

# School, age, and exposure effects in the child heritage language acquisition of the Spanish volitional subjunctive

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The present study investigated the production and receptive knowledge of the Spanish subjunctive mood in volitional clauses by 57 English-dominant heritage speakers in fifth, seventh, and eighth grades (ages 10–14), some of whom were enrolled in a dual-language immersion program. Children's self-reported frequency of use of Spanish affected command of this structure, and participants showed more consistent selection of the subjunctive than production of this form. There were no differences in production or selection between children in the dual-language immersion and monolingual English schools, but older children produced and selected the subjunctive more than younger participants. The lexical frequency of individual subordinate verbs did not affect subjunctive use. ~~These findings argue for the protracted development of this structure.~~



The role for frequency of use and asymmetrical performance between tasks support Putnam and Sánchez's (2013) activation approach to heritage language acquisition. However, the absence of an effect for bilingual schooling or lexical frequency and the increased use of subjunctive mood with age do not strictly align with theories of a reassembly of features in heritage language acquisition, and argue for a protracted development of subjunctive mood in heritage Spanish.

**Keywords:** heritage language acquisition, child bilingualism, protracted development, Spanish as a heritage language, dual language immersion

## 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 a more socially prevalent language. Spanish heritage speakers (HSs) in

the United States, who tend to experience a shift in dominance towards English at the start of schooling (i.e., Castilla-Earls et al., 2019; Hiebert & Rojas, 2021) have been a frequently-studied example of HL acquisition, including in the present project. Research on HL acquisition has generally focused on preschool children and adults, so school-aged children are the “missing link” (Montrul, 2018, p. 534) in this line of study: 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. Putnam and Sánchez (2013) advance a proposal that accounts for addressing receptive and productive knowledge distinctly. These researchers argue that activation of the HL in the memory leads to processing input for intake, which strengthens the associations between features and their morphological realization. Putnam et al. (2019, p.19) define these features as “indices on lexical items and larger syntactic objects that allow generated structures to be interpreted at external interfaces.” Similarly, Lohndal and Putnam (2021) claim that these abstract syntactic and semantic features are mapped onto morphology and are joined together to form lexical items that can be spelled out and interpreted.

Putnam and Sánchez (2013) claim that decreases in HL exposure bring about crosslinguistic influence from the dominant language, which can cause variability in mapping features onto morphology to generate lexical items. Eventually, decreased exposure can result in the reassembly of these features at the underlying level due to crosslinguistic influence from the more-dominant language. Following these researchers, the reassembly process begins under the online pressures of language production due to decreases in exposure, such that bilinguals may show stronger receptive knowledge than what they exhibit in production. Moreover, Putnam and Sánchez (2013) predict that it is harder to map features together to create lexical items that are activated less-frequently in the memory. Therefore, HSs are more likely to produce or interpret features that are realized on more-frequent lexical items. Lohndal and Putnam (2024) argue that the notion of feature reassembly is redundant with exoskeletal approaches to language that separate syntax and morphology; however, the approach described here provides specific and testable predictions that can explain different acquisitional outcomes between and within individual HSs.<sup>1</sup>

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1. Specifically, Lohndal and Putnam (2024, p.12, italics original) argue that their “Claim is that *Feature Reassembly* as a mechanism is not needed as it can be captured by independently required mechanisms in exoskeletal models.” Therefore, these researchers argue that the structure building operations that feature reassembly assumes can be integrated into models that

This approach applies a process of progressive language restructuring due to crosslinguistic influence, while other studies on child HSs have shown the opposite, whereby bilinguals acquire their HL in a protracted fashion (Corbet & Domínguez, 2020; Cuza & Miller, 2015; Cuza & Solano-Escobar, 2023; Martínez Nieto & Restrepo, 2022; Montrul & Potowski, 2007; Montrul & Sánchez-Walker, 2013). Therefore, a study testing the influence of both age and patterns of exposure is highly relevant for evaluating if and how these two approaches to HL acquisition **may interact** in accounting for child HSs' development. The present paper addresses this opportunity for research, beginning with an overview of how bilingual education influences the acquisition of HLs. Secondly, a principled review of the subjunctive mood and of research on its acquisition is presented. The research questions, hypotheses, and methodology follow. After presenting the results, this article concludes with a discussion of the findings, their implications, and their limitations.

