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The acquisition of obligatory and variable mood selection in epistemic predicates by L2 learners and heritage speakers of Spanish

Eduardo Lustres, Aída García-Tejada & Alejandro Cuza
Purdue University

The present study examines the extent to which L2 learners and HS of Spanish acquire target knowledge of subjunctive mood selection in Spanish. Specifically, we analyze obligatory and variable selection in temporal and concessive constructions. Ten HS of Spanish, ten English-speaking L2 learners and fifteen controls from Mexico completed a sentence completion task. Results indicate significant differences between the two experimental groups and the monolingual control group. The HS outperformed the L2 learners in three of the six conditions-tested. No significant differences were found between obligatory and variable subjunctive selection within the epistemic modality. Results suggest that the obligatory nature of mood selection does not play a role in the acquisition of the Spanish subjunctive within the epistemic modality.

Keywords: subjunctive mood, Spanish HS, L2 acquisition of Spanish, age effects, obligatoriness

1. Introduction

Heritage speakers (henceforward HS) are bilinguals who were exposed to a minority language since birth at home and to a majority language spoken by the community (Rothman, 2009, pp. 156–157). Differently from monolinguals, input available to HS has been affected to some degree by language contact (Pascual y Cabo & Rothman, 2012, p. 451). Heritage acquisition also differs from second

language (henceforward L2) acquisition. Whereas HS were exposed to their heritage language naturalistically in early childhood, L2 learners in the US commonly start acquisition of the L2 after puberty in a classroom setting (Montrul, 2016, p. 252). These differences in the age of acquisition and the quantity and quality of input received contribute to language processing and language acquisition in adulthood. Moreover, language acquisition is affected by multiple factors, for instance, the type of structure acquired.

In bilingual acquisition, the Spanish subjunctive (SUB) has been reported to be particularly challenging for heritage speakers and English-speaking second language learners evidenced in a lack of target knowledge of subjunctive mood selection in Spanish (e.g., Collentine, 1997; Montrul, 2007, 2009; Montrul & Perpiñán, 2011; Silva-Corvalán, 1994). The current study extends previous research by analyzing the extent to which Spanish HS have target knowledge of obligatory and optional subjunctive mood selection in temporal and concessive clauses. Some researchers have argued interface vulnerability effects in the acquisition of variable subjunctive selection in both L2 learners (e.g., Iverson, Kempchinsky, & Rothman, 2008) and HS (e.g., Montrul, 2007, 2009). A limitation of these studies is that they have compared obligatory selection in deontic modal bases versus variable selection in epistemic modal bases. Perez-Cortes (2016) examined subjunctive selection within the deontic modality and found no differences between obligatory and variable selection. However, no previous work has examined the acquisition of variable and obligatory epistemic predicates by HS. We cover this gap in the literature by examining preterit indicative (PRET IND), present subjunctive (PRES SUB) and imperfect subjunctive (IMP SUB) in (a) temporal adverbial clauses with *cuando* ('when') and *antes de que* ('before'), and (b) concessive adverbial clauses with *aunque* ('although') and *aun a riesgo de que* ('even at the risk of').

The goals of the current study are: (a) to analyze the production of variable and obligatory subjunctive mood selection by HS and L2 learners in two types of epistemic bases (Chung & Timberlake, 1985): temporal and concessive clauses; (b) to investigate existing similarities and differences between HS, L2 learners, and native speakers of Spanish. If differences are found between HS and L2 learners, we aim to examine if they can be explained in terms of the type of structure (obligatory vs. variable) and age-related effects (Johnson & Newport, 1989; Montrul, 2008).

In what follows we summarize the constraints of subjunctive mood selection in Spanish (Section 2), followed by previous research on the acquisition of subjunctive mood selection in Spanish (Section 3). Section 4 outlines the study and Section 5 reports on the results. The discussion and conclusions are provided in Section 6.

2. Subjunctive mood selection in Spanish

Modality is a semantic notion that determines the context and conditions in which a proposition is evaluated. Mood, on the other hand, is the grammatical expression of modality, which refers to the probability, obligation, or necessity of what is stated (Comrie, 1976).

In Spanish, modality can be expressed morphologically in the verbal inflection with the indicative and subjunctive moods (Bosque & Demonte, 1999). Syntactically, the Spanish subjunctive is restricted to subordinated clauses that are introduced by a complementizer from the matrix clause, such as a subordinating conjunction (e.g., *cuando*) or a verb + conjunction (e.g., *querer que*) (Bosque & Demonte, 1999). Lexically, subjunctive mood selection with certain complementizers (e.g., temporal clauses with *cuando* ‘when’) is variable. Variable selection allows the use of both indicative (IND) (1a) and subjunctive (SUB) (1b), whereas with other complementizers (e.g., temporal clauses with *antes de que* ‘before’) mood selection is obligatory and only allows the use of SUB (1c) (Bosque & Demonte, 1999).

- (1) a. *Arturo entró en la oficina cuando su jefe llegó* (IND).
 ‘Arturo entered in the office when his boss arrived.’
 b. *Pablo comerá las galletas cuando Andrés llegue* (SUB).
 ‘Pablo will eat the cookies once Andrés arrives.’
 c. *José terminará el pastel antes de que Ana llegue* (SUB) / **llega* (IND).
 ‘Jose will finish the cake before Ana arrives.’

Numerous proposals have attempted to characterize the selection of the subjunctive mood in Spanish. The indicative/subjunctive distribution has been explained in terms of ‘Assertion/Non-assertion’ (e.g., Hooper, 1975), ‘Realis/Irrealis’ (e.g., Givón, 1994), ‘Strong intensionality/Weak intensionality’ (e.g., Farkas, 1985) and ‘Veridicality/Non-veridicality’ (e.g., Giannakidou & Quer, 1997), among others. Other proposals, however, reject binary explanations of mood selection in Spanish, pointing out that the great semantic flexibility inherent to the Spanish mood system cannot be captured using such a restricted approach (e.g., Bell, 1980). Some authors propose that the Spanish subjunctive can appear in different modal bases, that is, common conversational backgrounds shared by speakers when they evaluate a proposition (Kratzer, 1981). Chung and Timberlake (1985) propose three types of modal bases: deontic (2a), epistemic (2b), and epistemological (2c).

