

The production and comprehension of Spanish *se* use in L2 and heritage Spanish

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Abstract

Previous studies in the acquisition of clitic *se* in Spanish have focused on the syntactic processes needed to perform detransitivization. However, current approaches on event structure reveal that *se* encodes aspectual information which is crucial for its acquisition. We examine the use, intuition and interpretation of the aspectual features constraining the clitic *se* in Spanish with physical change of state verbs and psychological verbs in declarative sentences, and in a set of *why*-questions. Twenty Spanish heritage speakers (HSs), 20 English-speaking L2 learners of Spanish, and 20 Spanish monolingual speakers participated in the study. Results showed a clear advantage among the HSs over the L2 learners across conditions. In general, the use of *se* with change of state verbs at advanced levels of proficiency seems to be harder to acquire than with psych verbs due to the aspectual morphological marking in L1 English. Interestingly, L2 learners and HSs were less sensitive to the [+inchoative] feature with psych verbs in *why*-questions. Results are also discussed in terms of the age of onset of bilingualism as an affecting factor on the acquisition of the aspectual values of inchoative *se*.

Keywords

clitic *se*, cross-linguistic influence, heritage language acquisition, L2 Spanish, second language acquisition

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I Introduction

In the last three decades, cross-language interaction has been a central issue in formal approaches to second language (L2) acquisition research (Hawkins and Chan, 1997; Licerias, 1989; Pérez-Leroux and Licerias, 2002; Montrul, 2004; Schwartz and Sprouse, 1996; Tsimpli and Roussou, 1991; White, 2003; Zobl, 1980). More recently, this line of research has been extended to the acquisition of heritage languages among adult heritage speakers (HSs) and the extent to which they diverge from L2 learners (Montrul, 2002, 2006, 2008; Montrul and Slabakova, 2003; Polinsky, 2018). Heritage speakers are bilinguals who have been naturalistically exposed to a first language (L1) since birth and a second language spoken by the community (Montrul, 2016; Valdés, 2001).

The Spanish clitic *se* is a widely discussed multifunctional clitic involved in several syntactic environments (Mendikoetxea, 2012). Previous work on the bilingual acquisition of Spanish clitic *se* only examines L2 acquisition so far (Montrul, 2001; Cabrera, 2019; Escobar and Teomiro, 2016; Escutia-López, 2016; Gómez-Soler, 2015a, 2015b), and it has been proven to pose many acquisition challenges due to the multiplicity of functions and syntactic environments involved (see Section II). Research shows that at advanced levels of proficiency the acquisition of inchoative *se* is possible, but also subject to L1 transfer with errors of omission (Montrul, 2001; Gómez-Soler, 2015a, 2015b; Zyzik, 2006). Previous studies have overlooked aspectual properties that may be relevant for the acquisition of *se* and rarely include production data (Bruhn de Garavito, 1999; Montrul, 2001; Tremblay, 2006). We contribute to previous work by examining the extent to which HSs and L2 learners are sensitive to the [+inchoative] feature of *se* with physical change of state verbs (e.g. *la ventana se rompió* ‘the window broke’) and with psychological verbs in declaratives (e.g. *la niña se asustó* ‘the kid got scared’) and if this feature is subject to cross-linguistic influence. We also test psych verbs with *why*-questions (e.g. *¿por qué te asustas?* ‘Why are you getting scared?’) in which the use of *se* is determined by the contextual need of encoding inchoative aspect. In addition, we explore if there is a role for the age of onset of bilingualism by establishing a relationship between early exposure to Spanish and higher degree of target knowledge of the aspectual distinctions instantiated by *se*.

The study is organized as follows. Section II summarizes existing differences between the English and Spanish morphological encoding of aspectual values in clitic *se*, followed by a literature review on the acquisition of these structures (Section III). Section IV reports on the empirical study, with the results discussed in Section V, while Section VI presents the discussion of the data. Finally, Section VII includes the conclusions.

II The clitic *se* as an aspectual element: Inchoative *se*

The clitic *se* appears in a wide range of syntactic environments that involve different semantic and aspectual values. As a multifunctional element, *se* is found in combination with different types of verbs and it represents grammatical phenomena such as voice, impersonality, coreferentiality, causation, telicity, and inchoativity, among others. Within the traditional analysis (Mendikoetxea, 1999; Sanz and Laka, 2002), the clitic *se* triggers the surface representation of syntactic processes (i.e. case-checking, agreement

operations and theta-role reduction). Most studies on the development of clitic *se* have considered inchoative *se* a detransitivizer, which does not add aspectual meaning (Kempchinsky, 2000, 2006). In order to gain a deeper understanding of the challenges that *se* poses for L2 learners and HSs, a syntactic description based on semantic compositionality provides a better approach to explore whether the difficulties stem from mere syntactic processes such as theta-role reduction or whether aspectual features are also a primary factor in its acquisition. Moreover, it will enable us to explore the role of crosslinguistic influence (CLI) in the acquisition of *se*.

We follow Kempchinsky (2000, 2004) in analysing the clitic *se* as the realization of features related to the Aspectual Phrase.¹ Aspectual information is instantiated in the syntactic configuration of arguments and events and is related to Event Phrases (Pustejovsky, 1991).² Based on the representation of event structure, psychological verbs and physical change of state verbs (henceforward change of state verbs) are accomplishment verbs and have two subevents: E1 (INITIATE) and E2 (TRANSITION/RESULT) (Zagona, 1999). In predicates that include inchoative *se*, E2 is the RESULT/CHANGE OF STATE whereas E1 can be understood as a PROCESS/INCHOATE. This proposal outlines that the event phrase in which linking to E2 occurs, there is an AspP located between the two layers of the verbal phrase (vP). Inchoative *se* is an aspectual element that merges as the head of AspP and introduces a temporal subevent of CHANGE OF STATE as shown in (1a) for Italian, which is replicated for Spanish in (1b) (Kempchinsky, 2004):

- (1) a. . . .[AspP la finestra [Asp' si [VP (la finestra) rompere . . .]]]
 b. . . .[AspP la ventana [Asp' se [VP (la ventana) romper . . .]]]
 'The window broke.'

This approach allows a precise examination of the [+inchoative] aspectual feature in the production and interpretation of *se* with physical verbs of change of state and psychological verbs. These verb classes participate in the causative/inchoative alternation with transitive and intransitive sentences, as shown in (2b) and (3b) (e.g. Burzio, 1986; Kempchinsky, 2000):

- | | | |
|--------|--|-----------------------------------|
| (2) a. | María rompió el cristal. | Transitive change of state verb |
| | 'María broke the glass.' | |
| b. | El cristal se rompió. | Intransitive change of state verb |
| | 'The glass broke' with inchoative <i>se</i> | |
| (3) a. | El león asustó a la niña. | Transitive psychological verb |
| | 'The lion frightened the child.' | |
| b. | La niña se asustó. | Intransitive psychological verb |
| | 'The child got frightened' with inchoative <i>se</i> | |

Both verb classes combine with inchoative *se* in their intransitive counterpart as shown by the contrast in (2) and (3). In (2b), the verb expresses change of state with external causation, as in *quemar(se)* 'to burn'; *hundir(se)* 'to sink', etc. (Levin and Hovav, 1995:

92). Eventive psychological verbs also participate in the alternation as shown by the pairs in (3).

In order to assess whether English inchoative *get* in (5b) is a facilitator in the acquisition of Spanish *se*, we compare psychological predicates with change of state verbs in terms of the clitic *se* that triggers an eventive interpretation and an inchoative aspectual reading in Spanish. For a predicate to be considered inchoative, its reference needs to include the onset of some eventuality (Marín and McNally, 2011). Spanish change of state and psychological verbs as in (4a) and (5a) have morphologically marked inchoative aspect instantiated with the clitic *se*; see Kempchinsky, 2004.

- | | | | |
|-----|----|-----------------------------|--|
| (4) | a. | <i>La ventana se rompió</i> | [reflexive pronoun + V3rd/sing] |
| | b. | The window broke | [Ø + V3rd/sing] |
| (5) | a. | <i>Mi mamá se enojó</i> | [reflexive pronoun + V3rd/sing] |
| | b. | My mom got angry | [PeriphrasticV <i>get</i> + adjective] |

In English, change of state verbs exhibit zero-morphological marking as in (4b), whereas psych-verbs in (5b) are morphologically marked with inchoative *get* (Haegeman, 1985; McIntyre, 2012). Emotional reactions in English may be explained by ‘psychological’ *get* + adjective constructions under three conditions: (1) when the only participant experiences a certain psychological or mental effect; (2) when an external cause may be inferred from the context that provokes the Experiencer’s reaction; and (3) where the non-intentional human subject with decreased agentivity cannot control the psychological change she undergoes (Mitkovska and Buzarovska, 2012). The element *get* marks the onset of the reaction and encodes the [+inchoative] feature just as Spanish *se* for psychological predicates. Moreover, the marker *get* does only appear with psychological verbs of the *frighten* type, which involve a change of state (Arad, 1999; Parodi and Luján, 2000; Tenny, 1994).

