

Linguistic Approaches to Bilingualism

Home and School Exposure and Age Effects in the Heritage Language Acquisition of the Spanish Volitional Subjunctive

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1. Introduction

A central question in bilingual children's development is how patterns of exposure characterize the acquisition of heritage languages (HLs). HLs are spoken in situations of language contact where speakers frequently develop stronger competence in another more socially-prevalent language. Consequently, HLs are typically not present at school, which generally causes Spanish heritage speakers (HSs) in the United States to experience a shift in dominance towards English at the start of schooling (i.e., Castilla-Earls et al., 2019; Hiebert & Rojas, 2021). Research on HLs has generally focused on preschool children and adults, so school-aged children are the “missing link” (Montrul, 2008, p. 434) in bilingualism research. Given the dearth of information about language development in this age group, it is unclear what course bilinguals follow between early childhood and adulthood. Thus, comparisons of younger versus older children can distinguish between language attrition and protracted development.

Evaluating HL acquisition under different contexts of exposure and by comparing productive and receptive knowledge provides a more holistic view of HSs' developmental trajectory. Along these lines, Putnam and Sánchez (2013) have argued that HL acquisition are ongoing and dynamic. Their approach takes the position that activation of the HL in the memory leads to processing input for intake, which strengthens the associations between lexical and formal features.¹ These researchers claim that changes in language use (and the resultant activation in the memory) will affect production before receptive knowledge, such that morphological errors may

¹ For the purposes of this study, Putnam et al.'s (2019, p. 19) definition of *feature* is followed: “Features are seen as indices on lexical items and larger syntactic objects that allow generated structures to be interpreted at external interfaces.”

not reflect underlying representation. Therefore, this framework provides testable predictions for why children under different contexts of exposure would differ from one another, and why they may exhibit asymmetrical productive and receptive knowledge.

There are multiple ways to empiricalize exposure. This study compares multiple metrics of exposure – overall frequency of HL use, morphosyntactic proficiency, and exposure to Spanish at school – to explore HS children’s acquisition of subjunctive mood in volitional clauses. Proficiency and frequency of use have been used as proxies for exposure in recent research (Dracos & Requena, 2022; Giancaspro & Sánchez, 2019; López-Otero et al., 2023a, 2023b; Perez-Cortes, 2016), but understanding the impact of HL exposure through schooling is an underexplored approach. To measure input at school, the present study compared Spanish HSs in a traditional English-only school with age-matched peers in a dual-language immersion (DLI) program where 50% of academic instruction is offered in Spanish.

Evaluating language acquisition in DLI is a critical yet underexplored avenue for understanding the impact of exposure in childhood, as HSs enrolled in these programs purportedly receive greater quantity and quality of input, both of which are tied to HL acquisition (see Pascual y Cabo & Rothman, 2012 and references within concerning the latter). From the perspective of input quality, DLI supplements home exposure to Spanish at a time when comparable children in traditional schools have already begun to exhibit a shift in dominance towards English (Castilla-Earls et al., 2019; Hiebert & Rojas, 2021; Merino, 1983), and around when monolingual children master the structure tested here, the volitional subjunctive (Blake, 1983; Dracos et al., 2019). This provides HSs enrolled in these programs with additional HL input and activation, which, following Putnam and Sánchez (2013), should result in stronger productive and receptive grammatical knowledge. From the perspective of input quality, DLI schools purportedly offer students with

access to vocabulary that is specific to academic content areas taught in Spanish (larger lexicon) and to lengthier and more complex discourse (greater morphological and syntactic diversity). Furthermore, HS children in DLI programs may receive explicit instruction on Spanish grammar, which provides them with opportunities to refine their linguistic repertoires.

Ironically, only Gathercole (2002) has employed experimental methods to study the development of HSs' Spanish language skills in DLI when compared to children of similar characteristics in English-only schools, but with elementary-aged children using a receptive task only. In her study, the researcher reported that all children experienced growth in knowledge of non-canonical grammatical gender by fifth grade, but that the rate of development was faster in HSs attending a DLI school. While bilingual education has previously been identified as facilitating the acquisition of morphosyntax in German-dominant HSs (Kupisch et al., 2014; Kupisch and Rothman, 2018), these studies focused on adults who were not actively enrolled in school. Therefore, exploring the production and receptive knowledge of Spanish HSs with different levels of input in Spanish at home and school *at the time of testing* is important for research on HL development.

To address each of these areas, the present study explores how age, frequency of HL use, morphosyntactic proficiency, and HL exposure at school affect HS children's and adolescents' acquisition of subjunctive mood, a complex and late-acquired morphosyntactic structure that has been a frequent topic in past research, as reviewed in the following section. The research questions, hypotheses, and description of methodology follow. After presenting results, this article concludes with a discussion of findings, their implications, and their limitations.

2. Spanish Subjunctive Mood: Theory and Acquisition

If patterns of exposure are deterministic in the acquisition of HLs as Putnam and Sánchez (2013) argue, a logical hypothesis is that structures that require extensive input and that emerge late in monolingual populations will be particularly susceptible to input effects. The subjunctive, which is one such structure, is one of three moods in Spanish alongside the indicative and imperative (Seco, 1990). Mood is a morphological realization of modality (Bosque, 2012), which is the evaluation of the truth value of propositions (Sánchez-Naranjo, 2014). All Spanish verbal inflections are marked for one of the three moods, although in a sample of 20,000,000 spoken and written tokens, only approximately 7.2% of inflected verbs carried subjunctive morphology (Biber et al., 2006). This points to its infrequency in the input that HSs receive, especially if this exposure is less in quantity compared to monolingual acquisition.

There are two morphological paradigms for the subjunctive, one in the present tense and the other in the imperfective past. Both have forms for subject person and number agreement. In concert with most previous research, this study concerns the present subjunctive, so discussion is limited to this tense here. The present subjunctive is formed either through a shift in verbal inflection or through both a morphophonological change in the verb stem and a shift in inflection from the more-frequent indicative. In this study, only the first of these patterns is tested in order to hold morphological regularity constant. Verbs whose infinitives end in **-ar** shift their thematic vowel to **-e** in the subjunctive (e.g., the verb *hablar*, ‘to talk,’ shifts from indicative *habla*-3PS to subjunctive *hable*-3PS), while those that end in **-er** and **-ir** shift their thematic vowel to **-a** (e.g., the verb *comer*, ‘to eat,’ shifts from indicative *come*-3PS to subjunctive *coma*-3PS).

The syntax and semantics of subjunctive mood have been the topic of considerable scholarship. Fábregas (2014) argues that subjunctive inflections comprise a single spell-out of multiple structures that differ in their syntax and semantics. These inflections occur almost

exclusively in subordinate clauses whose subject differs from the main clause. Some uses of the subjunctive, such as volitional clauses as exemplified in (1), result from lexical selection, whereby a lexical item in the main clause subcategorizes for the subjunctive mood in tensed subordinate clauses with a distinct **subject**.

- (1) *Rosa quiere que Carmen venga a su casa.*
 Rosa want-3PS-IND COMP Carmen come-3PS-SUBJ to her house.
 Rosa wants Carmen to come to her house.