- (2) a. *Laura quiere que Ana compre* (SUB) / **compra* (IND) *pan*.
 ‘Laura wants Ana to buy bread.’
 b. *Laura cocinará antes de que Miguel llegue* (SUB) / **llega* (IND).
 ‘Laura will cook before Miguel arrives.’

- c. *Laura duda que Julia termine (SUB) / *termina (IND) su plato.*
 ‘Laura doubts that Julia will finish her plate.’

In the deontic modality (e.g., commands and indirect commands), the evaluation is dependent on the notions of permission, necessity, and obligation. For instance, directives with *querer que* (as in 2a) are deontic because they express volition. Epistemic modalities (e.g., relative and adverbial clauses), on the other hand, involve the evaluation of an event with respect to all possible worlds and concern the factual status of the proposition. For instance, temporals with *antes de que* (as in 2b) are epistemic because they express the non-factuality of the proposition. Finally, epistemological modalities (e.g., verbs of opinion and doubt) also involve the evaluation of an event with respect to all possible worlds and concern the factual status of the proposition. Additionally, epistemological bases include speaker’s attitudes in the process of evaluation. For example, predicates of doubt (as in 2c) are epistemological because they express the opinion of the speaker about the non-factuality of the proposition.

Moreover, some SUB constructions exhibit tense co-occurrence between the verb of the main clause and the embedded verb (Sánchez-Naranjo, 2014). In variable constructions, this tense co-occurrence determines the use of IND or SUB (as shown in 3a / 3b). In obligatory constructions, tense co-occurrence determines the use of present subjunctive or imperfect subjunctive (as shown in 4a / 4b).

- (3) a. *Pedro entró (PRET IND) en la oficina cuando su jefe llegó (PRET IND).*
 ‘Pedro entered in the office when his boss arrived.’
 b. *Pedro entrará (FUT IND) en la oficina cuando su jefe llegue (PRES SUB).*
 ‘Pedro will enter in the office when his boss arrives.’
- (4) a. *Andrea entró (PRET IND) en casa antes de que Laura llegara (IMP SUB).*
 ‘Andrea entered home before Laura arrived.’
 b. *Andrea entrará (FUT IND) en casa antes de que Laura llegue (PRES SUB).*
 ‘Andrea will enter home before Laura arrives.’

The following section will discuss previous research regarding the acquisition of the Spanish subjunctive mood selection in obligatory and variable constructions.

3. The acquisition of subjunctive mood selection in Spanish

3.1 Previous research on the acquisition of subjunctive mood selection in Spanish

The acquisition of the Spanish subjunctive is a gradual and complex process, as shown in previous studies examining first language acquisition in monolingual

Spanish-speaking children. Blake (1983) demonstrated that the subjunctive system is acquired at different stages. Based on previous findings, Pérez-Leroux (1998) proposed three stages in the acquisition of the subjunctive regarding the type of modality. In monolingual development, the deontic modality is acquired earlier, subsequently, the epistemic modality is mastered, and the epistemological modality is the last one to be acquired.

Research with bilingual speakers reveals that the acquisition of the Spanish subjunctive shows great variability among both L2 learners (e.g., Collentine, 1997; Terrell, Barcroft, & Perrone, 1987) and HS of Spanish (e.g., Montrul, 2007, 2009; Montrul & Perpiñán, 2011). Some studies have explained this variability due to the vulnerability of optional subjunctive selection in opposition to obligatory subjunctive selection among both L2 learners (e.g., Iverson, Kempchinsky, & Rothman, 2008; Massery & Fuentes, 2014) and HS (e.g., Montrul, 2007, 2009; Silva-Corvalán, 1994).

Among HS, several studies have argued that obligatory selection is easier to acquire than optional selection (e.g., Silva-Corvalán, 1994; Montrul, 2007, 2009). Montrul (2007, 2009) examined obligatory and optional subjunctive selection in deontic, epistemic and epistemological contexts. Both studies tested interpretation with a morphological recognition exercise and comprehension with a sentence conjunction task. Additionally, the second study examined production with an oral elicitation task. In both studies, HS showed higher variation with optional selection than with obligatory selection in comparison to native speakers. Montrul accounted for these results by arguing for the interface vulnerability of variable constructions. However, these results present two limitations. First, not all of the instruments tested all of the conditions that were analyzed. The morphological recognition task and the oral elicitation task tested obligatory deontic contexts (e.g., *busco* ‘I’m looking for’) and obligatory epistemological contexts (e.g., *dudo que* ‘I doubt that’), while the sentence conjunction task tested variable epistemic contexts (e.g., temporal clauses with *cuando*, ‘when’ and relative clauses). Second, the author compared obligatory and variable selection from different modalities (i.e., deontic, epistemic and epistemological modal bases).

In L2 acquisition, previous studies have also argued for interface vulnerability in variable contexts (e.g., Iverson, Kempchinsky, & Rothman, 2008; Massery & Fuentes, 2014). Iverson, Kempchinsky and Rothman (2008) examined the acquisition of obligatory deontic contexts and variable epistemic contexts by intermediate and advanced L2 learners with a grammaticality judgment task. Results showed differences between groups. Participants in the intermediate group exhibited more difficulties with variable contexts than with obligatory contexts, while participants in the advanced groups did not show significant differences between obligatory and variable contexts. Massery and Fuentes (2014) examined mood selection in deontic, epistemic, and epistemological predicates

among L2 learners of Spanish. Participants completed a mood conjugation task. Deontic predicates exhibited high scores, while epistemic and epistemological predicates yielded low scores. The authors claimed that these results supported the Interface Hypothesis (e.g., Sorace, 2000; Sorace & Filiaci, 2006). However, as in Montrul (2007, 2009), these studies by Iverson, Kempchinsky and Rothman (2008) and by Massery and Fuentes (2014) also mixed in their analyses structures that belonged to different modalities (i.e., deontic and epistemic modal bases in the first case; deontic, epistemic and epistemological modal bases in the second one).