As this study goes beyond the purely syntactic phenomena involved in the causative-inchoative alternation, assessing whether learners and HSs have a clear representation of *se*’s inchoative feature in the head of AspP is key to explore a potential positive impact of overt morphology. Another question is whether aspectual information in *se* involves further difficulties. To test that, we included a context in which the use of *se* is determined by the need of encoding aspect (i.e. a context in which resorting to a non-pronominal construction that lacks the [+inchoative] feature would be pragmatically odd). Let us consider the following sentences in Spanish:

- | | | | |
|-----|----|---------------------------------|-------------|
| (6) | a. | <i>¿Por qué te asustas?</i> | [+eventive] |
| | | ‘Why do you get scared?’ | |
| | b. | <i>¿Por qué estás asustado?</i> | [+stative] |
| | | ‘Why are you scared?’ | |

Spanish questions as (6a) behave as (5a) regarding the inchoative aspect marker with an eventive interpretation. Clearly, *estar asustado* in (6b) does not force reference to the

initial interval of being upset and does not allow for an inchoative interpretation (Marín and McNally, 2011). In fact, (6b) is a [+stative] construction with the auxiliary verb *estar+adj*, which does not have inchoative aspect morphologically encoded. English also allows for a [+stative] structure *be + adjective* (e.g. *why are you upset?*). This structure seems to be commonly found when the cause of the psychological change is known by both speakers. Certainly, a structure with *get* and an eventive interpretation would be possible in English for *why*-questions (e.g. *why are you getting upset?*, *why do you get upset?*). In (7), the temporal context triggers an inchoative reading of a mother's reaction:

- (7) A mom and her daughter are happily walking to school. All of a sudden, a dog appears, they both see the dog and the little girl starts crying.

The mom asks: *¿Por qué te asustas? / #¿Por qué estás asustada?*
 'Why are you scared?'

In the context provided, something has suddenly caused a change in the girl's emotional state and the cause is known by everyone in the context. The mom's question is not intended to ask about the cause of the reaction, but to point out that there is no need for such a sudden emotional change. The use of a [+stative] construction in Spanish (i.e. *¿por qué estás asustada?* 'why are you scared?') assumes that the person has been upset for some time before the question is uttered and that the speaker who asks the question has not been there to experience the onset of the psychological reaction (i.e. change of state). In other words, the state it describes holds prior to the reference time implied by the context (Marín and McNally, 2005). Within the same situation, English seems to conceptualize the event differently and allows a stative reading that focuses on the result state regardless of time reference (i.e. the fact that a person *is* scared and not so much the fact that a person *became* or *got* scared).

Considering that Spanish psychological predicates are inchoative based on their interpretation with respect to time reference, Marín and McNally (2011) argue that even if a [+stative] predicate were to include obligatory reference to the onset of the state described, the *estar+adj* structure in (6b) would be pragmatically infelicitous as in (8b) (note the English translation in (8a) with inchoative *get*):

- (8) a. Siempre que Ana tiene un examen, se preocupa mucho.
 'Whenever Ana has an exam, she gets very worried.'
 b. # Siempre que Ana tiene un examen, está muy preocupada.
 # 'Whenever Ana has an exam, she is very worried.'

To summarize, the three conditions under investigation encode interpretations in English and Spanish that stem from distinct syntactic, semantic and aspectual values as indicated in Table 1. While Spanish change of state verbs in their intransitive form need the clitic *se* as the head of AspP, in English an empty morpheme heads AspP. On the other hand, psychological verbs in declaratives do have overt morphology with the periphrastic *get*

Table 1. Summary of differences between Spanish and English.

	Change of state verbs	Psych verbs	Why + psych verbs
Spanish	<i>La ventana se rompió</i> [+inchoative] [+change of state]	<i>La niña se asustó</i> [+inchoative] [+change of state]	<i>¿Por qué te enojas?</i> [+inchoative] [+change of state] <i>¿Por qué estás enojada?</i> [+state]
English	The window <i>Ø</i> broke [+inchoative] [+change of state]	The kid got scared [+inchoative] [+change of state]	Why are you <i>getting</i> upset? [+inchoative] [+change of state] Why <i>are</i> you upset? [+state]

for both processes (i.e. [+inchoative] morphological instantiation and detransitivization). Finally, in the case of Spanish psych verbs in *why*-questions, what triggers the [+inchoative] pronominal option over the [+stative] one is the interpretation of the context as [+eventive].

III Previous research

I Spanish se in L2 learners and heritage speakers

Although most available studies on L1 acquisition of clitic *se* do not follow the same classification for the various types of *se*, it is generally accepted that inchoative *se* is acquired earlier than other types such as true reflexives (Anderson, 1998; Jackson-Maldonado et al., 1998; Teomiro and Escobar, 2013).

Previous research in L2 acquisition of clitic *se* has focused on various phenomena regarding the argument structure of the constructions that *se* can appear with, especially on the properties of *se* as a detransitivizer (Bruhn de Garavito, 1999; Montrul, 1999, 2000, 2001; Tremblay, 2006; Zyzik, 2006). Studies on the [+inchoative] feature of *se* are limited (Cabrera, 2012, 2019), and aspect is generally an overlooked property of *se*, which may lead to morphological variability. This study aims to fill this gap in the literature by examining the aspectual dimension of inchoative *se*.

An important question in bilingual acquisition research is whether transfer equally impacts HSs and L2 learners' grammars (Montrul, 2008, 2010a, 2010b). The main purpose of this study is to examine the production and the interpretation of clitic *se* by HSs so far untested with these structures and to compare them to L2 learners. This study aims to determine which properties of inchoative *se* are acquired and which ones are subject to CLI. This section presents the most relevant research related to the L2 acquisition of clitic *se*.

Montrul (1999, 2001) investigated the nature of the causative/inchoative alternation of psych verbs and change of state verbs in English, Spanish and Turkish as second languages looking at verbs that differ in the morphological expression of the alternation cross-linguistically. Results revealed that Spanish-speaking learners of English rejected zero-derived inchoative forms of change of state (e.g. 'The window broke') and accepted forms with *get* in contrast with the other groups (e.g. 'The window got broken'). At intermediate levels of proficiency, *se* omission was more frequent with change of state verbs

than with psych verbs. The phenomenon was considered to be direct influence from the L1. The idea is that L2 learners have difficulties with the overt realization of morphology when absent in the L1 and that the problem is morphophonological.

In Cabrera's (2010, 2012, 2019) replication of Montrul (1999, 2001), participants were allowed to correct the items after judging them on the scale. Results evidenced that beginner and intermediate learners rejected intransitive forms like *La puerta se abrió* and corrected them by changing them into transitive or by excluding *se*. Advanced learners evidenced less *se* deletion and more changes into transitive forms. Despite the high level of individual variation, results seem to support that morphological properties of the L1 (i.e. overgeneralization or absence of *se*) are transferred earlier in development than lexico-syntactic properties (i.e. sensitivity to verb classes).

In similar fashion, a developmental study across four levels of proficiency examined the acquisition of the morphological causative-inchoative alternation in final attainment (Gómez-Soler, 2015a). L1 English learners at low proficiency levels over-extended *se* with unergatives and non-alternating unaccusatives (*El tren (*se) llegó* 'The train arrived'), whereas near native speakers behaved native-like. Learners seem to be sensitive to the semantic nuances that allow the transitivity alternation. Such sensitivity increases with higher proficiency. Psychological predicates were also examined by Gómez-Soler (2015b). Results evidenced that participants made significant distinctions between the use of *se* and other pronouns, but they also confounded inchoative *se* with reciprocal *se* (*María y Juan se gustan* 'Juan and María like each other'). The author concludes that *se* is not easily extractable from the input because of the nuanced semantic distinction between the verbs that allow *se* and the ones that do not. Additionally, L1 transfer does not seem to be completely transparent in terms of which properties are transferred as other constructions with *se* have overt morphology in English.

As for the L2 production of *se* structures, Zyzik (2006) found errors of *se* omission with considerable variability in performance for different verbs and argues that the acquisition of *se* with change of state verbs involves sequence learning. She suggested that learning the causative-inchoative alternation takes place verb-by-verb and that the *se* morpheme undergoes a 'chunking process' with individual lexical items. At advanced levels of proficiency, L2 learners are able to extract *se* from the individual lexical items and use it productively, although some omission problems remain, especially when the verbs are less frequent in the input.

Research reviewed in this section points out two main aspects regarding the L2 acquisition of inchoative *se*. First, L1 transfer has been documented in the case of *se* as a detransitivizer with errors of omission. And second, native-like performance has also been documented at the 'near-native' level of proficiency. L1 English overt morphology has been argued as a facilitator for *se*'s target interpretation (Montrul, 1999, 2001). However, *se* avoidance with psych verbs has also been well attested with learners resorting to different constructions (Gómez-Soler, 2015a, 2015b). The question is not anymore whether constructions with inchoative *se* will lead to L1 transfer in bilingual grammars, but rather, which properties of inchoative *se* are transferred. Inchoativity clearly poses some challenges with *se* constructions as learners need to be sensitive to the aspectual and semantic nuances of verbs that are relevant for the distinction. The multiplicity of

functions of *se* may also lead to the emergence of optionality in bilingual grammars (Escutia-López, 2016; Gómez-Soler, 2015a).