Following Kempchinsky (2009), subjunctive inflections in volitional clauses such as (1) comprise an uninterpretable feature that is checked and deleted in the heads of **Force and Fin**; in these contexts, the meaning of mood inflections is least transparent (Fábregas, 2014).

In contrast to Spanish, English has a less-utilized subjunctive system (see Iverson et al., 2008 for a syntactic account). Acceptability judgment data have shown that the indicative exists as a grammatical alternative to the subjunctive in English, such that this morphosyntactic contrast has largely been neutralized (Iverson et al., 2008; Rojas, 1998). English lacks a morphological paradigm that specifically marks mood (it is marked through past tense forms). Moreover, English requires control structures in many volitional contexts where subjunctive mood is expected (e.g., rather than sentence (1), English would require the infinitival construction *Rosa wants Carmen to come to her house*). Therefore, the volitional subjunctive is a crosslinguistic difference between English and Spanish at both the syntactic and morphological levels. As a result, HSs must acquire and maintain the syntax, semantics, and morphology of the Spanish mood system, which emerges late even in monolingual children, on the basis of quantitatively less input than monolinguals and in the face of crosslinguistic influence from English.

2.1. Monolingual Acquisition

The first subjunctive inflections emerge in monolingual Spanish-speaking children before age three (Aguirre, 2003; López-Ornat et al., 1984). Blake (1983) and Dracos et al. (2019) revealed that the volitional subjunctive approached but **did not reach categorical use in children ages four and five**. Therefore, even though the subjunctive emerges in volitional clauses before other syntax contexts (see also Pérez-Leroux, 1998), this structure is mastered later than many other inflections and therefore requires extensive input to develop, even in monolingual children.² Since bilingual children may require longer than monolinguals to acquire a structure that is present in only one of their languages (i.e., Genessee & Paradis, 1996), HSs' acquisition of subjunctive mood may extend into the school years, which makes studying this structure particularly relevant for exposing the impact of sustained exposure to Spanish at school during this time period.

2.2. *Heritage Language Acquisition of Spanish Subjunctive*

To this effect, the available data on English-Spanish bilingual children underscore that exposure influences the acquisition of the Spanish subjunctive. Two case studies on English-Spanish simultaneous bilingual siblings with different levels of input reveal attrition of subjunctive mood around the school period by the sibling with less exposure (Anderson, 2001; Silva-Corvalán, 2014). Similarly, Merino (1983) reported that 32 simultaneous English-Spanish bilingual children in an English-only school showed decreased in subjunctive production from 70% to 55% over two years. These longitudinal studies argue that the lower exposure that Spanish HSs (typically) receive after the onset of schooling leads to attrition of subjunctive mood.

Cross-sectional work on older children has also provided evidence for exposure effects. In a study with 50 bilingual children, Dracos and Requena (2022) found that proficiency and

² Take, for instance, the acquisition of differential object marking or gender agreement morphology, which appear to be at ceiling in Spanish monolingual children by ages three to four (i.e., Mariscal, 2009; Rodríguez-Mondoñedo, 2008), rather than five.

frequency of exposure, but not age, affected volitional subjunctive production, but the researchers note that their study lacked a large number of older children with which to clearly plot development into adolescence. Since both proficiency and frequency of use are proxies for exposure (Giancaspro & Sánchez, 2021; López-Otero et al., 2023a, 2023b; Perez-Cortes et al., 2019); thus, these findings suggest that exposure may impact HSs' mood systems more than age. Additionally, in a study on the grammatical development of seventh and eighth grade bilingual children enrolled in a DLI program, Potowski (2007a) found that HSs produced less subjunctive across contexts than Spanish-dominant peers, which begs the question of whether HS children without school exposure to Spanish would show comparable tendencies. These experiments report production data only, which may not reflect underlying syntactic competence (see Perez-Cortes et al., 2019).

Finally, Flores et al. (2017) found that German-dominant HSs of Portuguese who spoke their HL with both of their parents and who did not have older siblings showed considerable growth in subjunctive production rates between 8-12 years old, while children with one Portuguese-speaking parent showed comparable growth after 13 years old only. These data suggest that age and exposure are interconnected, such that children with less exposure require longer to obtain the requisite amount of input with which to master this structure. Since growth transpired during the late childhood and adolescent years, these findings argue that bilinguals continue to acquire subjunctive late into childhood. However, there is not yet an experiment comparing productive and receptive knowledge in bilingual children, particularly one that controls for both home and educational exposure to the HL.

Research on bilingual adults has been largely consistent. Despite van Osch and Sleeman's (2018) finding that volitional clauses comprise the most stable context of subjunctive mood in adult HSs, this group shows variability in their command of this structure. Adult HSs are more

precise in their command of the subjunctive at higher proficiency levels (Giancaspro, 2019; Montrul, 2009; Perez-Cortes, 2016). Moreover, Perez-Cortes (2016) found that an interaction between proficiency and frequency of use of Spanish affected subjunctive production, acceptability judgment, and interpretation. She reported that at intermediate proficiency levels, adult HSs showed more precise receptive knowledge than production of subjunctive mood, particularly when they reported less-frequent use of Spanish. Furthermore, factors such as the morphological regularity (Giancaspro et al., 2022; Perez-Cortes, 2022) and lexical frequency (Giancaspro, 2020) of the subordinate verb affect HSs' production and interpretation of subjunctive mood.

To summarize, patterns of exposure influence both the acquisition and attrition of this structure by Spanish HSs, both children and adults. It has been difficult to interpret the role of age in its acquisition, primarily because of the lack data from large numbers of older children. Adult HSs with less exposure to Spanish recognize the subjunctive more consistently on receptive tasks than they produce it, which has not yet been tested with children. Therefore, since subjunctive development is affected by patterns of exposure and is late-acquired by monolingual children, bilingual schooling and frequent use of and exposure to Spanish should provide a key benefit for HSs in the acquisition and maintenance of this structure.

3. The Study

Only one previous study has compared Spanish-speaking children in bilingual schools with age-matched peers without bilingual education (Gathercole, 2002), which reported receptive data only. Kupisch and Rothman (2018) argue that bilingual education positively influences HL acquisition, a claim that has not yet received attention with children who are actively enrolled in DLI programs. Relatedly, there is not yet a study on the acquisition of the subjunctive by bilingual

children that has incorporated productive and receptive tasks with multiple age groups. To contribute to the growing body of research that emphasizes the importance of HL exposure (in line with Putnam and Sánchez, 2013), a study that measures HL proficiency and use *and* method of schooling with multiple age groups of HSs and that incorporates productive and receptive tasks is necessary. Four research questions (RQs) were proposed:

1. With regards to volitional subjunctive production and selection, how do HSs in a DLI school compare to **SDBAs** and age-matched HSs without bilingual education?

Putnam and Sánchez's (2013) framework would predict that HSs with more-frequent exposure to and processing would be less likely to reassemble the features of their HL grammar than those with less-frequent exposure. Potowski (2007a) found that Spanish-dominant children produced more subjunctive than age-matched HSs in a DLI program, but there are no available data comparing HSs' command of the Spanish subjunctive under different contexts of school exposure. Therefore, it was predicted that HSs in DLI would produce and select more volitional subjunctive than age-matched peers in an English-only school, but less than SDBAs.