## 2. Exposure, heritage language development, and dual language immersion

Inherent to Putnam and Sánchez's (2013) approach to HL acquisition is the fact that exposure determines HSs' individual rates of language activation, which in turn determines the degree of HL restructuring that may ensue. This study incorporates overall frequency of HL use, morphosyntactic proficiency, and bilingual education as metrics for exposure to explore HS children's acquisition of subjunctive mood in volitional clauses. Proficiency and frequency of use have been used as proxies for HL exposure in recent research (Dracos & Requena, 2022; Giancaspro & Sánchez, 2019; López-Otero et al., 2023a, 2023b; Perez-Cortes, 2016). However, understanding the impact of exposure through education in the HL is an underexplored approach. To measure input at school, the present study compared Spanish HSs in a traditional monolingual English school with age-matched

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account for the language faculty more generally. However, these researchers do emphasize the importance of features as well as the dissociation between syntax and morphology, both inherent predictions advanced by Putnam and Sánchez's (2023) approach to HL acquisition and maintenance that is influential in accounting for the results of this and many studies on this topic. Lohndal and Putnam's (2024) claim has attracted attention from other scholars within this framework, including Domínguez and Hicks (2024) and Leal and Shimanskaya (2024), who **advance similar claims regarding** the importance of the predictions of the feature reassembly framework in accounting for acquisitional difficulty.

peers in a dual-language immersion (DLI) program where 50% of daily instruction is offered in Spanish during the elementary years.<sup>2</sup>

Evaluating language development in DLI is an underexplored avenue for understanding the impact of exposure in childhood, as HSs enrolled in these programs purportedly receive greater quantity and quality of HL input than peers educated monolingually in English at a critical developmental time. From the perspective of input quantity, DLI supplements home exposure to Spanish during the school years at a time when comparable children in monolingual English schools typically begin to exhibit a shift in dominance towards English (Castilla-Earls et al., 2019; Hiebert & Rojas, 2021). Monolingual children master the structure tested here, the volitional subjunctive, around the start of school (Blake, 1983; Dracos et al., 2019). Therefore, high HL exposure may be especially impactful during this time in the acquisition of this structure, which is satisfied through DLI education, but crucially not by traditional English schooling. From the perspective of input quality, DLI schools purportedly offer students with access to vocabulary specific to academic content areas (larger lexicon) and to lengthier and more complex discourse (greater morphological and syntactic diversity).

To date, few studies have employed methods from bilingualism research to study the development of HSs' Spanish language skills in DLI when compared to children of similar characteristics in monolingual English schools (but see Gathercole, 2002 and Thane, 2024a). While bilingual education has previously been identified as facilitative in the acquisition of morphosyntax in German-dominant HSs, these studies focused on adults who were not actively enrolled in school (see Kupisch and Rothman, 2018). Therefore, exploring the productive and receptive knowledge of Spanish HSs with different quantities of input at home and school *at the time of testing* is important for research on HL development.

The volitional subjunctive is an ideal area of the Spanish inflectional system to investigate in such a context for four reasons. Firstly, it shows minimal to no dialectal variation in monolingual communities, unlike some subjunctive contexts (e.g., Faulkner, 2021). Secondly, monolingual children master the volitional subjunctive around the start of schooling (Blake, 1983; Dracos et al., 2019). Since HSs enrolled in DLI programs have more input in Spanish than bilingual peers in traditional monolingual English schools during the time when monolingual children master the subjunctive, this method of education should be especially impactful on the acquisition of this structure. Thirdly, the subjunctive typically occurs in subordinate clauses, so HSs' acquisition of this structure may benefit from academic discourse in DLI programs that feature complex, multi-clause sen-

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2. Due to space limitations, readers are referred to Lindholm-Leary (2018) for further discussion of the premises and research concerning DLI education with Spanish HSs.

tences. Finally, the subjunctive is realized through verbal morphology, so it is possible to control for lexical frequency on productive and receptive tasks to most fruitfully test Putnam and Sánchez's (2013) predictions. Additional research on the subjunctive is reviewed in the following section.