Previous studies on bilingual language acquisition within a formal perspective have extensively reported crosslinguistic influence effects in morphosyntactic properties that differ typologically or that lie at the interfaces between syntax and other cognitive components (Montrul, 2004, 2008; 2010b; Pirvulescu et al., 2014; Sánchez and Mayer, 2018; Sorace, 2011). The advantages in the acquisition of morphosyntactic properties of HSs over L2 learners have been extensively documented (Cuza and Frank, 2015; Montrul, 2005, 2010b), but also the disadvantages (Montrul, Foote and Perpiñán, 2008). Differences between the two populations have been attributed to the age of acquisition and prolonged exposure to language input (Johnson and Newport, 1989; Montrul, 2008) along with other variables that play a role in bilingual language development (i.e. the quality/quantity of the input, the formal instruction received in the language, and the literacy abilities among others). However, the variability found in comprehension and production data from early and late bilinguals renders unclear whether HSs and L2 learners differ significantly in morphosyntactic knowledge and production at similar levels of proficiency.

Several models have been put forward to account for the source of difficulties that cause morphological variability in L2 and heritage language grammars. Some of these approaches involve the need of feature reassembly/restructuring (Prévost and White, 2000; Lardiere, 2009; Cuza and Pérez-Tattam, 2016; Putnam and Sánchez, 2013; White, 2008), while others place morphology as the ‘bottleneck’ of acquisition (Slabakova, 2008, 2019). In the case of heritage languages, reduced input has been argued to cause interrupted L1 acquisition, which leads to morphological variability (Montrul, 2002, 2016; Polinsky, 2006; Montrul and Perpiñán, 2011). Most recently, the decreased activation of linguistic information during the integration of morphology, syntax and semantics in real-time production and comprehension has been found to play a role in heritage language development in the form of differential access to representations and features (Perez-Cortes, Putnam and Sánchez, 2019). This approach suggests that morphological optionality stems from differential access when different languages are active simultaneously in the brain. It affects production more often than the underlying morphosyntactic representations. In the present study, we consider the potential effects of decreased activation and input in heritage language production and comprehension, along with the examination of the effects of age and CLI.

2 Research question and hypotheses

Following previous theoretical work on the existing differences between *se* constructions and their aspectual values and given the difficulties in the acquisition of inchoative *se*, the main goal of this study is to expand previous research by examining the acquisition of the [+inchoative] feature of *se* with change of state verbs and psych verbs. We argue that in relation to L1 influence in the target realization of *se*, there is an aspectual deficit related to the [+inchoative] feature that may lead to morphosyntactic optionality³ in bilingual grammars.

Additionally, we compare the linguistic representation and the ability to produce inchoative *se* of L2 learners and monolinguals with that of a bilingual population of

English-dominant HSs so far unexplored with these constructions. We tested young adult university students. The HSs had been born to Hispanic families and had been exposed to Spanish and English input from birth, whereas L2 learners had started learning Spanish in High School in classroom settings (for details, see Section IV.1). By comparing both populations, this study attempts to contribute to the issue of age-related effects and language experience in linguistic development and the potential morphosyntactic advantage of HSs over L2 learners (Cuza and Frank, 2015; Johnson and Newport, 1989; Montrul, 2006, 2008). Previous work is limited in that it focuses on L2 learners' grammaticality judgements. There are very few insights on learners' oral skills to produce these verbs, aside from Zyzik (2006) that only includes change of state verbs. We explore differences in production and comprehension by triangulating data with an oral production task, an acceptability judgement task (AJT) and a preference task. The present study aims to answer the following research questions:

- Research question 1: To what extent do HS and L2 learners of Spanish have knowledge of the aspectual morphology in change of state verbs, psych verbs and psych verbs with *why*-questions? Specifically, what are their patterns of use regarding the [+inchoative] feature instantiated by *se*?
- Research question 2: Can the difficulties with the target production of *se* with psych verbs be accounted for in terms of cross-linguistic influence?
- Research question 3: Does early exposure to Spanish play a role in the degree of target knowledge and production of the aspectual distinctions instantiated by *se*?

In regard to CLI, it is possible that HSs and L2 learners show negative transfer from L1 English due to the presence of a parallel structure in English (*be* + adjective) disregarding the Spanish [+inchoative] feature. However, as previously documented, overt marking of aspectual features in the L1 (i.e. *ger*) may facilitate target knowledge and production of *se*. Given the potential difficulties discussed, we expect HSs and L2 learners to behave differently from monolinguals regarding the [+inchoative] feature of *se*, especially in those structures where Spanish and English differ in the morphological encoding of inchoativity. Lastly, we expect HSs to outperform L2 learners due to the earlier exposure to the minority language and a more extensive exposure to Spanish during their lifespan (Johnson and Newport, 1989; Montrul, 2002, 2008). Specifically, we propose the following hypotheses:

- Hypothesis 1: The L2 learners and HSs will behave less accurately than monolinguals especially in those conditions subject to CLI (i.e. *se* + change of state verbs and *se* + psych verbs in *why*-questions).
- Hypothesis 2: The L2 learners and the heritage speakers will behave more target-like with psych verbs than with change of state verbs across tasks. Overt morphology of psych verbs in L1 English will act as positive transfer, whereas zero morphological marking in English change of state verbs will lead to cross-linguistic influence effects.
- Hypothesis 3: The HSs and the L2 learners will behave less target-like with *se* + psych verbs in *why*-questions than in declarative sentences. Negative transfer

from the English construction *be + adj* will lead to the preference of *estar + adj* in the case of psych verbs with *why*-questions.

- Hypothesis 4: The HSs will outperform the L2 learners given their earlier exposure to Spanish and the quantity and quality of input received during their lifespan (Johnson and Newport, 1989; Montrul, 2008, 2010a).

IV The study

I Participants

A total of 60 participants took part in the study: 20 English dominant HSs of Spanish, 20 English-speaking L2 learners of Spanish, both from the American Midwest, and 20 Spanish monolingual speakers from Mexico serving as control group. Participants completed a language history questionnaire, which included questions about their patterns of language use, linguistic background and self-assessment of English and Spanish linguistic skills (e.g. Cuza, 2013; Montrul, 2002). The HSs and the L2 learners completed a modified version of the DELE language proficiency test for Latin American Spanish (Cuza, Pérez-Leroux and Sánchez, 2013). Following previous research, scores between 40 to 50 points were considered as ‘advanced’ proficiency level and 30 to 39 points were considered ‘intermediate’ (Montrul and Slabakova, 2003). The HS group’s mean score in the DELE test was 40.7 points out of 50 (score range = 35 to 48; $SD = 4.6$) and the L2 learners’ group mean score was 38 out of 50 (score range = 31 to 49; $SD = 5$). In order to evaluate whether differences in proficiency between groups were significant, proficiency scores were submitted to a one-way ANOVA in R and results indicated a significant effect by group: $F(1,235) = 18.65, p < .001$.

The HSs had either been born and raised in the USA to Mexican parents ($N = 16$), or had moved from Mexico, Argentina and Puerto Rico before the age of 5;0 ($N = 4$). All of them had been exposed to Spanish and English from birth with the exception of the one participant who arrived in the USA at the age of 5;0. Thirty percent of the participants (6/20) indicated feeling more comfortable with English, while 65% (13/20) indicated feeling comfortable in both English and Spanish. The other 5% (1/20) reported feeling more comfortable with Spanish.

The L2 learners were all born and raised in the USA, except one who was born in Switzerland and came to the USA when she was two years old. Some of the participants had studied abroad in Hispanic countries for 6-week periods (8/10) or 3-week periods (2/10). One of them had studied in Costa Rica for one year.

The control group consisted of monolingual speakers from Guanajuato, Mexico. We chose a highly educated population comparable with the other groups in our study. All of the monolingual speakers were college students, who reported having little or no contact with English besides some English courses in high school. The rationale for adding a monolingual control group follows seminal work from a formal perspective (Liceras, 1989; Montrul, 1999, 2001; Pérez-Leroux and Liceras, 2002) and aims to be a baseline from which to observe potential morphosyntactic shifts in bilingual grammars. Table 2 summarizes participants’ relevant data.

Table 2. Participants’ background information.

	L2 learners (n = 20)	Heritage speakers (n = 20)	Controls (n = 20)
Age of onset of bilingualism	L2 classroom setting (M = 14;0)	Born and raised in the USA except 4 whose Age of Arrival was 5 y/o	Born in Mexico Tested in Guanajuato, Mexico.
Age at testing	Age range = 18–22 (M = 19.7; SD = 1)	Age range = 16–21 (M = 19.3; SD = 1.5)	Age range = 18–28 (M = 21; SD = 2.3)
DELE score	31–49 (M = 38/50, SD = 5)	35–48 (M = 40.7/50, SD = 4.6)	N/A
Patterns of language use	Use more ENG in every situation.	Use equally SPAN and ENG at home/social sits. More ENG at school/work	N/A. Very little contact with English.
Self-reported proficiency (max. 4)*	SPAN 2.8 (SD = 0.5) ENG 4 (SD = 0)	2.96 (SD = 0.5) 3.89 (SD = 0.2)	– –

Notes. * 1 Scale for self-ratings of language ability: 0 = null, 1 = limited, 2 = adequate, 3 = good, 4 = excellent.

Table 3. Verbs under analysis by condition.