2. Do morphosyntactic proficiency in and overall frequency of use of Spanish affect individual HSs' rates of volitional subjunctive production and selection?

Since previous research has established morphosyntactic proficiency and use of Spanish as proxies for exposure (e.g., Giancaspro & Sánchez, 2021; López-Otero, 2023a, 2023b; Perez-Cortes, 2016), Putnam and Sánchez's (2013) approach to HL acquisition would posit that both variables affect HSs' command of morphological and syntactic structures. Previous studies on child (Dracos et al., 2022; Flores et al., 2017) and adult (Montrul, 2009; Montrul & Perpiñán, 2011; Perez-Cortes, 2016) HSs have found that both variables are predictive of rates of subjunctive production,

acceptability judgment, and interpretation. The same effect was predicted in this study, whereby HSs who obtain higher proficiency scores and who report using Spanish more frequently would produce and select the volitional subjunctive more often.

3. Do older HSs show increased production of and preference for the volitional subjunctive?

The role of age has been difficult to pinpoint in previous research. Since exposure to the HL likely decreases as children become older due to the prevalence of English in school, Putnam and Sánchez (2013) would predict that school-aged HSs would experience reassembly of features of their HL that differ from those of the dominant language. While this tendency has been found in preschool children and HSs in the preschool and elementary periods (Anderson, 2001; Merino, 1983; Silva-Corvalán, 2014), previous studies on have lacked a substantial group of late-childhood and adolescent participants. A positive correlation between age and subjunctive production and selection points towards HSs' protracted acquisition of this structure, while a negative correlation would imply attrition in older school-aged children. Consistent with the closest available data on older children and adolescents from Flores et al.'s (2017) study on Portuguese HSs, it was predicted that the older participants in this study (7th/8th grade; ages 12-14) would produce the volitional subjunctive and select it on a preference task more frequently than younger participants (5th grade; ages 10-11).

4. Do HS children exhibit asymmetries between productive and receptive knowledge of volitional subjunctive?

Putnam & Sánchez's (2013) framework argues that individuals with less-frequent use of Spanish possess stronger receptive knowledge than what they exhibit in production. Previous research on the acquisition of subjunctive mood supports this position (Perez-Cortes et al., 2019). Therefore,

it was predicted that HSs in the DLI program, as well as those who reported frequent use of Spanish overall, would not show differences between rates of volitional subjunctive production and selection, but that those who report lower activation and who were in an English-only school would select more volitional subjunctive than they would produce it.

3.1. Participants

57 English-dominant Spanish HS children, as well as 18 SDBAs, participated in this experiment. Each child was placed into two groups depending upon age and school exposure to Spanish³ as shown in as summarized in Table 1, although descriptive data reported four groups: HSs in DLI in 5th grade (DLI-5; $n = 19$), and in 7th/8th grades (DLI-7/8; $n = 13$) and HSs in a monolingual English school in 5th grade (MLE-5; $n = 14$) and 7th/8th grades (MLE-7/8; $n = 25$). All participants in 5th grade were 10-11 years old, and those in the 7th/8th grade group were 12-14 years old. The comparison of HSs to other one another can isolate how certain factors related to language experience, such as bilingual schooling, affect the acquisition of Spanish morphosyntax, and moves away from conventional HS-versus-monolingual comparisons (Rothman et al., 2023).

School	5 th	7 th /8 th	Total by school
DLI	19	13	32
Monolingual English	14	11	25
Total by grade group	33	24	57

Table 1. Division of participants by grade and school.

In the DLI school, HSs received 50% of instruction in Spanish from Kindergarten through fifth grade, and daily Spanish HL instruction from sixth grade. To participate, children needed to have attended the DLI school for at least half of elementary school (second grade or earlier). The 5th graders represent the “finished product” of elementary DLI programs, while the 7th/8th grade

³ This approach is consistent with that employed by Montrul and Potowski (2007) in their study of the acquisition of grammatical gender in a DLI school.

groups enable facile comparisons with Potowski's (2007a) study on subjunctive development in DLI and address the absence of bilingual children of this age range in previous studies.

The children enrolled in the monolingual school were matched for age, socioeconomic status, and family background with those in DLI. Both schools' demographic reports indicated matching percentages (within 1%) of Latinx families, English learners, and students with low socioeconomic status; Spanish was the home language for the majority of participants in each. While only some children's parents spoke English, all spoke Spanish, and all participants were predominantly exposed to Spanish at home (see Table 2). Children in both schools were primarily of Mexican descent, although there were also participants who spoke Guatemalan and Dominican varieties of Spanish.⁴

Finally, the 18 SDBAs represented the input that HSs receive to their HL at home and, where relevant, at school. These bilinguals were from a total of seven Spanish-speaking countries and averaged 9.5 years living in the United States. Results of the *Diploma del Español como Lengua Extranjera* lexical and morphosyntactic proficiency measure (Montrul & Slabakova, 2003), which is used frequently with adults, revealed that these individuals had retained high proficiency in Spanish, averaging 47.7/50. The SDBAs verified that the tasks elicited the volitional subjunctive as expected and represent a source of input for the HS groups. Table 2 provides a summary of each group's proficiency, frequency of use, and number of monolingual Spanish-speaking parents.

Variable	SDBA (n = 18)		DLI-7/8 (n = 11)		MLE-7/8 (n = 13)		DLI-5 (n = 19)		MLE-5 (n = 14)	
	μ	SD	μ	SD	μ	SD	μ	SD	μ	SD
Frequency of use of Spanish (max. 30 points)	15.2	5.9	15.7	4.7	14.0	4.6	15.5	6.2	13.7	4.2

⁴ Recent studies have not observed dialectal differences in use of the volitional subjunctive (Faulkner, 2021).

Proficiency score (max. 18 points)	12.1	2.0	12.0	2.3	11.5	2.2	9.3	3.3	9.0	2.4
Number of monolingual Spanish-speaking parents	1.9	0.2	1.0	0.9	1.4	0.8	0.9	0.9	1.4	0.9

Table 2. Participant group averages with standard deviations.

3.2. Method and Tasks

All tasks were administered using laptop computers over Qualtrics software in students' schools with the researcher present; the SDBAs carried out the study asynchronously online. As in many previous studies, the prompts were displayed on a screen, but their responses were oral. A software known as Phonic was embedded into Qualtrics to record responses on the production task. Prior to the study, adult participants and children's parents signed a consent form.

3.2.1 Language background tasks. Before completing the experiment, participants completed a language use questionnaire. Since the youngest children in this study were 10 years old, it was determined that these individuals would be able to complete this questionnaire independently, which provides a more direct measurement of their use of Spanish beyond family settings. The questionnaire asked participants to indicate when they began attending their school and to rate how frequently they used Spanish in six contexts: with parents, with family members, at school,⁵ with friends, in public, and while watching television. Participants indicated how often they used Spanish in each context using 1-5 Likert scales with fixed descriptors (0: never, 1: hardly ever, 2: 3-4 times per week, 3: 1-2 times per day, 4: every day/almost always, 5: always). The sum of these Likert scales comprised each participant's 30-point overall frequency of use score, a continuous variable in the statistical modeling.