Perez-Cortes (2016) examined Spanish HS and L2 learners' acquisition of obligatory and variable subjunctive selection in deontic desideratives (i.e., *Quiero que vengas* 'I want you to come' vs. *Te digo que vengas* 'I tell you to come') and indicative selection in reported speech (i.e., *Digo que vienes* 'I say that you come'). Unlike previous studies, this research focused on deontic predicates instead of comparing structures that belonged to different modalities. After controlling for the type of modality, the author did not find any differences between obligatory and variable selection. These results suggest that the source of morphological optionality in the heritage and L2 grammars does not stem from the obligatory nature of the selection (as argued by Massery & Fuentes, 2014 and by Montrul, 2007, 2009), but from the type of modality expressed by the predicate under evaluation. Perez-Cortes pointed out the importance of testing obligatory and variable contexts within the same modal base. However, the acquisition of obligatory and variable mood selection in epistemic predicates remains underexplored in L2 and heritage acquisition.

3.2 Research questions and hypotheses

Following previous research, we examine the extent to which L2 learners and HS of Spanish have target knowledge of obligatory and variable subjunctive mood selection in Spanish in two types of epistemic predicates: temporal and concessive clauses. We analyze existing similarities and differences between HS of Spanish and L2 learners. If differences are found, we examine if they can be explained in terms of the type of structure (obligatory vs. variable) and early exposure to Spanish. We pose the following research questions:

- RQ1:** To what extent do heritage speakers and L2 learners acquire subjunctive mood selection in temporal and concessive clauses?
- RQ2:** What is the role of age of onset of bilingualism and early exposure in the acquisition of the subjunctive mood selection?
- RQ3:** If difficulties are found, can they be explained in terms of the type of subjunctive selection (variable selection vs. obligatory selection)?

Based on previous research, we hypothesize the following:

- H1. The heritage speakers and the L2 learners will show higher variation in the production of the subjunctive mood in temporal and concessive clauses compared to monolingual speakers serving as a baseline (as in Montrul, 2007, 2009):
 - H1a. Specifically, it is expected that the heritage speakers and the L2 learners will show variation with target tense and mood selection.
- H2. The heritage speakers will show lower variation than the L2 learners in the production of the subjunctive mood in temporal and concessive clauses given their earlier exposure to Spanish and the quantity and quality of input received (as in Montrul, 2008).
- H3. Subjunctive selection will not differ significantly between obligatory and variable constructions within the epistemic modality (as found in Perez-Cortes, 2016 for the deontic modality).
 - H3a. Subjunctive selection will not differ significantly between *cuando* + present subjunctive clauses and *antes de que* + present subjunctive clauses.
 - H3b. Subjunctive selection will not differ significantly between *aunque* + present subjunctive clauses and *aun a riesgo de que* + present subjunctive clauses.

4. The study

4.1 Participants

A total of 35 participants took part in the study: ten HS of Spanish, ten English-speaking L2 learners, and fifteen Spanish native speakers serving as a control baseline. Participants in the experimental group took a Spanish proficiency test (as in Cuza, Pérez-Leroux, & Sánchez, 2013). All participants completed a language background questionnaire (as in Cuza, 2013).

The HS ($n = 10$; age range 16–21; $M = 18.4$) were undergraduate students from a major research university in the American Midwest. They were second generation heritage speakers born and raised in the US, except for two of them, who were born in Argentina and Puerto Rico and came to the US before the age of 5. All the HS reported to have two Spanish-speaking parents, except for one, who had a Spanish-speaking mother and a Czech-speaking father. All of them had been exposed to Spanish from birth and to English before the age of 5. One half of the participants (50%) reported feeling more comfortable speaking English, and about 40% reported being equally comfortable in both languages. Many of them had visited Hispanic countries almost every year, and 50% reported visiting Mexico for 2–4

weeks every year or almost every year. Regarding patterns of language use, Spanish was reported to be the language used at home and English the language used at school, at work, and in social situations. At home, 40% of the HS reported speaking 'mostly Spanish', 50% 'slightly more Spanish' and 10% 'equal English and Spanish'. At school and at work, 60% of them reported speaking 'English only' or 'mostly English', 30% 'slightly more English' and 10% 'equal English and Spanish'. In social situations, 100% of them reported speaking 'English only' or 'mostly English'. Their self-reported proficiency in English was 'excellent' (3.93/4) and 'good' in Spanish (3.05/4). Their mean score in the proficiency test was 43/50 ($M = 43$, $SD = 3.49$).

The L2 learners ($n = 10$; age range 16–21; $M = 18.4$) were also undergraduate students from a major research university in the Midwest. They were all born and raised in the US, except one who was born in Switzerland and came to the US at the age of two. English was the L1 of all the L2 learners. All of them had been exposed to English from birth and to Spanish during middle school or high school (age range 13–16; $M = 14.7$). None of them studied in a bilingual school. All of them reported feeling more comfortable speaking English than Spanish. Most of them reported having visited Spanish-speaking countries (Spain, Mexico, and Costa Rica). The majority of the participants (90%) had spent a period of 6 weeks abroad and one of them had spent a period of one year living in Costa Rica. Regarding their patterns of language use, English was reported to be the language used in every situation. At home, all of them reported speaking 'only English'. At school and at work, 30% of them reported speaking 'only English', 60% 'mostly English' or 'slightly more English' and 10% 'equal English and Spanish'. In social situations, 50% of them reported speaking 'only English', 40% 'mostly English' and 10% 'equal English and Spanish'. Their self-reported proficiency in English was 'excellent' (4/4) and in Spanish 'good' (2.83/4). Their mean score on the proficiency test was 35/50 ($M = 35$, $SD = 6.08$).

The native speakers in the control group ($n = 15$; age range 18–28; $M = 21.2$) were students from a public university in Guanajuato (Mexico). We decided to use monolinguals as a control group over bilingual long-term immigrants following seminal work from a formal perspective (Montrul, 2008). The Mexican native speakers of Spanish used as a control group reported to have 'little contact' or 'no contact' with English and were highly educated college students comparable with the HS and L2 learners in our study.