Structure	se + change of state verbs	se + psych-verbs	se + why + psych verbs
Target option	La ventana <i>se rompió</i> ‘The window broke’	La niña <i>se asustó</i> ‘The kid got frightened’	‘Why are you scared?’ ¿Por qué <i>te asustas</i> ?
Non-target option	La ventana <i>Ø rompió</i>	La niña <i>Ø asustó</i>	¿Por qué <i>estás asustada</i> ?
Verbs	romper(se) to break derretir(se) to melt abrir(se) to open cerrar(se) to close quemar(se) to burn hundir(se) to sink	enojar(se) to get upset asustar(se) to get frightened preocupar(se) to get worried distracer(se) to get distracted soprender(se) to get surprised estresar (se) to get stressed	

2 Methods

The participants completed an elicited production task conducted orally with visual support, and two written tasks: an acceptability judgement task (AJT) and a forced preference task (Geeslin and Guijarro-Fuentes, 2006; Montrul, 1998, 2010b). These tasks aimed to test for production, grammatical intuition and interpretation of the [+inchoative] feature of clitic *se*. We targeted clitic *se* with change of state verbs, and psych verbs in declaratives and its second person form *te* for *why*-questions with psych-verbs (see Table 3).⁴ Distractors targeted the use of subjunctive and *ser* and *estar* uses which were part of a larger study. The items were randomized and counterbalanced across participants to avoid any potential presentation-order effects in every task.

The oral elicited production task aimed to test for the ability to produce the clitic *se* after having interpreted the prompts as eventive. It included 18 test items and 47 distractors. For the declarative structures (e.g. *la ventana se rompió* ‘the window broke’; *la niña se asustó* ‘the kid got scared’), the task included a preamble and a photo in order to interpret the inchoative meaning of the verbs. For *why*-question test items (e.g. *¿por qué te asustas?* ‘why are you getting scared?’), the task included a contextual preamble and a photograph showing two characters together and the cause for the change in the psychological or emotional state in one of the characters. The cause of the change in the emotional state is known by both of the characters in the context. Therefore, the preamble ensured the inchoative and eventive interpretation of the verb as the question does not focus on the end result, but on the *change* of psychological state. For this condition, represented in (9), we expected participants to use the [+inchoative] pronominal option *¿Por qué te asustas?* (‘Why are you getting scared?’). However, we suspected that learners and HSs may use the [+stative] construction *¿Por qué estás asustada?* (‘Why are you scared?’) due to its morphosyntactic similarity with English and the availability of this construction in the Spanish input in different linguistic contexts.

(9) Test item for Elicited Production Task: *se* with psych-verbs in *why*-questions.

Context: *Rosita y su mamá están caminando felizmente a la casa. De pronto, Rosita ve un perro, comienza a llorar y su mamá le dice:*

‘Rosita and her mom are happily walking home. Suddenly, Rosita sees a dog, starts crying and her mom says:’



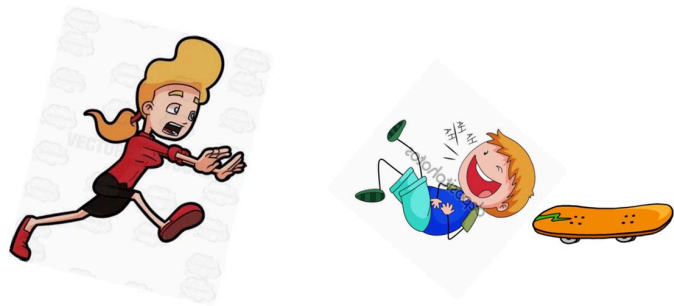
Prompt: *Hijita, ¿por qué _____ (asustar)?*
 ‘My little daughter, why _____ (to scare)’

Expected Response: *¿por qué te asustas?* ‘why are you getting scared?’

Unexpected Response: #*¿por qué estás asustada?* ‘why are you scared?’

(10) Test items for Elicited Production Task: *se* with psych-verbs in *why*-questions

La mamá, muy tranquila, ve a Pedrito jugando a la patineta. De pronto, ¡Pedrito cae al suelo! Su mamá lo ve y grita, pero Pedrito le dice....



“Mamá, estoy bien, ¿por qué _____ (preocupar)?”

A two-item trial training was completed to ensure that the participants were comfortable with the task and understood the procedure. The participants were shown a PowerPoint presentation with the preambles and prompts in the task. They were instructed to complete the sentences in the prompts orally after the researchers had read the preamble and prompt to the participants with a rising intonation. Participants’ responses were recorded with a digital voice recorder.

The paper-and-pencil-based acceptability judgement task (AJT) was designed to elicit participants’ grammatical intuitions of the [+inchoative] feature of *se*. This task included 36 test items, 18 target and 18 non-target and 64 distracters (see Table 3). The participants were first asked to read the preamble and then indicate whether the sentence was odd or good on a Likert scale ranging from 1 to 5 (*completely odd, odd, nor fine nor bad, fine, or completely fine*) according to the context presented. For sentences marked as *completely odd* or *odd*, participants were asked to underline the part of the sentence that caused the oddity.⁵

(11) Test item for AJT: *se* + psych verb in declaratives

19. La mamá y el niño estaban en el parque. El niño estaba jugando y la mamá estaba sentada.
La mamá vio a su hijo llorando y preocupó.

1	2	3	4	5
Completamente raro	Raro	Ni raro ni bien	Bien	Completamente bien

Finally, a contextualized forced preference task was administered to the participants to test the written comprehension of clitic *se* in the structures under analysis. This task included 18 items and 36 distractors. Since the structure *estar+adj* is not ungrammatical, but aspectually and pragmatically odd, the AJT does not completely account for the sensitivity to the aspectual distinctions that speakers have, but their grammaticality judgements. We included a preference task to successfully assess which of the structures participants would prefer in a given context (Cuza and Frank, 2015; Geeslin and Guijarro-Fuentes, 2006). This task exhibited the same preamble found in the previous tasks and

introduced the target option (*se* for declaratives and *te* for questions) and the non-target option (*se* omission for declaratives and *estar+adj* for questions). Participants were asked to select the option that best conveyed the meaning captured by the preamble.

(12) Test item for Preference Task: *se* + physical change of state in declaratives

. Ayer en la tarde hacía mucho calor en el parque y la niña compró un helado de chocolate.

¿Qué prefieres?

A. La niña dejó el helado en la mesa y se derritió.

B. La niña dejó el helado en la mesa y derretió.

Table 3 presents the structures and the verbs tested with each structure (six per structure). In the case of psych verbs, the same verbs were included in order to make a comparison between the type of structure and its aspectual interpretation.

The tasks were piloted before implementation to ensure that the preambles in the tasks would provide an inchoative and eventive interpretation of the verb in the prompt. Monolinguals completed the experiment in a quiet room at a university in Mexico, while the HSs and the L2 learners were tested in a lab setting. Only Spanish was used during the experiment that lasted for approximately 1 hour and thirty minutes. After completing the DELE test, the informants were presented with the elicited production task, the AJT, and finally the contextualized preference task.

V Results

I Elicited production task

For the quantitative analysis, target responses were coded as 1, and absence of clitic *se* was coded as 0. We implemented a generalized linear mixed effect model (GLMM) using the GLIMMIX function (in the SAS software, Version 9 of the SAS System for Windows). Given the binary nature of the dependent variable in the experiment, we assume that it follows a binomial distribution in the analyses. Group (Heritage Speakers, L2 Learners, and Control group) is the fixed effect and the variable of participants is regarded as the random effect. We examined three conditions with GLMM where *se* was required: change of state verbs, psych verbs, and psych verbs in *why*-questions. A Bayesian inference analysis was also performed for psych verbs in declaratives (see Section V.2). We also conducted a post hoc pairwise comparison analysis to determine where the differences lie between groups. We compared the fitted probabilities⁶ for pairs of groups, adjusting the results for multiple comparison using the Tukey–Kramer multiple tests adjustment method.

As expected, all groups behaved differently in the use of clitic *se* as shown in Figure 1. The HSs produced target *se* for *se* + psych verbs and change of state verbs and *te* for psych verbs in questions at higher rate than L2 learners, which results in a visible pattern along conditions. However, performance varied within type of structure. Both groups seemed to do better with psych verbs but differed regarding the other two conditions.

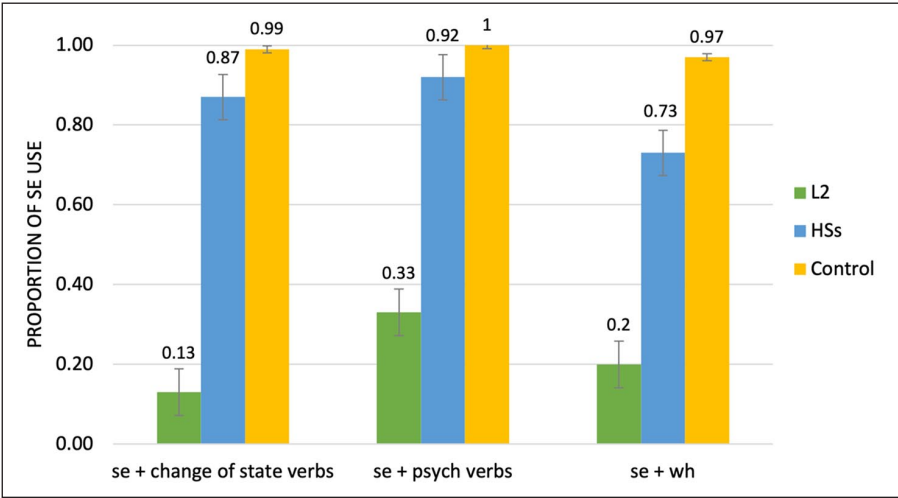


Figure 1. Mean proportion of target *se* production across conditions by group.
Notes. L2 = second language. HS = heritage speakers.