⁵ Since previous research has shown that children in DLI frequently respond in English despite receiving 100% of input in Spanish (Potowski, 2004), it is plausible that even those children enrolled in bilingual schools would show variability in their use of Spanish.

Subsequently, all participants completed part of the Bilingual English-Spanish Assessment (BESA; Peña et al., 2018) to measure their morphosyntactic proficiency in Spanish. This task included eighteen stimuli testing inflectional morphology, although 4/18 questions were not reported here because they evaluated subjunctive mood, whose inclusion would be tautologous. The remaining questions targeted gender/number agreement ($k = 4$), verbal agreement ($k = 4$), preterit aspect morphology ($k = 2$), and clitic gender ($k = 4$). The number of correct responses comprised each participant's proficiency score, which also formed a continuous variable.

3.2.2. Experimental tasks. In addition to the questionnaire and proficiency test, there were production and preference tasks. These two tasks were centered around the same communicative context, in which a mother shared how she wanted her twin daughters to care for their younger brother, Juanito, while away at sleepaway camp. The same eight verbs, listed in Table 3, were used once per task. All verbs pertained to the most-frequent first conjugation class (*-ar*) and were disyllabic and transitive.

Spanish	English
<i>amar</i>	'to love'
<i>cuidar</i>	'to care for'
<i>llamar</i>	'to call'
<i>llevar</i>	'to take/carry'
<i>mirar</i>	'to look at'
<i>peinar</i>	'to comb'
<i>pintar</i>	'to paint'
<i>tratar</i>	'to treat'

Table 3. List of verbs used across tasks.

The production task contained a trial and 16 experimental items and followed a sentence completion format. There was a brief written prompt, and participants needed to complete the final sentence using any form of the word in parentheses, as well as any other necessary words. Participants could not change or move any of the words in the prompt. 8 items targeted the subjunctive mood following the matrix verb *querer* ('to want'), as in (2). In addition, 4 stimuli

tested knowledge of the indicative mood following the matrix verb *creer* ('to believe'), and 4 were fillers. Only the eight subjunctive items were analyzed, but the additional sentences were included to prevent responses from becoming predictable. In the adult version, there were 25 additional distractors targeting infinitival complements.

- (2) *A veces Juanito se pone triste si sus hermanas dicen que no quieren hablar con él. ¿Qué quiere la mamá? Quiere que las hermanas _____ (LLAMAR) Juanito cada noche.*⁶

Sometimes Juanito gets sad if his sisters say that they don't want to talk with him. What does the mother want? She wants that the sisters _____ (CALL) Juanito every night.

In the preference task, participants again read prompts related to the mother's desires for her children. There was a total of 23 items in the task. 8 items targeted the subjunctive in volitional clauses following *querer*, as in (3), 3 targeted the indicative mood with *creer*, and the remaining 12 were fillers. The adults' experiment contained an additional 31 stimuli inserted between the target items. In this task, participants needed to select which sentence that described each prompt they felt sounded best. The two sentences differed only in the use of the subjunctive or indicative. Therefore, this task tapped participants' underlying knowledge of mood, as it required that they discern between the indicative and subjunctive without requiring HL production.

- (3) *La mamá sabe que las hermanas no siempre hablan con Juanito. ¿Qué quiere la mamá?*
 a. **Quiere que las hermanas lo miran cuando hablan con él.*
 b. *Quiere que las hermanas lo miren cuando hablan con él.*

The mother knows that the sisters don't always talk with Juanito. What does she want?
 a. She wants the sisters to look at (*IND) him when they talk with him.
 b. She wants the sisters to look at (SUBJ) him when they talk to him.

4. Results

⁶ Note that in all of these sentences, the differential object marker *a* was missing, as this experiment also tested HSs' knowledge of DOM in each of these sentences; these data are not reported here.

All data were anonymized and uploaded to a GitHub repository (BLINDED). Data analysis took place in RStudio (R Core Team, 2022) using the *emmeans* (Lenth, 2021), *lme4* (Bates et al., 2015), *lmerTest* (Kuznetsova et al., 2017), *sjPlot* (Lüdtke, 2021), and *tidyverse* (Wickham et al., 2019) packages. Production or selection was the binary dependent variable, whereby responses in the subjunctive received a score of 1, and all others received a score of 0. Forms with correct mood inflections but with tense or agreement morphology that did not match the prompt were accepted, since the objective of this study was not to evaluate these morphological features. There were 37 instances in the production experiment where there were errors with participants' audio recording or in which responses were not related to the stimuli, leaving 563/600 (93.8%) observations for analysis, including data from the SDBAs. There were 600 observations in the preference task. All groups' rates of subjunctive production and selection are summarized in Figures 1 and 2 below. In the HSs' production data, the children produced the subjunctive in a total of 131/426 instances (30.7%), and alternative forms in the remaining 295 instances (69.2%). While indicative substitution was by far the most frequent alternative, followed by infinitival forms, there were also alternative structures used in the HSs' data, as summarized in Table 4.

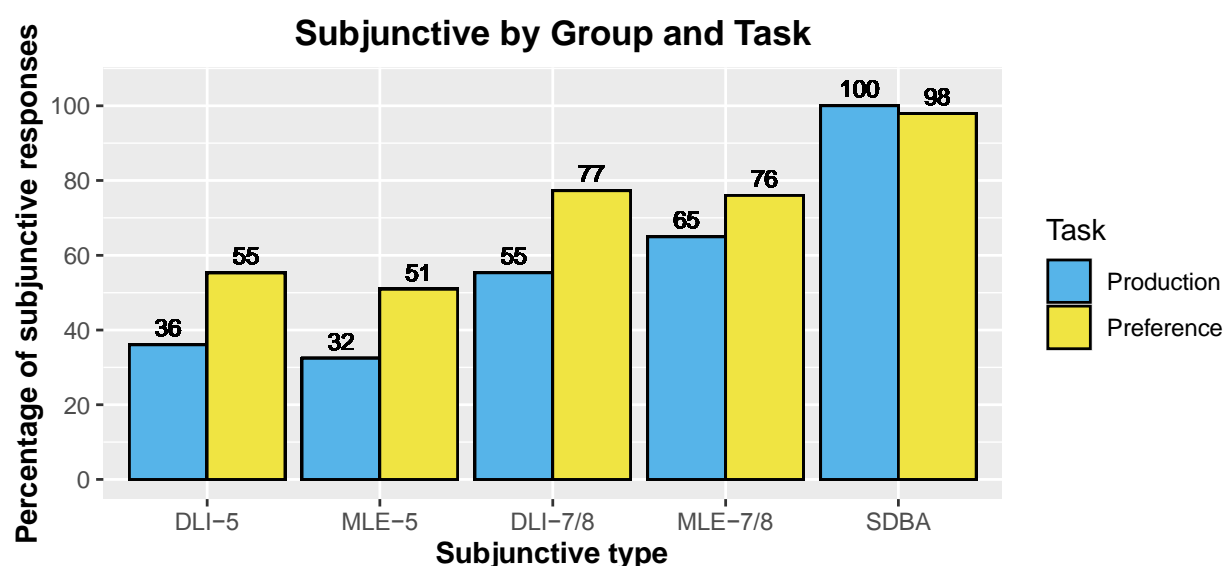


Figure 1. Percentages of subjunctive production and selection by group and task.