4.2 Tasks

Participants were asked to complete a sentence completion task (as in Cuza, 2016). The sentence completion task examined eight structures (see Table 1): (1) variable *cuando* clauses with preterit indicative, (2) variable *cuando* clauses

with present subjunctive, (3) obligatory *antes de que* clauses with present subjunctive, (4) obligatory *antes de que* clauses with imperfect subjunctive, (5) variable *aunque* clauses with preterit indicative, (6) variable *aunque* clauses with present subjunctive, (7) obligatory *aun a riesgo de que* clauses with present subjunctive, and (8) obligatory *aun a riesgo de que* clauses with imperfect subjunctive.

Table 1. Structures tested in the sentence completion task

			Temporal clauses	Concessive clauses
Variable contexts			Complementizer <i>cuando</i>	Complementizer <i>aunque</i>
	Matrix verb	Subordinated verb		
	Preterit IND	Preterit IND	<i>Pedro entró a la oficina cuando llegaste</i> 'Pedro entered to the office when you arrived'	<i>Paula suspendió el examen aunque estudió</i> 'Paula failed the exam although she studied'
	Future IND	Present SUB	<i>Pedro entrará a la oficina cuando llegues</i> 'Pedro will enter to the office when you arrive'	<i>Paula suspenderá el examen aunque estudie</i> 'Paula will fail the exam even if she studies'
Obligatory contexts			Complementizer <i>antes de que</i>	Complementizer <i>aun a riesgo de que</i>
	Matrix verb	Subordinated verb		
	Preterit IND	Imperfect SUB	<i>Pedro entrará a la oficina antes de que llegues</i> 'Pedro will enter to the office before you arrive'	<i>Paula no estudiará aun a riesgo de que suspenda</i> 'Paula will not study even at the risk of failing'
	Future IND	Present SUB	<i>Pedro entró a la oficina antes de que llegaras</i> 'Pedro entered to the office before you arrived'	<i>Paula no estudió aun a riesgo de que suspendiera</i> 'Paula did not study even at the risk of failing'

The sentence completion task was specifically designed to test the production of subjunctive mood selection. The sentence completion task had a total of 32 test items (4 test items × 8 conditions), 33 distractors and 2 training items. The

distractors tested the use of the clitic *se* (18 items) and *ser / estar* (15 items). The training items tested mood selection like the test items but were discarded from our analysis. All items consisted of a preamble and a prompt (see Example 1). The question eliciting the response was *¿Qué sucede en la historia?* (*What happens in the story?*). The prompt consisted of a sentence with a matrix verb in preterit indicative or in morphological future (see Table 1) and a blank space where the subjunctive or the indicative should be selected depending on the context and the complementizer. Instead of the conjugated form, there was an infinitive form set off by parenthesis. Most of the verbs included were regular, but we also included some frequent irregular verbs (e.g., *traer, comenzar, poner, hacer*, etc.). Participants were asked to complete the sentence orally by conjugating the infinitive form provided between parenthesis.

- (1) Preamble: *Mañana Carolina va a escalar una montaña muy peligrosa. Se puede caer de la montaña y hacerse daño, pero ella no tiene miedo. ¿Qué sucede en la historia?*

*Here appears a photo of a
young woman climbing a
rock.*

‘Tomorrow Carolina will climb a very dangerous mountain. She may fall from the mountain and get injured, but she is not afraid. What happens in the story?’

Prompt: *Carolina escalará la montaña aun a riesgo de que se _____ (caer)*
‘Carolina will climb the mountain even at the risk of _____ (to fall)’

Target response: *caiga* (PRES SUB)

Non-target response: *cae* (PRES IND), **caer* (INF)

4.3 Procedure

The testing was conducted in a quiet laboratory setting. Participants were tested individually by the researcher in forty-five minutes to one-hour long testing sessions. Four components were administered to the participants in the following order: (1) consent form, (2) Spanish proficiency test, (3) language background questionnaire and (4) sentence completion task.

The Spanish proficiency test and the language background questionnaire were written. The Spanish proficiency test had a maximum score of 50 and consisted of two parts: (1) a vocabulary section with four multiple-choice options (30 items); and (2) a cloze test with three multiple-choice options (20 items). The language background questionnaire included questions about personal information,

education, stays in countries where Spanish is the majority language, and self-assessed language ability. Participants completed the Spanish proficiency test individually. During the completion of the language background questionnaire, the researcher assisted the participants by reading and explaining the questions.

For the sentence completion task, two sets (set A and set B) were created and items were randomized and counterbalanced. One half of the participants received set A and the other half received set B. Participants and the interviewer were seated in front of a laptop with a PowerPoint presentation. Each item was presented visually and aurally, and the task was conducted orally. The preamble was read by the interviewer and participants were asked to complete sentence prompts orally by conjugating the infinitive form between parentheses.

4.4 Data analysis and coding

Responses from the sentence completion task were digitally recorded and then transcribed for analysis. Results for the training items and the distractors were discarded in the analysis. Target responses were coded as 1 and non-target responses were coded as 0. All dialectal and sociolect variants of subjunctive forms (such as *haiga* / *haya*) were considered target. Mean values were obtained and transformed into arcsine values before conducting parametric tests to make the data normally distributed.

5. Results

After tabulating the results, a repeated measures ANOVA was conducted with the participants' arcsine transformed scores as the dependent factor, and group, condition and the interaction group-condition as independent factors. The factor group had three levels (controls, L2 learners and HS) and the factor condition had eight levels (see Table 1). Results showed a significant main effect for group ($F(2, 32) = 45.03, p < .001$), for condition ($F(7, 224) = 15.77, p < .001$) and for the interaction group-condition ($F(14, 224) = 3.22, p < .001$)

Since group, condition and the interaction group-condition were found to be significant, we proceeded to conduct a series of post-hoc tests with Tukey adjustment comparing groups and conditions. Tukey post-hoc HSD tests measuring where the differences lie between groups showed that the control group differed significantly from the L2 group ($t(32) = 9.36, p < .001$) and HS ($t(32) = 5.15, p < .001$). Results also showed significant differences between the L2 group and the HS group ($t(32) = 3.83, p = .016$). Overall, the control group did significantly better than the two experimental groups, and the HS group did significantly better than the L2 group.