### 3. Spanish subjunctive mood: Theory and acquisition

If patterns of exposure are deterministic in HL acquisition, a logical hypothesis is that structures that emerge late in monolingual populations will be particularly susceptible to input effects. The subjunctive is one such structure and is one of three moods in Spanish alongside the indicative and imperative (Seco, 1990). Mood is a morphological realization of modality, which is the evaluation of the truth value of propositions (Bosque, 2012). All Spanish verbal inflections encode one of the three moods, although studies show that as few as 7.2% of inflected verbs are marked with 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 monolinguals. Consequently, frequent exposure, particularly through DLI, would purportedly be especially relevant for acquiring this structure.

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. This study concerns the present subjunctive, which 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. 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 syntactic and semantic representations. 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 in (1), result from a process of obligatory lexical selection, as a lexical item in the matrix clause subcategorizes for the subjunctive 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) are the morphological realization of an uninterpretable feature that is

checked and deleted in the heads of Force and Fin.<sup>3</sup> Working within feature-oriented frameworks of HL acquisition (Lohndal & Putnam, 2021, 2024; Putnam & Sánchez, 2013), the task for the Spanish speaker in acquiring the volitional subjunctive is twofold. Firstly, one must learn which matrix items select the uninterpretable mood feature; secondly, one must map this feature onto (or interpret it through) inflectional morphology to generate lexical items.

In contrast to Spanish, English has a less-utilized subjunctive. Acceptability judgment data have shown that the English indicative exists as a grammatical alternative to the subjunctive (Iverson et al., 2008; Rojas, 1998). In addition, English lacks a morphological paradigm that is specific to mood, as it is marked through past tense forms. Moreover, English requires control structures in volitional contexts where subjunctive mood is expected in Spanish. For instance, in place of the subordinate clause in sentence (1), English would use the infinitival construction *Rosa wants Carmen to come-INFINITIVE 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 volitional subjunctive, which emerges late even in monolingual children, on the basis of less input than monolinguals and in the face of crosslinguistic influence from English, whose syntax diverges in this area. Putnam and Sánchez's (2013) approach would predict that decreasing HL activation would lead to increased difficulty mapping subjunctive inflections onto subordinate verbs, especially those that are infrequent and particularly in production. Ultimately, this could cause the complete reassembly of the uninterpretable mood feature at the representational level after prolonged periods of disuse.

### 3.1 Monolingual acquisition

Monolingual Spanish-speaking children begin producing subjunctive inflections before age three, but studies show that monolingual children between ages four and five have not yet reached categorical subjunctive production (Aguirre, 2003; Blake, 1983; Dracos et al., 2019; López-Ornat et al., 1984). The subjunctive emerges in volitional clauses before other syntactic contexts, yet later than other verbal inflections (Mariscal, 2009; Pérez-Leroux, 1998; Rodríguez-Mondoñedo, 2008). Since even monolingual children require extensive exposure to master the subjunctive, more so than other structures, exposure may be particularly impactful when HSS' input spaces are divided between two (or more) languages.

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3. Following Cinque and Rizzi's (2012) cartographic analysis, both Force and Fin are syntactic categories in the left periphery below the complementizer phrase layer.

### 3.2 Heritage language acquisition of subjunctive

The available longitudinal data on English-Spanish bilingual children underscore that exposure influences this group's acquisition of the subjunctive. Two case studies on English-Spanish simultaneous bilingual siblings with different quantities of HL input reveal attrition of subjunctive around the start of schooling by the sibling with less exposure, likely due to increased input in English through school (Anderson, 2001; Silva-Corvalán, 2014). Similarly, Merino (1983) reported that elementary-aged simultaneous bilingual children in a monolingual English school showed decreased subjunctive production over two years.