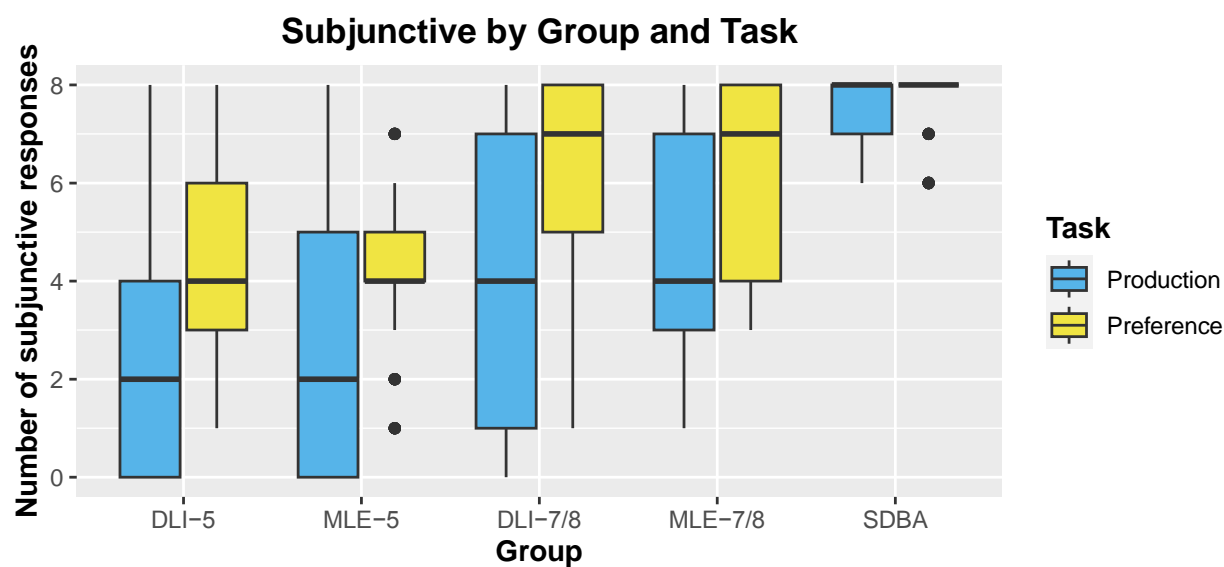


Figure 2. Statistical summary of number of subjunctive sentences produced or selected by group and task.

Structure	Observations
Indicative mood	224 (75.9%)
Infinitive	41 (13.8%)
<i>Ir a (going to)</i> periphrastic future	13 (4.4%)
Modal verbs in indicative	11 (3.7%)
Uncategorizable forms ⁷	5 (1.6%)
Imperfect subjunctive	3 (1.0%)
Preterit	1 (0.3%)

Table 4. List of alternative structures (total 298) to subjunctive mood in HSs' data.

To further evaluate these data, two Generalized Linear Mixed Methods (GLMM) binomial logistic regression models were necessary. In both models, the suppliance of the expected mood inflection was incorporated as the dependent variable, with participant and item as random effects. The first model incorporated a five-way categorization of group (SDBA, DLI-5, MLE-5, DLI-7/8, MLE-7/8), with SDBA as the baseline, to determine the differences between each. The resulting model, summarized in Figure 3 below, revealed significant main effects at the $p \leq .05$ level for all

⁷ These forms were innovative inflections that are not a part of the Spanish inflectional system, and therefore, could not be categorized using existing categories.

groups: DLI-5 ($\beta = -5.98$, $SE = 0.93$, $p < .001$), MLE-5 ($\beta = -6.29$, $SE = 0.97$, $p < .001$), DLI-7/8 ($\beta = -4.61$, $SE = 1.00$, $p < .001$), MLE-7/8 ($\beta = -4.34$, $SE = 0.97$, $p < .001$). Since this model only compared the HS groups to the SDBA, Tukey post-hoc comparisons between all groups were necessary. Only the differences between the SDBAs and the four groups of HSs were significant at the $p \leq .05$ level; none of the differences between the HS groups were significant at this level.

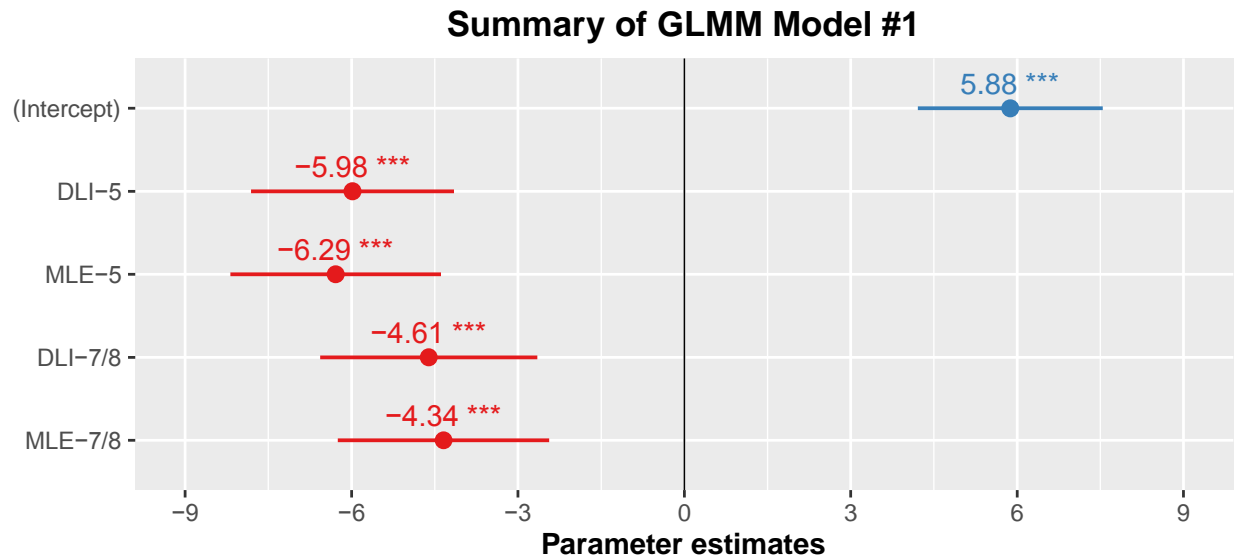


Figure 3. Results of GLMM model #1.