In what follows, we discuss our results by condition for the temporal and concessive clauses. We present the group results by condition using Tukey post-hoc HSD tests and then discuss the individual data to have a better understanding of any existing differences between groups and conditions. Finally, we present a qualitative analysis of non-target responses.

5.1 Results: Temporal clauses

In this section, we discuss the results of the sentence completion task for the temporal clauses. Overall, the HS did better than the L2 learners and both groups were outperformed by the control group. Differences between obligatory and variable selection were not statistically significant. Results are shown in Figure 1. Error bars represent standard error.

With regards to the selection of the IND mood in temporal clauses with *cuando* + PRET IND, the HS behaved target-like (98%) and the L2 learners exhibited some difficulties (78%). The L2 learners differed significantly from the controls ($t(224) = 2.73, p = .018$), whereas the HS did not ($t(224) = 0.41, p = .91$). Although the HS did better than the L2 learners (98% vs. 78%), their differences were not statistically significant ($t(224) = 2.12, p = .087$).

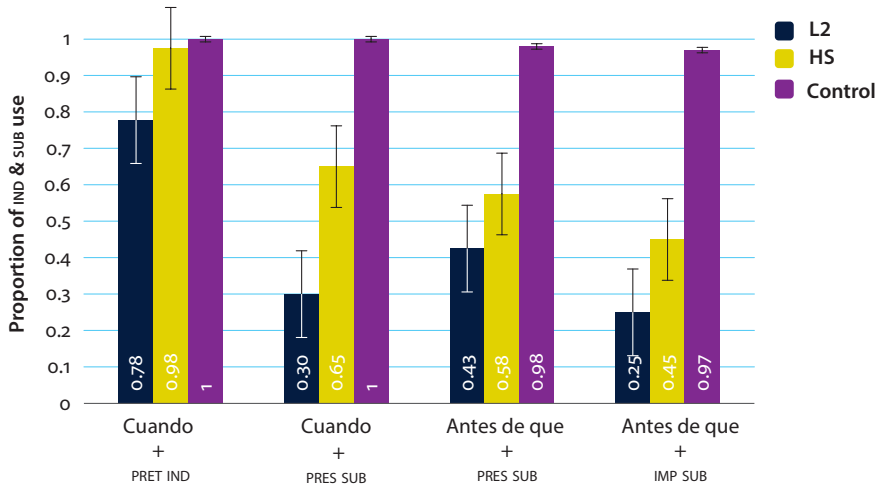


Figure 1. Proportions (%) of target mood per type of context and group in temporal clauses

Regarding the production of SUB temporal clauses, the HS and the L2 learners were outperformed by the controls across all conditions. Both the HS and the L2 learners exhibited difficulties with *cuando* + PRES SUB (65% / 30%), *antes de que* + PRES SUB (58% / 43%) and *antes de que* + IMP SUB (45% / 25%). The two experimental

groups differed significantly from the control group. Both the HS and the L2 learners differed significantly from the controls with *cuando* + PRES SUB ($t(224) = 3.51$, $p = 0.016$; and $t(224) = 6.96$, $p < .001$ respectively), *antes de que* + PRES SUB ($t(224) = 4.46$, $p < .001$; and $t(224) = 5.67$, $p < .001$ respectively) and *antes de que* + IMP SUB ($t(224) = 4.74$, $p < .001$; and $t(224) = 6.54$, $p < .001$ respectively).

Comparing the experimental groups, the HS did better than the L2 learners with *cuando* + PRES SUB (65% vs. 30%), *antes de que* + PRES SUB (58% vs. 43%) and *antes de que* + IMP SUB (45% vs. 25%). The experimental groups differed significantly with *cuando* + PRES SUB ($t(224) = 2.93$, $p = .010$), but no statistical differences were found with *antes de que* + PRES SUB ($t(224) = 1.10$, $p = .51$) and *antes de que* + IMP SUB ($t(224) = 1.65$, $p = .22$). These differences between the experimental groups can be related to the significant main effect found in the interaction group-condition.

Regarding the type of subjunctive selection, the HS had fewer difficulties with variable *cuando* + PRES SUB than with obligatory *antes de que* + PRES SUB (65% vs. 58%). On the contrary, the L2 learners had fewer difficulties with obligatory than with variable selection (43% vs. 30%). However, obligatory and variable selection did not differ significantly neither among the HS ($t(224) = 0.2001$, $p = .90$) nor among the L2 learners ($t(224) = 0.4210$, $p = .99$).

In order to observe if the group differences were supported at the individual level, we conducted an individual analysis of the experimental groups (see Table 2). As represented in the group results, the HS outperformed the L2 learners. Bolded numbers represent the highest number of participants of each group by condition. A hyphen (-) represents zero responses.

Table 2. Number of target responses by condition in temporal clauses

Group	Range	#items	<i>cuando</i> +	<i>cuando</i> +	<i>antes de que</i> +	<i>antes de que</i>
			preterite indicative	present subjunctive	present subjunctive	+ imperfect subjunctive
			#participants	#participants	#participants	#participants
L2 ($n = 10$)	<i>High</i>	3–4	7/10	2/10	3/10	1/10
	<i>Mid</i>	2	2/10	1/10	2/10	2/10
	<i>Low</i>	1	1/10	2/10	2/10	2/10
	<i>Zero</i>	0	–	5/10	3/10	5/10
HS ($n = 10$)	<i>High</i>	3–4	10/10	6/10	6/10	3/10
	<i>Mid</i>	2	–	1/10	–	2/10
	<i>Low</i>	1	–	1/10	3/10	1/10
	<i>Zero</i>	0	–	2/10	1/10	4/10

Regarding differences between groups, the HS group did better than the L2 group. In *cuando* + PRET IND clauses, 7/10 L2 learners were in the high range versus 10/10 HS. The difference between the two experimental groups increases in *cuando* + PRES SUB clauses. In this condition, 2/10 of the L2 learners were in the high range as opposed to 6/10 of the HS. With *antes de que* + PRES SUB, 5/10 L2 learners were in the high or medium ranges versus 6/10 HS; whereas in *antes de que* + IMP SUB, 3/10 L2 learners were in the high or medium ranges versus 5/10 HS.