Cross-sectional work on older children has also provided evidence for exposure effects. Dracos and Requena (2022) found that proficiency and frequency of exposure, but not age, affected volitional subjunctive production, but this study lacked a large number of older children with which to plot development into adolescence. Potowski (2007b) also found that adolescent HSs in a DLI program produced less subjunctive across six syntactic contexts than Spanish-dominant peers. Finally, Flores et al. (2017) found that German-dominant HSs of Portuguese who had higher exposure to their HL showed growth in subjunctive mood production between ages 8 and 12, while children with less exposure achieved comparable growth after age 13 only. The latter study suggests a positive relationship between age and exposure. While Flores et al.'s (2017) findings reinforce the central role of exposure in Putnam and Sánchez's (2013) approach, they imply that exposure modulates the rate of protracted development rather than the rate of increasing optionality and feature reassembly. Across these studies, there is not yet a study comparing productive and receptive knowledge in bilingual children, nor one that controls for both home and educational exposure. Furthermore, exploring lexical frequency may yield more nuanced results that can explain variability at the within-speaker level, as Putnam and Sánchez (2013) argue.

Like children, adult HSs are more precise in their command of the subjunctive at higher proficiency levels and with more frequent HL use (Giancaspro, 2019b; Montrul, 2009; Perez-Cortes, 2016). Furthermore, factors such as the morphological regularity and lexical frequency of the subordinate verb affect adult HSs' production and interpretation of subjunctive mood (Giancaspro, 2020; Giancaspro et al., 2022; Perez-Cortes, 2022), but neither has been explored with bilingual children. In fact, ample previous studies within Spanish as a HL have revealed frequency effects with adults (Giancaspro, 2020; Hur, 2020; Hur et al., 2020; López Otero, 2023; Perez-Cortes, 2022; Thane, 2023b), but only one previous study has explored frequency effects with child HSs with only two verbs (Goldin et al., 2023). Therefore, exploring the influence of lexical frequency with



bilingual children not only provides a nuanced account of subjunctive development, but also has broader implications for HL acquisition.

#### 4. The study

To contribute to the growing body of research that emphasizes the importance of HL exposure, a study that measures proficiency, use, *and* method of schooling with multiple age groups of HSs and that incorporates productive and receptive tasks testing lexical frequency is necessary. Based on the research reviewed thus far, five research questions (RQs) were proposed:

1. How do HSs in a DLI school compare age-matched HSs without bilingual education in the production and selection of the volitional subjunctive?  
Putnam and Sánchez's (2013) framework would predict that HSs with more-frequent exposure to and processing of Spanish would show greater consistency in mapping the subjunctive onto lexical items. Therefore, it was predicted that HSs in DLI who have greater exposure to Spanish would produce and select more volitional subjunctive than age-matched peers in a monolingual English school.
2. Do proficiency in and frequency of use of Spanish affect individual HSs' rates of volitional subjunctive production and selection?  
Putnam and Sánchez's (2013) approach to HL acquisition would posit that proficiency and frequency of use affect HSs' subjunctive mood knowledge. Previous studies on child and adult HSs have found that both variables are predictive of rates of subjunctive production, acceptability judgment, and interpretation (Dracos & Requena, 2019; Flores et al., 2017; Montrul, 2009; Montrul & Perpiñán, 2011; Perez-Cortes, 2016). Therefore, it was predicted that 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 and selection of the volitional subjunctive?  
Since exposure to the HL 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 greater difficulty mapping features onto inflectional morphology as they get older. While subjunctive loss has been found in HSs in early childhood (Anderson, 2001; Merino, 1983; Silva-Corvalán, 2014), previous studies have lacked a substantial group of late-childhood and adolescent participants. However, the closest available data



with older HSs of Portuguese from Flores et al.'s (2017) study show protracted development of subjunctive mood, rather than attrition. Therefore, it was predicted that the older participants (7th/8th grade; ages 12–14) would produce the volitional subjunctive and select it more frequently than younger participants (5th grade; ages 10–11).