While HSs were less target in psych verbs + *wh*, the L2 learners were less target with change of state verbs.

a Change of state verbs. Results showed overall significant difference among groups with *se* + change of state ($F(2,300) = 30.09, p < .001$). The post-hoc analysis showed significant differences between HSs and L2 learners ($p < .001$) and between L2 learners and the control group ($p < .001$). No significant difference was found between the HSs and the control group ($p = .0958$). The control group showed the highest fitted probability with change of state (99%). The HSs were very close to the control group with the fitted probability of 92%. The L2 learners had the lowest probability of 9% (see Table 4 and Figure 2 below).

b Psych verbs in declaratives. Regarding the production of *se* with psych verbs, the control group and the HSs behaved at ceiling with very little variation. In these cases, the Maximum Likelihood Estimate for logistic regression does not exist. This issue of separation (or non-identifiability) is surprisingly common when we run logistic regression analysis on real-world data. To resolve this issue, we implemented a Bayesian inference analysis⁷ which focuses on predicting probability. It assigns a probability to each hypothesis and then evaluates it. To test significance, we look at the confidence interval (CI) of the Bayesian analysis and check whether the CI contains 0. If the 95% CI does not contain a zero, we are 95% confident that this variable is different from the baseline (control) group. We also conducted pairwise comparisons between groups using Bayesian method. Similar to the overall model inference, we checked the 95% CI to determine the result significance.

Results showed that the HSs were not significantly different from the control group (the CI contained 0). However, the results showed 95% confidence that the L2 learners

Table 4. Results of the GLMM model with logit link and binomial response variable *se + change of states* condition.

	Estimate	SE	t (df)	p
<i>Fixed effect terms:</i>				
Intercept	4.9520	1.1121	4.45 (57)	< 0.0001
Group-heritage speakers	-2.5503	1.2263	-2.08 (300)	0.0384
Group-L2 learners	-7.2221	1.2195	-5.92 (300)	< 0.0001
Group-control group	0	–	–	–
<i>Random effect terms:</i>				
Intercept (participant)	2.6539	0.9612	–	–

Notes. Overall model F test result: $F(2, 300) = 30.09$, $p < 0.0001$.

Tukey–Kramer pairwise comparison post-hoc analysis

Comparison groups	Fitted probability for production of <i>se + change of states verbs</i>	p
Heritage speakers vs. L2 learners	0.92 (0.04) vs. 0.09 (0.04)	< 0.001
Heritage speakers vs. control group	0.92 (0.04) vs. 0.99 (0.01)	0.0958
L2 learners vs. control group	0.09 (0.04) vs. 0.99 (0.01)	< 0.001

behaved differently from the HSs and the control group. A pairwise comparison also showed no significant differences between the HSs and the control group (CI contains 0). It also revealed significant differences between the L2 learners and the other groups. This is shown in Tables 5 and 6:

c Psych verbs in why-questions. Regarding the use of *se* with *why*-questions, results showed significant differences between groups ($F(2,300) = 23.54$, $p < .001$). A post hoc analysis showed significant differences among groups: the HSs and L2 learners ($p < .001$), the HSs and the control group ($p < .012$), and the L2 learners and the control group ($p < .001$). As indicated in Table 7 and Figure 3, the control group showed the highest fitted probability (97%), followed by the HSs (probability of 78%), and the L2 learners with the lowest probability (13%).

HSs and learners used the stative structure *estar + adj*. However, L2 learners ($M = 0.43$) resorted to the stative construction more frequently than the HSs ($M = 0.20$). The control group only produced 3% (4/120 instances) of non-target *estar + adj* ($M = 0.03$) with *estar enojado* ‘be upset’. In the case of the HSs, their production of non-target *estar + adj* ($M = 13\%$) is certainly higher with *enojarse* (45%; 9/20) followed by *estresarse* (25%; 5/20). The possibility of an item effect (*enojarse*) is rejected. In the HSs data, *estar + adj* is found with other test items in a smaller proportion. In the case of L2 learners, non-target *estar + adj* does not seem to pattern with items, but with participants who either had lower proficiency scores or lower self-reported proficiency values.

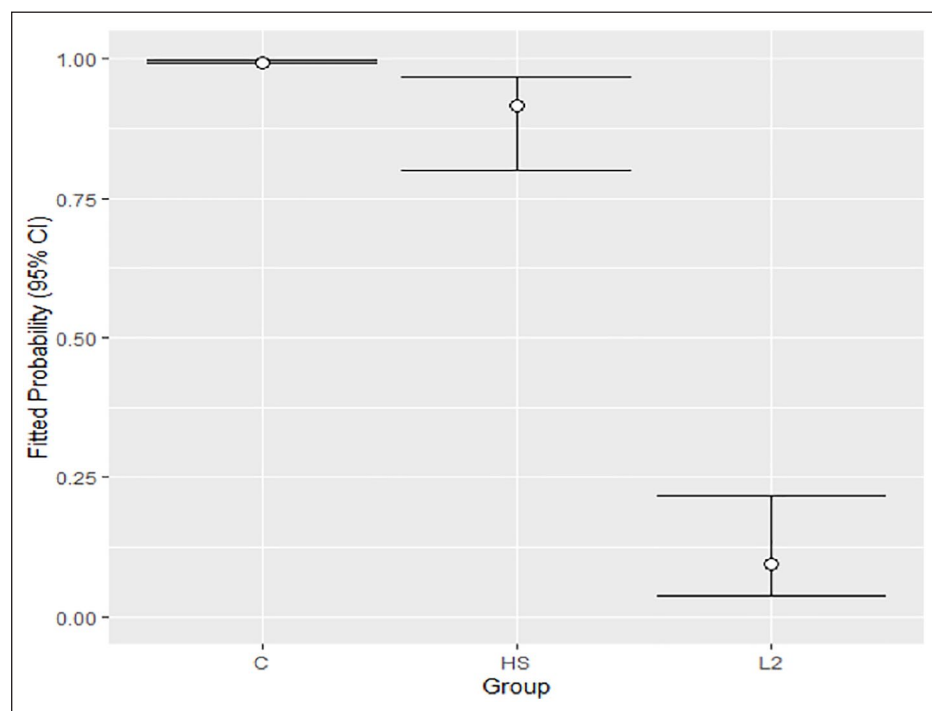


Figure 2. Fitted probability of producing *se* + change of states verbs.

Notes. CI = confidence interval. L2 = second language. HS = heritage speakers.

Table 5. Results of Bayesian analysis for production of *se* + psych verbs.

	Mean	SE	SD	95% CI	
Intercept	6.316	0.019	1.176	4.255	8.86
HSs	-1.23	0.024	1.428	-3.962	1.687
L2	-7.255	0.022	1.308	-9.948	-4.783
Control	—	—	—	—	—

Notes. CI = confidence interval. L2 = second language. HS = heritage speakers.

Table 6. Results of pairwise comparison for production of *se* + psych verbs.

	95% CI	
HSs vs. control	-.485	4.39
L2 vs. control	6.125	11.385
HSs vs. L2	4.437	9.269

Notes. CI = confidence interval. L2 = second language. HS = heritage speakers.

Table 7. Results of the GLMM model with logit link and binomial response variable: *se + wh* question.

	Estimate	SE	t (df)	p
<i>Fixed effect terms:</i>				
Intercept	3.6069	0.6728	5.36 (57)	< 0.0001
Group-heritage speakers	-2.3288	0.8124	-2.87 (300)	0.0044
Group-L2 learners	-5.4667	0.8341	-6.55 (300)	< 0.0001
Group-control group	0	–	–	–
<i>Random effect terms:</i>				
Intercept (participant)	2.7809	0.8736	–	–

Notes. Overall model F test result: $F(2, 300) = 23.54, p < 0.0001$.

Tukey–Kramer pairwise comparison post-hoc analysis

Comparison groups	Fitted probability of producing <i>se + wh</i> questions	p
Heritage speakers vs. L2 learners	0.78 (0.08) vs. 0.13 (0.06)	< 0.001
Heritage speakers vs. control group	0.78 (0.08) vs. 0.97 (0.02)	0.0123
L2 learners vs. control group	0.13 (0.06) vs. 0.97 (0.02)	< 0.001

2 Acceptability judgement task

The mean responses for the grammatical and ungrammatical sentences were submitted separately to a repeated measures ANOVA with group (Control group, HSs and L2 learners) as the between participant factor (independent factor) and structures (change of state verbs, psych-verbs in declaratives and psych-verbs in *why*-questions) as the within participant factor (dependent factor). In the case of grammatical sentences (Figure 4), there was a significant main effect per group ($F(2,57) = 22.21, p < .001$) but not by condition. The analysis revealed statistical differences between the L2 learners and the control group ($t(57) = 6.55, p < .001$), and between the L2 learners and the HSs across all conditions ($t(57) = 2.20, p = .002$). Differences between the HSs and the control group were not significant ($p = .07$) in any condition. For change of state verbs, L2 learners behaved statistically different from the control group ($t(114) = 4.93, p < .001$) and HSs ($t(114) = 3.27, p = .001$). To summarize, HSs outperformed L2 learners across conditions with grammatical sentences, although all groups showed a mean score above 4 ('fine' in the Likert scale).