The second GLMM model compared HSs to one another on the basis of exposure, proficiency, and age, and therefore did not incorporate data from the SDBAs. This model included frequency of use, school (MLE versus DLI), BESA proficiency score, age group (5th grade versus 7th/8th grade), and task (production versus preference) as independent variables, with two-way interactions between frequency of use and task, school and age group, and school and task. The monolingual school, 5th grade age group, and production task were set as baselines for these variables; BESA proficiency and frequency of use were continuous variables standardized prior to analysis. Results from this GLMM model, summarized in Figure 4, revealed significant main effects at the $p \leq .05$ level for frequency of use ($\beta = 0.58$, $SE = 0.25$, $p = .017$), the 7th/8th grade age group ($\beta = 1.58$, $SE = 0.66$, $p = .017$), and the preference task ($\beta = 0.95$, $SE = 0.27$, $p < .001$).

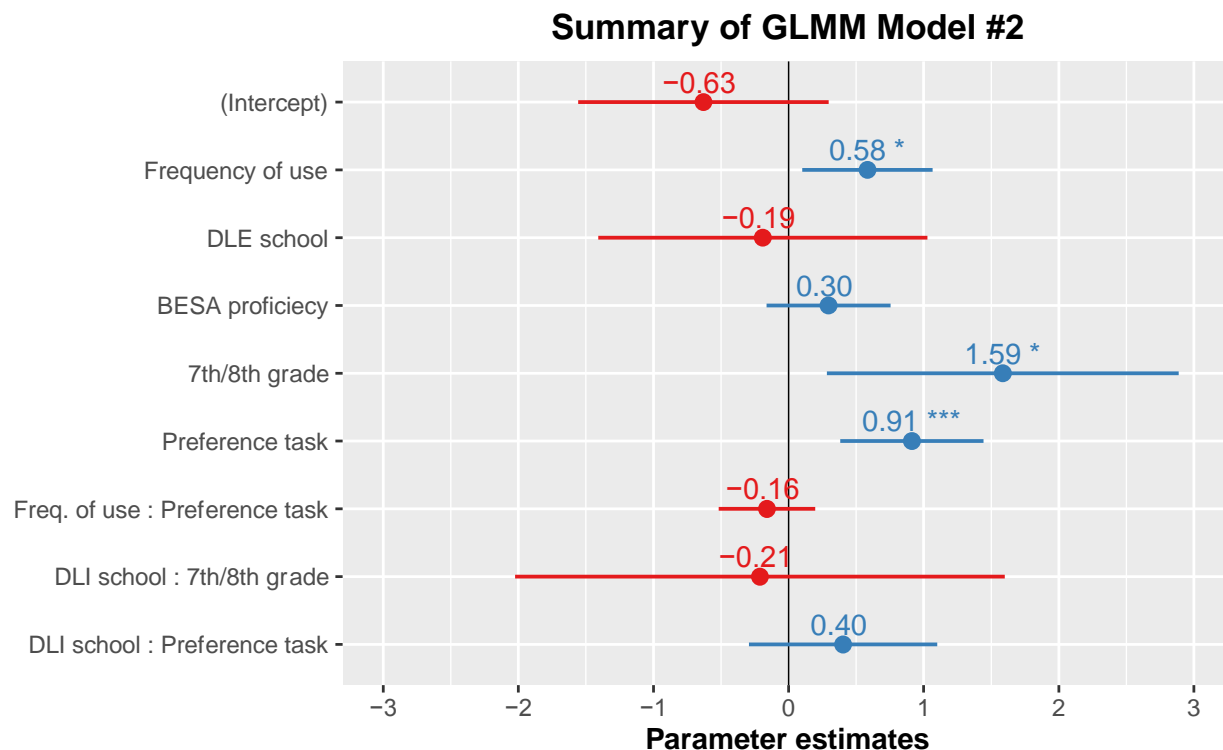


Figure 4. Summary of GLMM model #2.

Finally, individual analyses were conducted by calculating the total number of subjunctive forms in production and on the preference task for each participant. Figure 5 illustrates that all HSs produced or selected the subjunctive in at least two contexts. This argues against the altogether absence of this structure from their grammar, but rather revealed that HS had gradient knowledge of subjunctive mood.

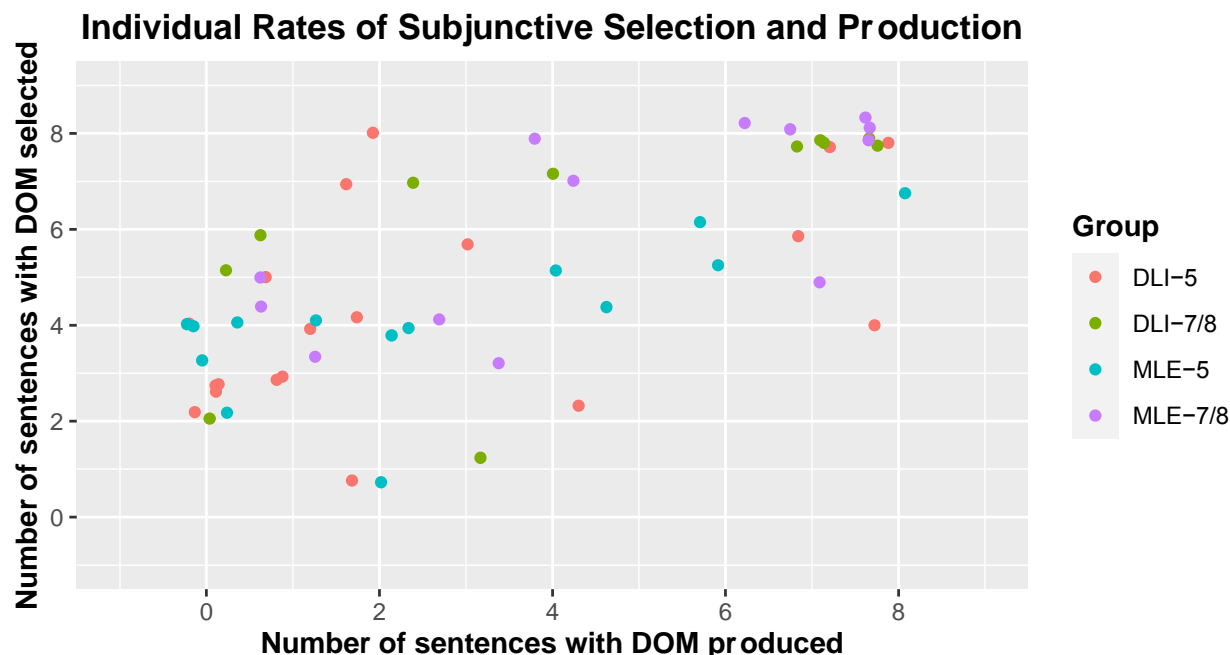


Figure 5. Individual rates of production and selection of subjunctive by participant.

Six participants produced and selected the subjunctive at ceiling. These participants' characteristics are listed in Table 5. That 5/6 of the participants were in the 7th/8th grade group reaffirms the effect for age in the statistical modeling. Aside from age, there are no clear developmental trends, as there were an equal number of children from each school, as well as some who showed great variability on the proficiency test and who reported infrequent use of Spanish both in and outside of school. In fact, three of these participants, one of whom attended DLI, reported never using Spanish at school.