As for differences between conditions, the two experimental groups performed similarly with obligatory and variable selection in temporal clauses. 3/10 L2 learners were in the medium or high range with *cuando* + PRES SUB versus 5/10 with *antes de que* + PRES SUB. For the HS group, 7/10 were in the medium or high range with *cuando* + PRES SUB versus 6/10 with *antes de que* + PRES SUB. Finally, with *antes de que* + IMP SUB, 7/10 L2 learners were in the low range or had zero correct answers versus 5/10 HS. These results suggest that the HS present more difficulties with the selection of the imperfect subjunctive than with the present subjunctive.

Subsequently, non-target responses were classified qualitatively. In Table 3 below we present the number of non-target responses out of the total number of responses per condition by group (40).

Two types of non-target selection were found: non-target mood, that is, uses of non-required IND forms (e.g., in **José llegó a casa antes de que llovió* PRET IND is used in a context where IMP SUB is required), and non-target tense, that is, uses

Table 3. Number of non-target responses across conditions in temporal clauses

		<i>cuando</i> + preterite indicative		<i>cuando</i> + present subjunctive		<i>antes de que</i> + present subjunctive		<i>antes de que</i> + imperfect subjunctive	
		Group		Group		Group		Group	
Mood	Tense	L2	HS	L2	HS	L2	HS	L2	HS
IND	PRES	6/40	1/40	21/40	14/40	10/40	18/40	9/40	3/40
	PRET	–	–	2/40	–	3/40	–	10/40	24/40
	IMP	–	–	–	–	–	2/40	–	2/40
	PREF	1/40	–	2/40	–	4/40	–	–	–
	PLU	–	–	–	–	–	–	2/40	–
	FUT	–	–	3/40	–	2/40	1/40	–	–
	COND	–	–	–	–	–	–	–	–
SUB	PRES	–	–	–	–	–	–	9/40	1/40
	IMP	1/40	–	–	–	4/40	2/40	–	–

of non-required SUB forms (e.g., in **José llegó a casa antes de que llueva* PRES SUB is used in a context where IMP SUB is required). The non-target mood category included cases of non-target IND forms such as present (PRES), future (FUT), preterit (PRET), imperfect (IMP), conditional (COND), preterit perfect (PREF) and pluperfect forms (PLU). The non-target tense category included cases of non-target SUB forms such as imperfect subjunctive (IMP) and present subjunctive forms (PRES) forms. Overall, two experimental groups showed a higher number of non-target mood responses than non-target tense responses. The higher number of non-target tense responses were found in the production of *antes de que* + IMP SUB clauses by the L2 learners.

Results from Table 3 show that the most common cases of non-target responses with temporal clauses were cases of non-target mood. Both the L2 learners and the HS overextended present indicative in *cuando* + PRES SUB and *antes de que* + PRES SUB clauses, and preterit indicative in *antes de que* + IMP SUB clauses. The HS and the L2 learners also showed cases of non-target tense. The two experimental groups overextended imperfect subjunctive in *antes de que* + PRES SUB clauses and present subjunctive in *antes de que* + IMP SUB clauses.

To summarize, in the production of target subjunctive in temporal clauses the HS and the L2 learners behaved significantly different from the control group across nearly all conditions. The HS and the L2 learners differed significantly with *cuando* + PRES SUB clauses, but no statistical differences were found with *antes de que* + PRES SUB clauses and *antes de que* + IMP SUB clauses. Moreover, no significant differences were found between variable *cuando* + PRES SUB clauses and obligatory *antes de que* + PRES SUB clauses for either the HS or the L2 groups.

5.2 Results: Concessive clauses

In this section, we discuss the results of the sentence completion task for the concessive clauses. Overall, the HS outperformed the L2 learners. The two experimental groups were outperformed by the control group. Regarding the type of structure, no significant differences were found between obligatory and variable selection. This is represented in Figure 2.

In the selection of the IND mood in concessive clauses, the HS did better than the L2 learners. With *aunque* + PRET IND, the HS had the same performance as the control group (95%), whereas the L2 learners presented some difficulties (73%). The differences between the L2 learners and the controls were statistically significant ($t(224) = 2.63, p = 0.0248$).

Regarding the selection of the SUB mood in concessive clauses, the two experimental groups were outperformed by controls across all conditions. Both the HS

and the L2 learners were significantly different from the control group in the production of *aunque* + PRES SUB ($t(224) = 3.51, p = 0.0016$; and $t(224) = 6.96, p < .0001$ respectively), *aun a riesgo de que* + PRES SUB ($t(224) = 3.70, p = 0.0003$; and $t(224) = 7.10, p < .0001$ respectively) and *aun a riesgo de que* + IMP SUB ($t(224) = 3.33, p = 0.0030$; and $t(224) = 4.80, p < .0001$ respectively). Contrary to expected, the control group presented difficulties selecting the imperfect subjunctive with *aun a riesgo de que* (77%).