A different pattern is observed for ungrammatical sentences (Figure 5). Controls rated change of state verbs and psych verbs below 2 on average. Differences between groups with change of state verbs seem to be more evident in this case. Whereas L2 learners rated *se* omission (e.g. *La ventana, La ventana rompió*) above 3, HSs did it below 3, and the control group rated them below 2. Acceptance of psych verbs in *why*-questions is not surprising given the grammaticality of the construction *estar*+adj and was included here for expository purposes.

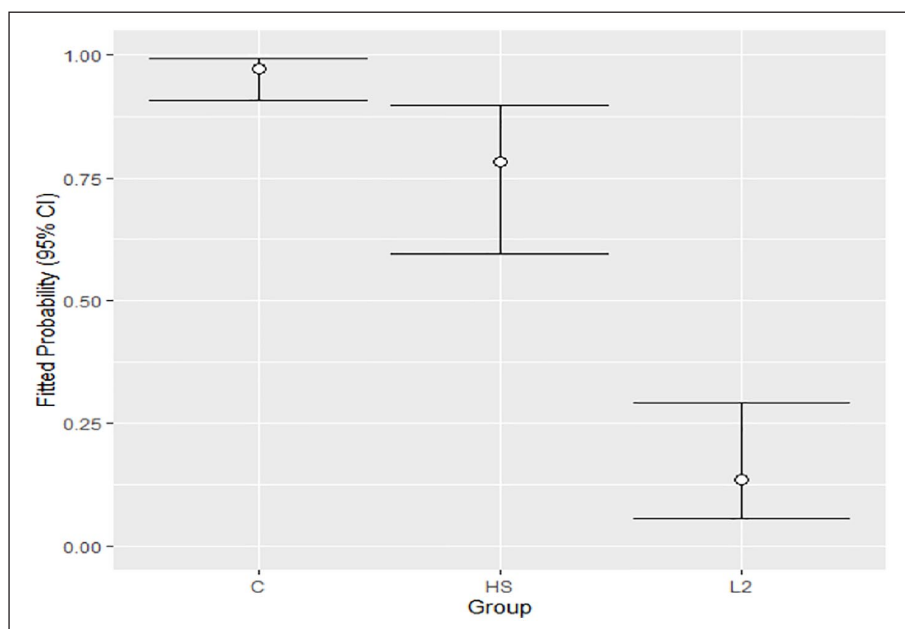


Figure 3. Fitted probability of producing *se + wh* questions.

Notes. CI = confidence interval. L2 = second language. HS = heritage speakers.

Results revealed a main effect for group ($F(2, 57) = 23.74, p < .001$) and condition ($F(4, 114) = 205.76, p < .001$), but also a significant interaction between group and condition ($F(4, 114) = 19.24, p < .001$). Overall differences between HSs and L2 learners ($t(57) = -4.56, p < .001$) and between L2 learners and the control group ($t(57) = -6.75, p < .001$) were significant. Further comparisons revealed significant differences with change of state verbs between L2 and the control group ($t(114) = -9.60, p < .001$), L2 and HSs ($t(114) = -6.05, p < .001$), but also between HSs and controls ($t(114) = -3.55, p < .002$). In the case of psych verbs, L2 learners behaved significantly different from the control group ($t(114) = -5.52, p < .001$) and from HSs ($t(114) = -4.80, p < .001$). No significant differences were found between HSs and controls ($p = .75$). This means that HSs were more accurate in their judgements of change of state verbs and psych verbs than L2 learners, although they still differed from the control group in the case of change of state verbs. The differences in means between change of state verbs and psych verbs were statistically significant for L2 learners ($t(114) = 4.27, p = .001$) and HSs ($t(114) = 2.71, p = .020$).

3 Forced preference task

As in the previous task, the HSs outperformed the L2 learners across the board, although L2 learners' rate of *se* preference was higher than in production. The HSs behaved target-like with the first two conditions. However, both groups exhibited difficulties with psych verbs in questions. Figure 6 shows the mean responses for each condition by group.

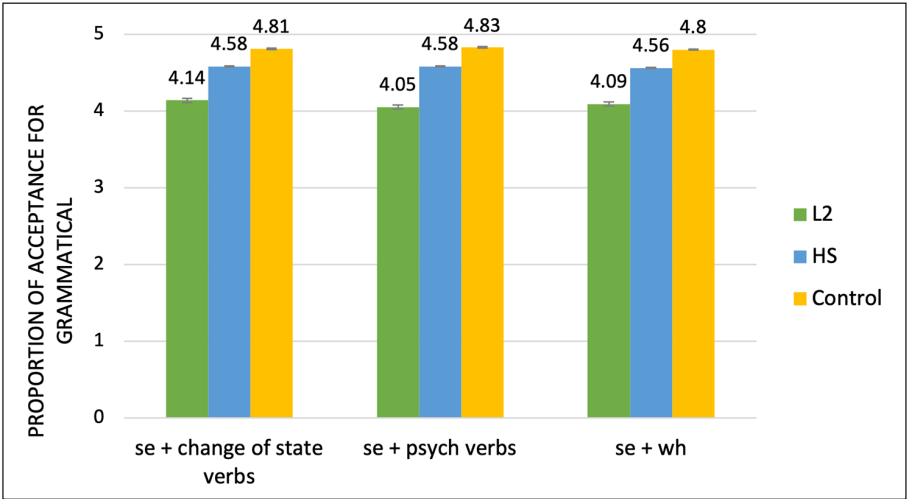


Figure 4. Mean proportion of acceptance for grammatical sentences.
Notes. L2 = second language. HS = heritage speakers.

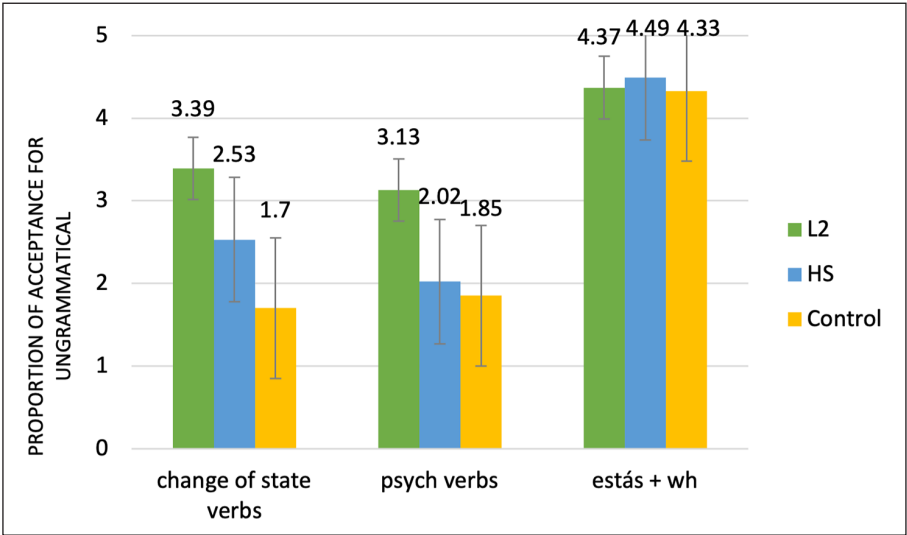


Figure 5. Mean proportion of acceptance for ungrammatical sentences.
Notes. L2 = second language. HS = heritage speakers.

a Change of state verbs. As shown in Tables 8 and 9, results showed no significant differences between the HSs and the control group. However, there were significant differences between L2 learners and the controls, and between the HSs and the L2 learners.

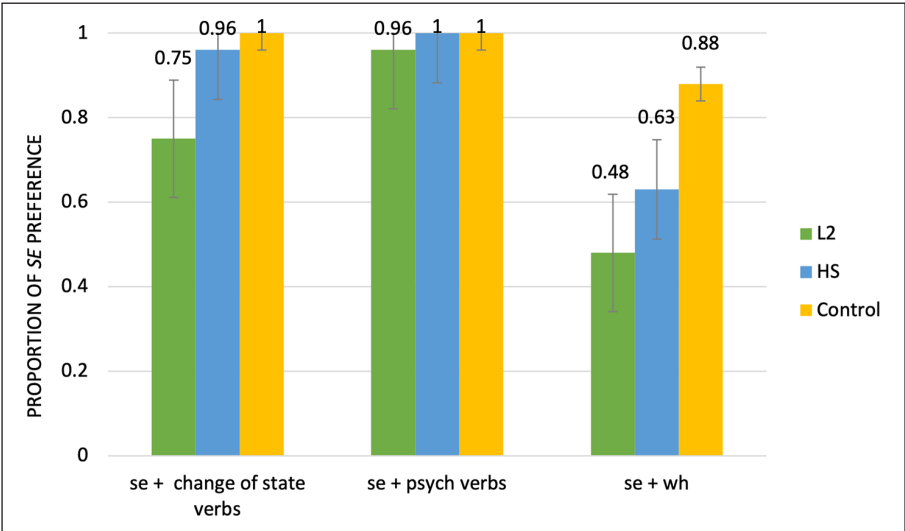


Figure 6. Mean proportion of target *se* preference across conditions and by group.
Notes. L2 = second language. HS = heritage speakers.

b Psych verbs in declaratives. As indicated in Tables 10 and 11, the HSs group was not significantly different from the control group. Given that the upper bound of L2 (−0.445) is close to 0, we should stay cautious about interpreting this result as significant. Results from the pairwise comparison showed an extremely small interval between the L2 learners and the controls (0.475–0.563 compared to other two interval groups (see Table 11). This suggests that the estimation might be inaccurate.

c Psych verbs in why-questions. As shown in Table 12 and Figure 7, results evidenced significant differences between groups ($F(2,300) = 9, p = .002$). A post hoc analysis showed significant differences between HSs and the control group ($p = .02$) and between L2 learners and controls ($p < .001$), but not between HSs and L2 learners ($p = .229$). The control group showed the highest fitted probability (91%), followed by the HSs (67%). The L2 learners showed the lowest probability of *se* preference (47%).