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

Putnam and Sánchez's (2013) framework argues that individuals with less-frequent use of Spanish possess stronger receptive knowledge than they exhibit in production. Previous research on the subjunctive 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. In contrast, those who reported lower activation and who were in a monolingual English school would select more volitional subjunctive than they would produce it.

5. Does the lexical frequency of the subordinate verb affect child HSs' production and selection of volitional subjunctive?

Putnam and Sánchez (2013) argue that HSs are more likely to produce and select inflectional morphology on more-frequent lexical items. Furthermore, research on adult HSs has found that the lexical frequency of the subordinate verb affects productive and receptive knowledge of the subjunctive (Giancaspro, 2020). For this reason, it was predicted that HSs would produce the volitional subjunctive and select it more frequently when the subordinate verb onto which the mood feature is mapped is more frequent.

#### 4.1 Participants

57 English-dominant Spanish HS children completed this study. Four groups of HS children participated: HSs in DLI in 5th grade (DLI-5;  $n=19$ ) and 7th/8th grades (DLI-7/8;  $n=13$ ), as well as HSs in a monolingual English school in 5th grade (MLE-5;  $n=14$ ) and 7th/8th grades (MLE-7/8;  $n=11$ ). 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 one another can isolate how certain factors related to language experience, such as bilingual schooling and age, affect the acquisition of Spanish morphosyntax, and moves away from conventional HS-versus-monolingual comparisons (Rothman et al., 2023).

In the DLI school, HSs received 50% of instruction in Spanish each day from kindergarten through fifth grade. After sixth grade, they continued to receive a daily Spanish for HSs course at the same school, but no longer received content

**Table 1.** Division of participants by grade and school

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

courses in Spanish. To participate in this study, 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; the 7th/8th grade groups address the absence of bilingual children of this age range in previous studies. The age-matched peers in the monolingual English school had not received any bilingual or world language instruction during their schooling. Both schools’ demographic reports indicated matching percentages (within 1%) of Latinx families and students with low socioeconomic status (measured through family income). According to questionnaire data, while some children’s parents spoke English, all spoke Spanish, and all participants were predominantly exposed to Spanish at home (see Table 2). Children from both schools who participated in the study were primarily of Mexican descent, although there were also participants who spoke Dominican and additional Central American varieties of Spanish.

18 Spanish-dominant bilingual adults (SDBAs; average age: 33.6,  $SD=10.1$ ) also completed this study. These adults were included only to norm the tasks and confirm that they elicited the expected subjunctive morphology as anticipated. These bilinguals were from seven Spanish-speaking countries and averaged 9.5 years in the United States. They primarily worked and resided in the same region where the two schools were located, and most were students at a large regional university in the same town as the monolingual English school. These bilinguals’ data are presented in Figure 1 to verify that they used the subjunctive categorically in this study, but they were not submitted for further analysis since this project concentrates on HSs (see Rothman et al., 2023). Table 2 provides a summary of each group’s proficiency using a subset of the Bilingual English-Spanish Assessment (Peña et al., 2014), frequency of use of Spanish (as calculated across six contexts using a language questionnaire described below), and number of monolingual Spanish-speaking parents.

**Table 2.** Participant group averages with standard deviations

Variable	SDBA ( <i>n</i> = 18)		DLI-7/8 ( <i>n</i> = 11)		MLE-7/8 ( <i>n</i> = 13)		DLI-5 ( <i>n</i> = 19)		MLE-5 ( <i>n</i> = 14)	
	$\mu$	SD	$\mu$	SD	$\mu$	SD	$\mu$	SD	$\mu$	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
Proficiency score (max. 14 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

## 4.2 Method and tasks

All tasks were administered using Qualtrics software. A software known as Phonic was embedded into Qualtrics to record participants' responses on the production task. Children carried out the tasks in their schools with the researcher present; the SDBAs carried out the study asynchronously online.

### 4.2.1 *Language background tasks*

Before completing the study, participants completed a language 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 Spanish usage away from home. This approach has been shown to be effective with high psychometric validity with children younger than those in the present study (Castilla-Earls et al., 2022). 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, 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.