Part.	Group	Freq. of use ⁸	School use	BESA	Parental languages
H5B10	DLI-5	5/25	0/5	7/14	1 Spanish only, 1 bilingual
H7B03	DLI-7/8	8/25	1/5	8/14	1 Spanish only, 1 bilingual
H8B04	DLI-7/8	19/25	3/5	11/14	Both Spanish only
H8M02	MLE-7/8	11/25	0/5	14/14	1 Spanish only, 1 bilingual
H8M06	MLE-7/8	15/25	0/5	14/14	Both Spanish only
H8M13	MLE-7/8	13/25	2/5	12/14	Both bilingual

Table 5. Characteristics of HS children who produced and selected subjunctive mood at ceiling.

⁸ This measurement refers to the five contexts of language use targeted on the language questionnaire except for “at school.” The sum of this and school language use formed the frequency of use score in the statistical modeling.

In comparison, there were three children, whose characteristics are summarized in Table 6, who selected the subjunctive in two instances and did not produce it. All three of these children were in the 5th grade age group, which is consistent with the inferential statistics. Furthermore, these participants reported using Spanish outside of school in less than half of their interactions, which also aligns with the finding that exposure to and use of Spanish modulates individual rates of subjunctive mood production and selection.

Part.	Group	Freq. of use ⁹	School use	BESA	Parental languages
H5B18	DLI-5	9/25	2/5	9/14	Both Spanish only
H5M01	MLE-5	10/25	2/5	14/14	Both Spanish only
H5M02	MLE-5	12/25	1/5	7/14	Both Spanish only

Table 6. Characteristics of HS children who produced and selected the fewest instances of subjunctive mood.

5. Discussion

The present study is the first to compare productive and receptive knowledge of subjunctive mood across multiple age groups of school-aged Spanish HSs, and adopted a novel approach by evaluating HL exposure through different methods of schooling. DLI programs provide children with a greater quantity of input, as well as a quality of input that may have a wider spectrum of vocabulary and grammatical structures necessary for academic discourse. Therefore, a logical yet largely untested assumption is that HSs enrolled in these programs would experience greater growth than peers in traditional schools, particularly with structures such as the subjunctive that are late-acquired in monolingual children and are highly variable in heritage Spanish. This prediction aligns with theories of HL acquisition that emphasize frequency of exposure (Putnam and Sánchez, 2013), but has not yet been tested with both productive and receptive tasks. Differences in performance on these tasks are an important component of Putnam and Sánchez's

⁹ See footnote #5.

(2013) framework, and therefore, this study was well-positioned to test these authors' predictions with children and adolescents, who have been largely absent from bilingualism research.

The first RQ investigated whether HSs in a DLI program differed from other HSs in an English-only school and from SDBAs in their command of the volitional subjunctive. This method compares HSs to to one another, rather than only to bilinguals dominant in the same language or to monolinguals (see Rothman et al., 2023). It was predicted that SDBAs would produce and select the subjunctive at ceiling, more than HSs, and that HS children from the DLI school would recognize and produce this structure more consistently than those without bilingual education. The SDBAs produced and selected the volitional subjunctive at ceiling, consistent with previous studies (Giancaspro, 2020; Martillo-Viner, 2016), and in line with this prediction. This argues that this group does not experience attrition of the volitional subjunctive and that it is still present in the input that HSs receive from this population. However, contra the predictions, there were no differences observed between the HSs in the DLI program and those in the English-only school regarding production or selection of the volitional subjunctive. In fact, the MLS-7/8 group produced more volitional subjunctive than the DLI-7/8 group, although this difference was not significant in the statistical modeling. On the surface, this finding does not support theories of language acquisition that posit a central role for exposure and activation (Putnam and Sánchez, 2013), a result that merits further discussion below.

The second RQ evaluated whether proficiency and frequency of use would affect individual participants' rates of subjunctive mood production and selection. Consonant with Dracos and Requena (2022), it was predicted that both variables would affect production and selection of the volitional subjunctive, although only frequency of use emerged as a significant predictor at the $p \leq .05$ level in this study. Therefore, participants' overall patterns of language use, which included

school, home, and public contexts, predicted their degree of command of the volitional subjunctive, but proficiency did not, which partially supports the hypothesis for this RQ. The finding that overall frequency of use was predictive of individual differences in subjunctive production and preference does align with the predictions of Putnam and Sánchez's (2013) hypothesis.

The third RQ evaluated the role of age in the HL acquisition of the volitional subjunctive. Based upon findings with German-dominant Portuguese HSs (Flores et al., 2017), it was predicted that older children would have higher rates of volitional subjunctive production and preference in the present study.¹⁰ The findings in this experiment support this prediction, as the 7th/8th grade group used the volitional subjunctive more frequently than the 5th grade children. This is consistent with some studies on other areas of the Spanish inflectional system (i.e., Corbet & Domínguez, 2020; Cuza & Miller, 2015; Goldin et al., 2023; Martinez Nieto & Restrepo, 2022; Montrul & Potowski, 2007), although counterevidence has also been reported (i.e., Goebel-Mahrle & Shin, 2021; Guijarro-Fuentes et al., 2017).

This finding is particularly intriguing when considering that the DLI-7/8 group, which represented more than half of the 7th/8th grade age group, had experienced a drop in exposure to Spanish at school, as their HL instruction decreased from 50% to one class per day after 5th grade. The positive effect for age argues against the attrition of this structure as children grow older, contra what has been documented with younger bilingual children (Anderson, 2001; Merino, 1983; Silva-Corvalán, 2014). Therefore, these findings suggest that HS' command of mood grows during the early adolescent years, which may not have been capturable in Dracos and Requena's (2022)

¹⁰ Flores et al. (2017) do not report receptive data, but in alignment with RQ4, it was predicted that children who produced this structure more frequently would also select it more consistently on the preference task.

study with predominantly younger participants. This does not preclude early attrition and subsequent reacquisition of subjunctive mood, but testing this possibility would require younger participants who may have found this experiment to be unwieldy lengthy. Regardless, the data suggest that children's mood systems experienced growth during the age range studied, rather than became reassembled due to crosslinguistic influence from English. Since Putnam and Sánchez's (2013) framework has primarily been tested with adults, it is possible that it does not account for the initial but protracted acquisition of structures such as the subjunctive mood. Future work may be useful to explore this possibility further and to propose modifications to this framework to account for the initial acquisition of morphosyntactic structures by HSs.

The final RQ evaluated whether HS children would show asymmetrical knowledge between productive and receptive knowledge of the volitional subjunctive. Putnam and Sánchez's (2013) theory posits stronger receptive knowledge for speakers with less-frequent exposure, so it was predicted that HSs with lower reported use of Spanish and who attended the English-only school would show stronger performance on the receptive preference task. However, HSs as a whole selected the subjunctive more frequently than they produced it, regardless of exposure. Here again, this finding aligns with Putnam and Sánchez's (2013) claim that bilinguals show stronger underlying syntactic knowledge when compared to optionality in production, but this was not modulated by patterns of exposure. These task asymmetries are also consistent with Perez-Cortes' (2016) study on the subjunctive mood with adult HSs with intermediate proficiency, which suggests that the adolescents in the present study are adult-like in this regard.