Overall, the HSs behaved completely native-like with change of state verbs and psych verbs in declaratives. The L2 learners’ accuracy increased remarkably across conditions and they behaved native-like with psych verbs in declaratives. As in production, L2 learners and HSs preferred *estar+adj* over *se* with psych verbs in questions, whereas both groups did not differ from the control group with psych verbs in declaratives. A possible misinterpretation of the context as stative, may explain monolingual variation.⁸ Their target performance ($M = 0.88$) decreases slightly in comparison to the production task ($M = 0.97$). A closer look to the items in which the controls preferred *estar+adj* reveals that variation with *enojarse* (4/14), *distraerse* (3/14), and *asustarse* (3/14) was very low, which rejects the possibility of an item effect.

Table 8. Results of Bayesian analysis for the preference of *se* + *change of state*.

	Mean	SE	SD	95% CI	
Intercept	6.096	0.02	1.061	4.203	8.534
HS	-1.448	0.19	1.152	-3.898	0.817
L2	-4.325	0.19	1.062	-6.815	-2.298
Control	–	–		–	–

Notes. CI = confidence interval. L2 = second language. HS = heritage speakers.

Table 9. Pairwise comparison for *se* + *change of state*.

	95% CI	
HS vs. control	-0.535	4.085
L2 vs. control	2.718	7.02
HS vs. L2	1.573	4.78

Notes. CI = confidence interval. L2 = second language. HS = heritage speakers.

Table 10. Results of Bayesian analysis for the preference of *se* + *psych verbs*.

	Mean	SE	SD	95% CI	
Intercept	6.983	0.03	1.508	4.417	10.438
HS	1.144	0.03	1.9	-2.376	5.205
L2	-3.076	0.028	1.481	-6.263	-0.445

Notes. CI = confidence interval. L2 = second language. HS = heritage speakers.

Table 11. Pairwise comparison for *se* + *psych verbs*.

	95% CI	
HS vs. control	-5.316	2.654
L2 vs. control	0.475	0.563
HS vs. L2	-0.704	9.048

Notes. CI = confidence interval. L2 = second language. HS = heritage speakers.

In order to examine whether the differences between groups and conditions were observable at the individual level, participants were classified into four different groups according to the number of target items with *se* they preferred out of six: *upper range* (5–6 target items), *mid-range* (3 to 4 target responses), *low range* (1 to 2 target responses) and *zero target preference*. The individual analysis confirmed that *estar*+adj. is not a general trend in the monolingual group. Only 3/20 participants fell into the mid-range group (i.e. 3–4/6 of *te* items over *estar*+adj). The other 17 monolinguals classified for the upper

Table 12. Results of the generalized linear mixed effect model (GLMM) Model with logit link and Binomial response variable: *se+wh* questions.

	Estimate	SE	t (df)	p
<i>Fixed effect terms:</i>				
Intercept	2.2928	0.4394	5.22 (57)	< 0.0001
Group-heritage speakers	−1.5639	0.5765	−2.71 (300)	0.0071
Group-L2 learners	−2.4231	0.5725	−4.23 (300)	< 0.0001
Group-control group	0	–	–	–
<i>Random effect terms:</i>				
Intercept (participant)	1.7834	0.5767	–	–

Notes. Overall Model F test result: $F(2, 300) = 9, p = 0.0002$.

Tukey–Kramer pairwise comparison post-hoc analysis

Comparison groups	Fitted probability for production of <i>se+wh</i> questions	p
Heritage speakers vs. L2 learners	0.67 (0.08) vs. 0.47 (0.09)	0.229
Heritage speakers vs. control group	0.67 (0.08) vs. 0.91 (0.04)	0.019
L2 learners vs. control group	0.47 (0.09) vs. 0.91 (0.04)	< 0.001

range (5–6 of *te* items by participant). This was not the case in the HSs group (10/20 participants were upper range) or the L2 group (only 5 participants in the upper range).

VI Discussion

The goals of the current study were two-fold. First, we aimed to examine if HSs and L2 learners are aware of the [+inchoative] feature that characterizes *se* with change of state verbs and psychological verbs in declaratives and in *why*-questions and whether this feature is subject to cross-linguistic influence. Second, we examined if there is a role for the onset of bilingualism by establishing a relationship between early exposure to Spanish and higher degree of target knowledge of the aspectual distinctions instantiated by *se*.

We hypothesized that L1 overt marking of aspectual morphology would facilitate target-performance of psych verbs over change of state verbs (hypothesis 2). This was partially corroborated. In production, there was a significant increase in the target use of *se* with psych verbs compared to change of state verbs in the case of L2 learners. However, this was not the case for HSs who behaved target-like with both types of verbs. This suggests that HSs might have overcome this stage and that the representation of *se* with both verb types is in place. Unlike HSs, L2 learners rated ungrammatical sentences above 3, although both experimental groups behaved statistically differently from the control group with ungrammatical sentences in the AJT. In general, both groups seem to differentiate between grammatical and ungrammatical sentences. In the case of L2 learners, less accuracy in judgements and the inability to produce *se* with both types of verbs

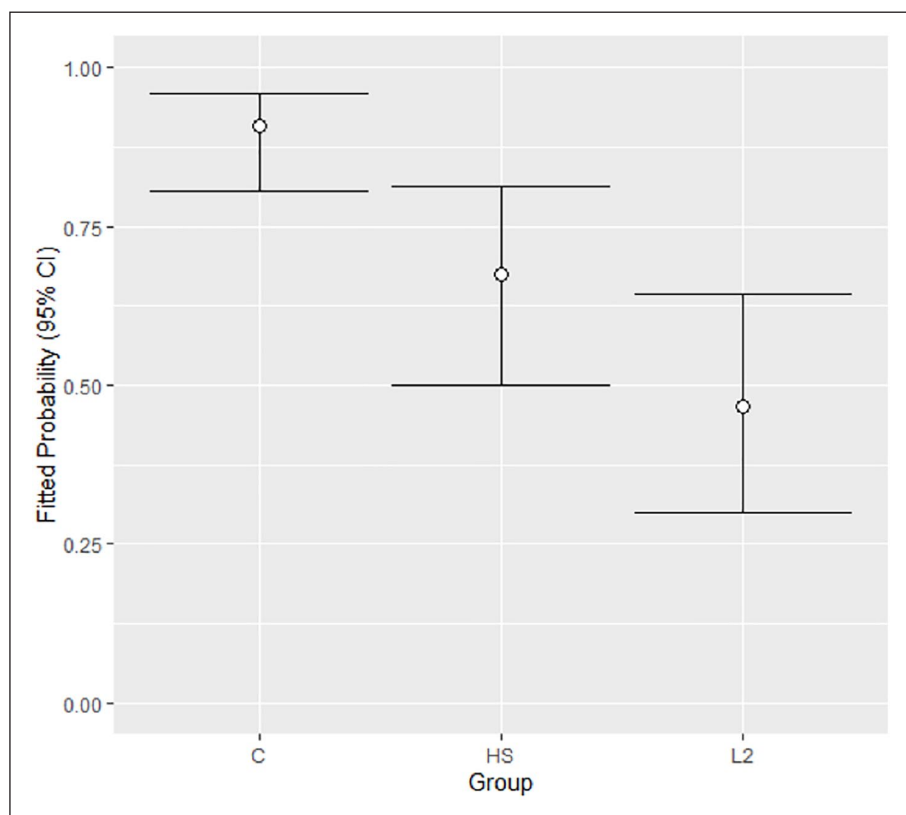


Figure 7. Fitted probability of *se* + *wh* questions preference.

Notes. CI = confidence interval. L2 = second language. HS = heritage speakers.

may suggest that they do not have a clear representation of the clitics' agreement features (i.e. agent role reduction and changes in argument structure). However, native-like behavior in the interpretation of psych verbs (the preference task) suggests that this assumption might be inaccurate, although they still exhibit difficulties with change of state verbs. In our view, the representation of the syntactic configuration of clitic *se* might be in place, but L1 influence plays a role in morphological surface inflection, which is more evident in production (Prévost and White, 2000; Lardiere, 2009). L1 overt morphology (*ger*) could act as a facilitator for psych verbs as long as what *se* encodes is meaningful and represented in learners' grammars. The nature of L1 transfer and morphological variability in comprehension may be morphological, but also lexico-syntactic (i.e. sensitivity to the distinct verb types that require *se*). These results support previous findings from comprehension tasks with L2 learners (Cabrera, 2012, 2019; Montrul, 1999, 2000, 2001).

