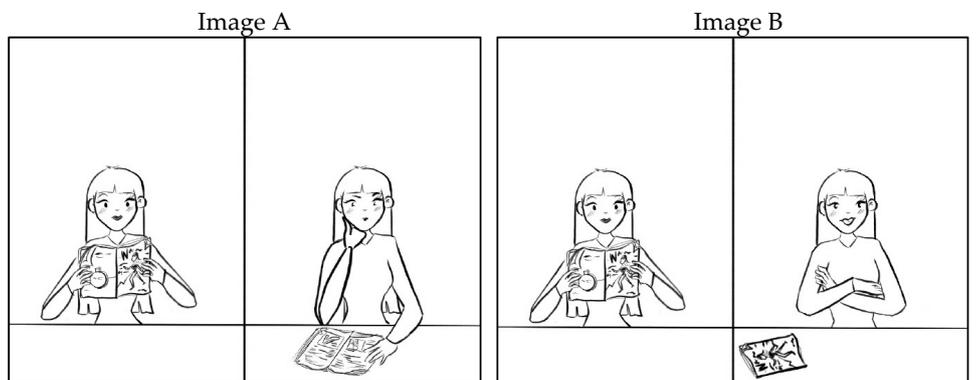
4. La niña comió el plátano.



5. El papá tomó el licuado.



6. La profesora leyó el periódico.



7. El niño comió la manzana.



8. La mamá tomó la cerveza.



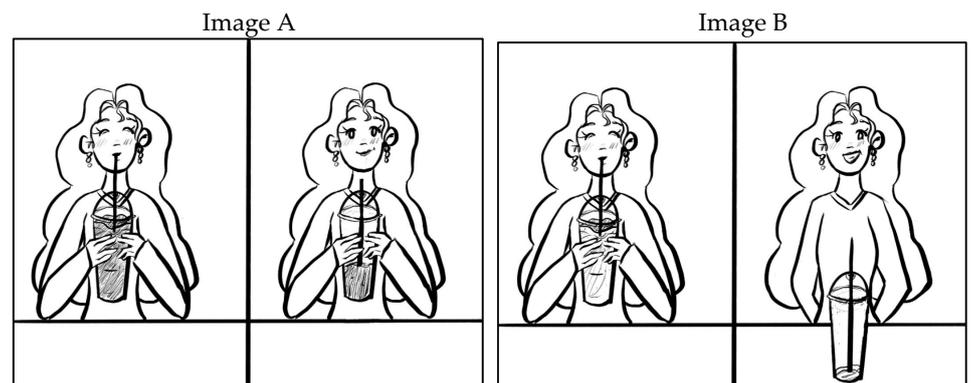
9. El estudiante leyó la revista.



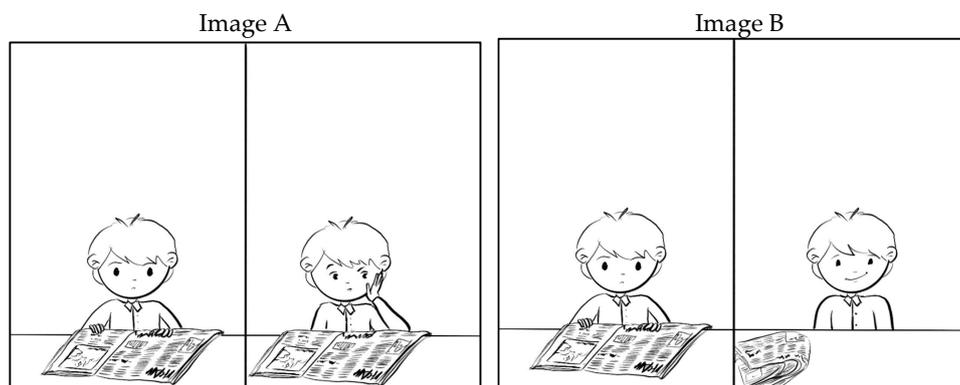
10. El niño comió el plátano.



11. La mamá tomó el licuado.



## 12. El estudiante leyó el periódico.



## Notes

- <sup>1</sup> See these works for further details of the model, as well as for extensive literature on the topic.
- <sup>2</sup> C is a cover of mereological object  $x$  (i.e.,  $x$  has parts that relate to the whole) if and only if C is a set whose sum is  $x$ .
- <sup>3</sup> The case of aspectual *se* is similar to what takes place in other languages, e.g., Slavic languages and Hungarian. The issue of telicity strategies falls under maximization or maximalization (Filip 2008; Kardos 2016). Key here is that maximization picks out the largest unique event in the denotation of a predicate, thus guaranteeing telicity (as no event subpart can be described in similar terms to the whole event).
- <sup>4</sup> See Martínez Vera (2022) and references therein for discussion of particles in English, which, crucially, are not maximizing means. Specifically, maximizers such as aspectual *se* (or its counterparts in Slavic languages or Hungarian, as Martínez Vera 2022 discusses) have an overarching effect on the whole event, i.e., on how the relevant scale and the theme are mapped into the event. English particles do not fix these aspects in the relevant sense. Thus, for instance, predicates in which the theme has an unspecified amount, e.g., *eat up sandwiches* (where *sandwiches* has cumulative reference), are possible, in contrast to cases with aspectual *se* as the ones discussed in this paper, where the theme's quantity must be specified.
- <sup>5</sup> The clitic *se* in Spanish can be interpreted as a reflexive clitic as in *María se mira en el espejo* 'Maria looks at herself in the mirror', a dative as in *Se lo dimos* 'We gave it to him/her/them', a detransitiver with change-of-state verbs as in *Se rompió* 'It broke' and psychological verbs as in *Ella se asustó* 'She got frightened', or even as an ethical dative as in *José se ganó la lotería* 'Jose won the lottery (for himself)'. We focus only on the aspectual interpretation of *se* in contexts where there is a contrast between two possible interpretations: a telic and an atelic one.
- <sup>6</sup> One possible reason for these particular results is a restructuring of the feature hierarchy used to determine telicity in the bilinguals' Spanish. In this case, there seems to be a higher reliance on *se* as a marker of telicity. This could be a case of fixating on one possible alignment (Sánchez 2019), or association of certain phonological or morphological features with lexical-semantic meanings for more efficient processing rather than exhibiting the typical variability found in bilingual heritage speakers. Further research is needed in this regard.

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