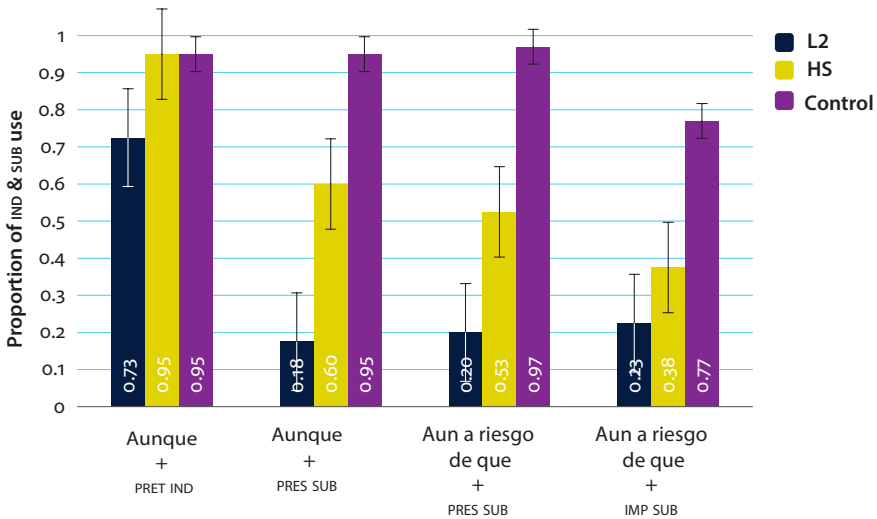


Figure 2. Proportions (%) of target mood per type of context and group in concessive clauses

When comparing the two experimental groups, the HS had a bigger advantage over the L2 learners selecting the SUB mood versus the IND mood in concessive clauses. The L2 learners were outperformed by the HS with *aunque* + PRES SUB (18% vs. 60%), *aun a riesgo de que* + PRES SUB (20% vs. 53%) and *aun a riesgo de que* + IMP SUB (23% vs. 38%). The two experimental groups differed significantly in the production of the present subjunctive in *aunque* ($t(224) = 3.15, p = 0.0052$) and *aun a riesgo de que* clauses ($t(224) = 3.10, p = 0.0062$). In the production of imperfect subjunctive in *aun a riesgo de que* clauses, the differences between the two experimental groups were not significant ($t(224) = 1.34, p = 0.3720$).

Regarding the type of subjunctive selection, the HS performed similarly in variable *aunque* + PRES SUB and in obligatory *aun a riesgo de que* + PRES SUB (60% vs. 53%). Similar results can be found among the L2 learners (18% vs. 20%). Neither the L2 learners nor the HS exhibited significant differences selecting the SUB in variable versus obligatory contexts ($t(224) = 0.0778, p = 0.6399$; and $t(224) = 0.8905, p = 1.0000$ respectively).

Table 4. Number of target responses by condition in concessive clauses

Group	Range	#items	<i>aunque</i> +	<i>aunque</i> +	<i>aardq</i> ^a +	<i>aardq</i> +
			preterite indicative	present subjunctive	present subjunctive	imperfect subjunctive
			#participants	#participants	#participants	#participants
L2 (n = 10)	<i>High</i>	3–4	7/10	1/10	1/10	1/10
	<i>Mid</i>	2	1/10	2/10	1/10	2/10
	<i>Low</i>	1	2/10	–	3/10	2/10
	<i>Zero</i>	0	–	7/10	5/10	5/10
HS (n = 10)	<i>High</i>	3–4	10/10	6/10	4/10	3/10
	<i>Mid</i>	2	–	1/10	1/10	1/10
	<i>Low</i>	1	–	1/10	3/10	2/10
	<i>Zero</i>	0	–	2/10	2/10	4/10

a. *aun a riesgo de que*

Results from an individual analysis on the production of concessive clauses provide a deeper insight of the group differences. This analysis is represented in Table 4.

The individual analysis is consistent with the statistical results. With regards to differences between groups, the HS outperformed the L2 learners across all conditions. With *aunque* + PRET IND, individual results showed that 7/10 L2 learners were in the high range versus 10/10 HS. Regarding SUB clauses, at least 7/10 L2 learners were in the low range or had zero correct answers across the three SUB conditions examined versus 6/10 HS. As for differences between obligatory and variable constructions, 7/10 L2 learners had zero correct responses with variable *aunque* + PRES SUB versus 5/10 with obligatory *aun a riesgo de que* + PRES SUB. In the HS group, 6/10 HS were in the high range with variable *aunque* + PRES SUB versus 4/10 with variable *aun a riesgo de que* + PRES SUB. Regarding the selection of imperfect subjunctive in *aun a riesgo de que* + IMP SUB clauses, 5/10 L2 learners had zero correct responses versus 4/10 participants from the HS group.

Finally, in Table 5 below we present the number of non-target responses out of the total number of responses per condition by group (40):

In concessive clauses, cases of non-target mood were more common with *aunque* + PRES SUB and with *aun a riesgo de que* + PRES SUB clauses compared to *aun a riesgo de que* + IMP SUB clauses, whereas in *aun a riesgo de que* + IMP SUB clauses participants showed high rates of non-target tense. Both the L2 learners and the HS overextended present indicative in *aunque* + PRES SUB and in *aun a riesgo de que* + PRES SUB clauses, and imperfect indicative in *aun a riesgo de que*

+ IMP SUB clauses. Both groups also showed a high use of present subjunctive in *aun a riesgo de que* + IMP SUB clauses. Overall, the HS and the L2 learners showed a higher number of non-target mood responses than non-target tense responses. However, in *aun a riesgo de que* + IMP SUB clauses non-target tense responses were higher than in other conditions.

Table 5. Number of non-target responses across conditions in concessive clauses

Mood	Tense	<i>aunque</i> + preterite indicative		<i>aunque</i> + present subjunctive		<i>aardq</i> + present subjunctive		<i>aardq</i> + imperfect subjunctive	
		Group		Group		Group		Group	
		L2	HS	L2	HS	L2	HS	L2	HS
IND	PRES	4/40	–	18/40	6/40	17/40	11/40	8/40	3/40
	PRET	–	–	3/40	4/40	–	3/40	3/40	3/40
	IMP	2/40	–	1/40	1/40	–	–	10/40	5/40
	PREF	–	–	–	–	–	–	–	–
	PLU	–	–	–	–	–	–	–	–
	FUT	–	–	3/40	4/40	5/40	3/40	–	1/40
	COND	–	–	1/40	1/40	1/40	–	–	–
SUB	PRES	–	2/40	–	–	–	–	10/40	12/40
	IMP	5/40	–	7/40	–	7/40	2/40	–	–

To summarize, in the production of target subjunctive in concessive clauses both the HS and the L2 learners behaved significantly different from the control group across all conditions. The L2 learners behaved significantly different from the HS in *aunque* + PRES SUB and in *aun a riesgo de que* + PRES SUB clauses but not in *aun a riesgo de que* + IMP SUB clauses. No significant differences were found between variable *aunque* + PRES SUB and obligatory *aun a riesgo de que* + PRES SUB clauses for either the HS or the L2 learners.