Besides the influence of L1 overt/absent morphology, we examined the aspectual dimension of the clitic with the eventive question (i.e. *¿por qué te asustas?*). Its interpretation forces the use of the pronominal option over the stative one in Spanish (i.e. *¿por*

qué estás asustado?). We discussed that the syntactic operations related to *se*'s agreement features are only problematic for learners with change of state verbs, especially in production, and that psych verbs in declaratives do not pose higher difficulties. Hypothesis 3 assumed that a negative transfer effect from the L1 *be*+*adj.* might encourage the preference of *estar*+*adj* in the case of psych verbs in *why*-questions. Both L2 learners and HSs behaved significantly different from controls in the production and preference of psych verbs with *why*-questions. While both populations exhibited target preference with psych verbs in declaratives, they did not with psych verbs in *why*-questions. L2 learners preferred the *estar*+*adj* construction and HSs showed variability in this regard, despite *se* encoding a [+inchoative] feature and *estar*+*adj* a [+stative] one. In our view, this stems from an aspectual deficit related to *se*'s lexico-syntactic functions as the head of AspP at advanced levels of proficiency. The [+inchoative] feature seems more difficult to compute and access than those related to argument structure and the clitic *se* poses higher difficulty when aspectually constrained in questions. This difficulty may be explained in terms of CLI at the aspectual and pragmatic level where structures mirroring English emerge in production and exhibit variability in comprehension (Perez-Cortes, Putnam and Sánchez, 2019). As a reviewer notes, the difficulties may also stem from distinct conceptualizations of the event that would follow the English pattern and have been found to cause CLI effects in bilingual grammars (Athanasopoulos and Bylund, 2013; Bylund and Jarvis, 2011). English focuses on the end result and allows the [+stative] structure *be*+*adj* which is parallel to Spanish *estar*+*adj*. Another contributing factor might be that interrogative sentences are more complex/marked than declaratives (Farkas and Roelofsen, 2017). Interrogative sentences have discursive restrictions which may pose additional difficulty for target performance at the pragmatic level.

In regard to the contrast between production and comprehension, L2 learners were more accurate in their intuition and comprehension (AJT and Preference Task) showing native-like behavior in conditions affected by the influence of overt morphology. However, they failed to produce *se* across conditions (Montrul, 2010a; White, 2008). Differences between task modality may be related to the higher difficulties in lexical access and retrieval of formal features and their mappings to phonological forms in real time language processing for production (Prévost and White, 2000; White, 2008). However, interpretation results indicate that L2 learners are not sensitive to the inchoative feature in comprehension either. This may indicate that while agreement features of the clitic are clearly represented, the aspectual feature of *se* is not, unlike in HSs grammars.

HSs decreased accuracy in comprehension ($M = 0.63$) as opposed to production ($M = 0.73$) of psych verbs in *why*-questions suggests that although the connection between the morphological form and the aspectual feature of the clitic might be unstable, is not incompletely represented or undergoing restructuring. Evidence from both tasks suggest that the *estar*+*adj.* construction is an alternative option to the morphological encoding of inchoativity which emerges as a viable choice to ease processing costs in production and impacts interpretation (Perez-Cortes, Putnam and Sánchez, 2019). As mentioned earlier (footnote 6), three controls in the preference task exhibited slight variability, which highlights the difficulty of setting baseline standards for comparisons in HL research. It also means that the small difference between comprehension and production in the case of HSs should be taken carefully. Although an increase in production might be unexpected,

two factors may be considered. HSs are normally exposed to the language in a more naturalistic environment and are more used to process oral production than written comprehension (Montrul, 2010a, 2016), as reflected by their patterns of language use. Also, their self-reported proficiency in Spanish speaking ($M = 3.3/4$) and understanding ($M = 3.55/4$) was higher than in reading ($M = 2.6$) and writing (2.5).

Finally, hypothesis 4 predicted that HSs would outperform L2 learners given their earlier exposure to Spanish and the quantity and quality of input received during their lifespan (Johnson and Newport, 1989; Montrul, 2008, 2010a). This was corroborated by the fact that HSs outperformed L2 learners in every condition across tasks with the exception of declarative psych verbs in the preference task, where no significant differences between groups were found. L2 learners seem to be more affected by cross-linguistic features pertaining to the overt marking of aspectual features. In the case of psych verbs in *why*-questions, HSs behaved more target-like than L2 learners, although their grammatical representation and behavior with the [+inchoative] feature was still not native-like. Overall, this study supports previous research in that it shows the advantages of HSs over L2 learners (Cuza and Frank, 2015; Montrul, 2005; Montrul, Foote and Perpiñán, 2008) and clearly indicates a role for the age of onset of bilingualism as an influential factor for the development of inchoative *se*. The differences between HSs and L2 learners in this regard may also be explained by the differences in proficiency and language dominance. Heritage speakers are more dominant in Spanish than L2 learners since their patterns of language use reflect more frequent use of Spanish at home and in social situations. Moreover, the significant difference in the mean proficiency scores between the L2 learners ($M = 38/50$) and HSs ($M = 40/50$) might have also impacted their behavior.

VII Conclusions

We examined HSs and L2 learners' awareness of the [+inchoative] feature instantiated in *se* with change of state verbs and psychological verbs in declaratives and in *why*-questions, and the potential cross-linguistic influence. We also established a relationship between early exposure to Spanish and higher accuracy in production and knowledge of *se* in order to examine the role of onset of bilingualism.

We would like to argue for CLI and age of onset of bilingualism as affecting factors on the acquisition of the [+inchoative] feature that characterizes *se* in HSs of Spanish- and English-speaking L2 learners. While *se* + psych verbs in declarative sentences appears to be easier for HSs and L2 learners due to positive transfer from English, *se* + change of state verbs is more difficult to acquire in the case of L2 learners due to the lack of positive transfer from English (L1). The divergences between groups in this regard might be related to the age of onset of bilingualism, differences in Spanish/English dominance and proficiency.

In the case with psych verbs in questions, the fact that both groups showed difficulties with this construction suggests an aspectual deficit. While they are able to perform syntactic processes as theta-role reduction for detransitivization with *se* in declaratives, they are not sensitive to the [+inchoative] feature that characterizes *se*. This may cause CLI from English as they are preferring the English-like option that is also available in Spanish, but aspectually and pragmatically odd in the contexts provided. The aspectual

feature of *se* is particularly difficult to compute and access for bilingual populations and leads to alternative options that mirror L1 English patterns. Another possible explanation is that questions are more marked than declarative sentences and, therefore, there might be discourse effects that may pose more difficulty for its acquisition and processing.

We would like to note that by only including 6 items per structure, our study is limited in that it does not address variability by lexical item. However, we left out verbs that, in our view, could potentially affect the results for reasons outside the scope of the study (i.e. verb frequency and contextual complexity required in task design). Following these criteria, we also tried to include the same verbs used in the previous studies that address inchoative *se*.

Our results contribute to current research by examining two different populations of bilinguals that have never been studied together with regard to the clitic *se*. By comparing L2 learners and HSs, this study provides insights on the issue of age-related effects in linguistic development and evidence that points towards a clear morphosyntactic advantage of HSs over L2 learners. This study also provides new data with the structure (i.e. psych verbs in questions), which allowed for an examination of the semantic and aspectual information of inchoative *se*. Finally, this study suggests that further research on the acquisition of clitic *se* will need to consider aspectual features applicable to the distinct types of *se*, as they seem to be posing higher difficulty than other syntactic processes at advanced levels.

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Notes

1. Other authors have also proposed a generalized aspectual reading for the clitic *se* (Basilico, 2010; De Miguel and Fernández Lagunilla, 2000).
2. For earlier views on *se* and compositionality of aspect, see Zagana, 1999.
3. Syntactic optionality is taken here as 'the coexistence within an individual grammar of two or more variants of a given construction' (Sorace, 2000: 93). Variability between the use of two forms is typical in L2 developing grammars, i.e. presence/absence of *se* or the use of parallel structures that mirror the L1 (*estar* + adj.) as avoidance strategies.

4. We did not include 3rd person singular *se* with *why*-questions to avoid additional processing difficulties triggered by contextual and pragmatic complexity; 2nd person singular *te* was used instead and its formal variant *se* was accepted as target in the elicitation task.
5. We discarded all of the ‘completely odd’ or ‘odd’ responses in the AJT that were unrelated to the structure under examination.
6. *Fitted probabilities* refers to the probability distribution to our data (repeated measures).
7. The Bayesian analysis uses our data to predict the true distribution of the population after rounds of data sampling. It provides comparatively stable and reliable estimates of the parameters. We use the *stan.glmer* function in R to analyse the generalized linear mixed effect model with Bayesian method.
8. A possible explanation for monolingual variation is that the three participants had misinterpreted the preamble in the task as stative and they preferred *estar*+adj. Some monolingual variation looking at semantic/aspectual/pragmatically contextualized differences is not uncommon (Bylund and Jarvis, 2011; Perez-Cortes et al., 2019). As a reviewer noted, a video-task focusing more on the inchoativity/sudden change of emotional state could have drawn a more fine-grained interpretation of the context as eventive. This is a limitation to our study and should be considered in further research.

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