It should be noted that while Putnam and Sánchez's (2013) framework correctly predicted stronger receptive than productive knowledge, the HSs in this study exhibited optionality in both tasks. The older children had subjunctive selection rates of 77% (DLI-7/8) and 76% (MLE-7/8),

while younger children were around chance level, at 55% (DLI-5) and 51% (MLE-5). This supports theories of HL acquisition that argue that at the group level, HSs develop different morphosyntactic systems than speakers dominant in the same language (i.e., Montrul, 2008, 2009, 2013). In this vein, differences between HSs and other populations of Spanish speakers cannot be attributed solely to morphological variability.

However, the individual analysis shows that all HSs produced and recognized the subjunctive in at least two contexts, which suggests that this structure is not completely absent from their grammar. **On one hand**, this highlights the importance of receptive data, as these trends could not be captured in previous experiments on subjunctive mood with HS children, but on the other, it raises questions of how to model this gradience more systematically. A possibility for future research is to explore the lexical frequency and morphological regularity of the subordinate verb, both factors that have been shown to affect adult HSs' knowledge of the subjunctive (Giancaspro, 2020; Giancaspro et al., 2022; Perez-Cortes, 2022).

Turning to production, the oldest participants in the present study produced less subjunctive than similarly-aged children in Potowski (2007a). In her experiment, 81% of the HSs in the same age range produced the subjunctive in a volitional clause. The participants in her study attended a DLI school where 80% of academic content was taught in Spanish, rather than 50%, and the greater HL input for these children may have conferred a slight advantage in acquiring the volitional subjunctive at the group level. Moreover, in this study, both groups of 5th grade children had lower rates of subjunctive mood production than those in Merino's (1983) longitudinal study on HL attrition in monolingual schools; in fact, even the HSs in the DLE-7/8 group produced the same percentage of subjunctive mood (55%) as those in Merino's (1983) data. The oldest children in the present study had similar levels of production of subjunctive mood as intermediate-proficiency

participants in Montrul's (2009) morphological recognition task (60.9%), so the adolescents in this study may have reached HS adult-like mastery of the subjunctive.

In sum, this study shows that HS children differ from SDBAs, as in previous research. Their command of the volitional subjunctive increases between fifth and eighth grades, although the role of education did not account for differences in mood knowledge in this study. Participants were more likely to select the subjunctive on the preference task than to produce it, and children who reported higher frequency of use across contexts had superior production and selection rates. Individual analyses revealed that all HSs recognized the volitional subjunctive in at least some of the stimuli, arguing against the total absence of modal contrasts in their grammars. These findings largely support Putnam and Sánchez's (2013) framework of HL acquisition, as (A) HSs with more exposure to and activation of Spanish had stronger command of the volitional subjunctive and (B) the children in this study patterned more similarly to SDBAs on a receptive task, as in past studies (i.e., Giancaspro & Sánchez, 2021; Perez-Cortes, 2016; Sherkina-Lieber, 2015). However, the predicted interaction between these variables was not evident, and the effect for age questions whether older bilingual children reassemble their grammatical knowledge or are amidst a protracted process of acquisition of the volitional subjunctive. Future research that adjusts the predictions that Putnam and Sánchez (2013) advance to account for HL restructuring to contexts of protracted HL acquisition would thus be useful.

As stated previously, the absence of the predicted advantage for children in DLI is dissonant with Putnam and Sánchez's (2013) predictions. A widespread assumption is that DLI guarantees continued HL acquisition (i.e., Lindholm-Leary and Genesee, 2014, p. 169; Potowski, 2007b, p. 188). A possible interpretation for this finding is that factors beyond input quantity are necessary to support HL acquisition and maintenance. It is possible that HS in DLI programs do

not produce in Spanish as frequently as in English, which has been documented previously (Potowski, 2004). In fact, some HSs in the DLI program explored here reported never using Spanish at school. If correct, this highlights that input alone is not enough to guarantee HL development of inflectional structures such as the subjunctive. This aligns with recent research on young schoolchildren that has found that rates of output affect performance on both productive and receptive tasks (Goldin, 2021; AUTHOR, XXXX). If this is correct, the consequence for HL acquisition theory would be that, like in second language acquisition (Swain, 1993), output might also be an essential component for acquisition and maintenance. Moreover, Montrul and Perpiñán (2011) argue that explicit instruction provided advanced proficiency second language learners with an advantage in subjunctive knowledge over proficiency-matched HSs. This implies that school is an important venue for acquiring less-frequent structures such as the subjunctive because they can facilitate form-focused learning, which may be necessary for this structure.

An additional consideration is the role of input quality in DLI programs. Although the SDBAs in the present study produced the subjunctive mood at ceiling, teachers in some immersion programs are HSs or second language learners of Spanish themselves. Since these populations have been demonstrated to show variable knowledge of subjunctive mood, as reviewed previously, HSs may receive qualitatively different mood system in the input that teachers or other children may transmit to them. In future research on HL acquisition in DLI schools, it would be beneficial for teachers to complete the same tasks as a point of comparison.

These findings differ from those reported by Kupisch and Rothman (2018), in which the HSs who have received bilingual education patterned similarly with bilinguals dominant in the same language in their command of morphosyntax. These researchers argue that their findings may not be replicable in U.S. contexts due to the absence of extensive bilingual education or social

support for multilingualism, a claim that receives support from this study. Furthermore, these findings suggest that not all contexts of exposure are equal, such that a global score across multiple contexts of language use may be more predictive of HSs' grammatical knowledge, and that input at school alone may not be sufficient to sustain HL acquisition.

While the present study makes important contributions to HL acquisition theories concerning exposure, namely Putnam and Sánchez's (2013) activation-oriented approach, there are multiple limitations. Firstly, this experiment did not consider the possible sources of *intra-speaker* variability, that is, what factors account for children's gradient production and selection of the subjunctive mood. A variable that has been shown to affect the acquisition of subjunctive mood is the lexical frequency of individual verbs (Giancaspro, 2020), a factor that Putnam and Sánchez (2013) emphasize can capture HS' gradient knowledge of a single structure. Future studies may wish to evaluate this variable. Additionally, while these data provide useful information on language development in late childhood, it may have been helpful to incorporate a comparable group of bilingual children dominant in Spanish, or other age groups of bilingual children, to most fruitfully compare these populations. Most importantly, this study had a limited sample of bilingual children from only two schools, so the absence of a statistically-significant effect for school type need not be taken as an argument against the effectiveness of DLI.

6. Conclusion

The present study concentrated on Spanish HSs' acquisition of the subjunctive mood in volitional clauses using production and preference tasks. The finding that children improve in their command of subjunctive knowledge with age during the secondary school years and into adolescence is novel in research on the acquisition of this structure. Furthermore, the findings that patterns of HL use and HSs' asymmetrical knowledge between production and comprehension

align with Putnam and Sánchez's (2013) activation-oriented account of HL acquisition and maintenance, although many participants displayed optionality in both domains. However, the finding that DLI did not have an impact on children's acquisition of the Spanish subjunctive raises questions about the role of input and output quantity and quality and suggests that variables such as home exposure are more deterministic in the acquisition of this structure. Future work with other grammatical structures would be useful to substantiate this claim.

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