6. Discussion and conclusions

The goal of this study was to examine the production of variable and obligatory subjunctive mood selection by HS and L2 learners in temporal and concessive clauses and to investigate existing similarities and differences between HS, L2 learners and native speakers of Spanish. Regarding differences between the groups examined, the HS and the L2 learners behaved differently from the control group.

The participants in the control group showed a significant advantage over the HS and the L2 learners in the production of present subjunctive and imperfect subjunctive in temporal and concessive clauses (confirming H1). Moreover, the controls significantly outperformed the L2 learners in the production of preterit indicative in temporal and concessive clauses.

In regard to the type of non-target responses, the results suggest semantic deficits in the production of temporal and concessive clauses, as found in previous research (e.g., Montrul, 2007, 2009; Montrul & Perpiñán, 2011). Specifically, the HS and the L2 learners presented two types of non-target selection with present and imperfect subjunctive: (a) selection of non-target tense; and (b) selection of non-target mood (confirming H1a). In the first case, participants were sensitive to the distinctions between indicative and subjunctive, but not to the tense (i.e., use of PRES SUB in contexts where IMP SUB was required as in **José llegó a casa antes de que llueva*). In the second case, participants were not sensitive to the distinctions between indicative and subjunctive (e.g., use of PRET IND in contexts where IMP SUB was required as in **José llegó a casa antes de que lloviera*).

Regarding differences between the two types of non-target responses, both the HS and the L2 group showed more non-target mood responses than non-target tense responses in the selection of present and imperfect subjunctive. The high use of indicative forms in contexts where subjunctive forms are required suggests that most of our experimental participants have not acquired mood restrictions yet. Previous research has demonstrated that tense and aspect restrictions are acquired before mood restrictions (e.g., Bardovi-Harlig, 2004). Our experimental participants seem to have acquired tense restrictions for the indicative mood given their high proportion of target responses in the selection of preterit indicative. However, for the subjunctive mood neither tense restrictions nor mood restrictions seemed to be acquired considering the low proportion of target responses and the type of non-target responses in the selection of present and imperfect subjunctive.

Furthermore, the results of this study show differences with individual lexical items, as found in previous work (e.g., Kanwit & Geeslin, 2017). In *aun a riesgo de que* + IMP SUB clauses, the higher use of non-target present subjunctive in comparison to *antes de que* + IMP SUB clauses, in which non-target responses consisted mostly on indicative forms, could be related to the frequency of these lexical items in the input. The lower frequency in the input of the conjunction *aun a riesgo de que* could be triggering a subjunctive reading. In the same line, the HS showed a considerable advantage over the L2 learners in the production of the present subjunctive in *cuando* clauses. These differences seem related to the nature and frequency of input of the groups, given that the highly frequent conjunction *cuando* is acquired early in HS grammars (e.g., Silva-Corvalán, 2014). This is consistent

with previous work predicting linguistic advantages for HS over L2 learners for aspects of early language development (e.g., Montrul, 2008).

With regards to differences between the experimental groups, the HS showed lower variation than the L2 learners across all conditions (confirming H2). The advantage of the HS over the L2 learners was statistically significant across 3 of the 6 subjunctive conditions analyzed: *cuando* + PRES SUB, *aunque* + PRES SUB and *aun a riesgo de que* + PRES SUB. In *antes de que* + PRES SUB, *antes de que* + IMP SUB and *aun a riesgo de que* + IMP SUB clauses, the HS also outperformed the L2 learners numerically, but these differences were not statistically significant. These results suggest an advantage of the HS over the L2 learners in the acquisition of subjunctive selection in adverbial and concessive clauses. Early Spanish-English bilinguals showed greater sensitivity to mood distinctions than late bilinguals. Age of onset of acquisition appears to play a key role in the target attainment of morphosyntactic properties. Although more research with a larger data set is necessary, these results suggest important contribution to current research and proposals on the role of age in heritage language bilingualism and L2 learning (e.g., Johnson & Newport, 1989; Montrul, 2008).

Regarding the type of subjunctive selection, previous studies (e.g., Massery & Fuentes, 2014; Montrul, 2007, 2009) suggest that obligatory subjunctive selection exhibits less optionality in L2 and heritage grammars due to the interface vulnerability (Sorace, 2000) of variable subjunctive selection. However, in the current study, no significant differences were found between obligatory and variable selection within the epistemic modality (confirming H3). First, variable selection in *cuando* + PRES SUB clauses did not differ significantly from obligatory selection in *antes de que* + PRES SUB clauses (confirming H3a). Second, variable selection in *aunque* + PRES SUB clauses did not differ significantly from obligatory selection in *aun a riesgo de que* + PRES SUB clauses (confirming H3b).

These results suggest that obligatory character does not play a role in the acquisition of the Spanish subjunctive when all structures belong to the same type of propositional modality. We add to previous work (Perez-Cortes, 2016) by providing new evidence for the role of the type modality in the acquisition of the Spanish subjunctive in epistemic modal bases. Furthermore, our results highlight the importance of controlling for the type of propositional modality in the study of the Spanish subjunctive.

The current results are limited in relation to statistical power given the low number of participants per group. Future research with more participants is necessary to generalize the results to HS and L2 learners of other backgrounds. Future research should also include more highly proficient participants since differences between variable and obligatory constructions could emerge at near-native levels. Our data is also limited in the sense that it targets only oral production. Since previous research

has shown an advantage for HS over L2 learners in oral tasks (e.g., Montrul, Foote, & Perpiñán, 2008; Montrul, Davidson, De La Fuente, & Foote, 2014), more research with intuition and comprehension is needed. Finally, the present study only examines obligatory and variable constructions within the epistemic modality. The next step is to conduct a study within a single experimental paradigm and examine obligatory and variable subjunctive selection in deontic, epistemic and epistemological modal bases to disentangle whether the source of morphological optionality in the heritage and L2 grammars stems from modality type.

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