Subsequently, participants completed part of the Bilingual English-Spanish Assessment (BESA; Peña et al., 2014) to measure Spanish morphosyntactic proficiency. This task included eighteen stimuli testing inflectional morphology,

although four questions were not reported here because they evaluated subjunctive mood, whose inclusion would be tautologous. The remaining questions targeted gender/number agreement with articles ( $k=4$ ), 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. Participants responded to each prompt by writing a full sentence.

4.2.2 Linguistic tasks

In addition to the questionnaire and proficiency test, there were two tasks 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.<sup>4</sup> The lemmatic frequency<sup>5</sup> of each verb was retrieved from the Davies (2016–) *Corpus del español*, a large database used in previous research on the subjunctive (e.g., Giancaspro, 2020; Perez-Cortes, 2022). Since this corpus has been shown to correlate with HSS’ self-reported lexical frequency ratings (Thane, 2023a), it was determined to be an appropriate source for analyzing the impact of lexical frequency on participants’ mood selection tendencies. The lemmatic frequencies for each verb also appear in Table 3.

Table 3. List of verbs used across tasks with their lexical frequency

Spanish	English	<i>Corpus del español</i> frequency
<i>amar</i>	to love	60,260
<i>cuidar</i>	to care for	208,649
<i>llamar</i>	to call	303,936
<i>llevar</i>	to take/carry	1,192,620
<i>mirar</i>	to look at	186,441
<i>peinar</i>	to comb	6,151
<i>pintar</i>	to paint	45,606
<i>tratar</i>	to treat	590,952

4. Recent research has shown that HSs are more likely to produce the subjunctive with irregular verbs (Giancaspro et al., 2022); the use of regular verbs in this study is addressed as a limitation in the discussion of results in this paper.

5. Vannest et al. (2011, p. 2) define lemmatic/base frequency as “the frequency of the base morpheme, equivalent to the total frequency of all the words containing this morpheme.” The term *lexical frequency* is interchangeable with lemmatic frequency in this paper.

The production task contained a trial and 16 items and followed a sentence completion format. There was a brief written prompt, and participants needed to complete the final sentence orally using the verb in parentheses, as well as any other necessary words. 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.

- (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.*<sup>6</sup>  
 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.

For the selection task, participants again read prompts related to the mother's desires for her children. There was a total of 23 items in the task. As in the production 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. Only the subjunctive items were analyzed. In this task, participants read two sentences that described the prompt, and needed to select which one looked best. These 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 (\*indicative) him when they talk with him.  
 b. She wants the sisters to look at (subjunctive) him when they talk to him.

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6. Note that in these sentences, the differential object marker *a* was omitted intentionally. Results concerning the differential object marker are presented in Thane (2024a, 2024b).

5. Results

5.1 Analysis

After administering the tasks, all data were manually coded, and a binary score was assigned to each response based upon the suppliance of the anticipated mood. Only the stimuli testing the subjunctive were included for analysis. All instances in which participants produced or selected the expected subjunctive form received a score of 1, and all other forms were assigned a score of 0. In the production task, forms with correct mood inflections but with tense or agreement morphology that did not match the prompt were accepted with a score of 1 because this study did not concentrate on these morphological categories. This comprised the binary dependent variable for both the descriptive and inferential statistics.

There were 30 instances in the HSs’ data from the production task where there were errors with participants’ audio recording or in which responses were not related to the stimuli. These observations were discarded, leaving 426/456 (93.4%) available for analysis. The children produced the subjunctive in a total of 193/426 instances (45.3%), and alternative forms in the remaining 233 instances (54.6%). 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.

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

Structure	Observations
Indicative mood	177 (75.9%)
Infinitive	35 (15.0%)
<i>Ir a (going to)</i> periphrastic future	13 (5.5%)
Uncategorizable forms	4 (1.7%)
Modal verbs in indicative	3 (1.2%)
Preterit	1 (0.4%)

\* “Uncategorizable forms” were innovative inflections that are not a part of the Spanish inflectional system, and therefore, could not be placed into named categories.

Additional data were coded to generate independent variables. Firstly, each participant’s group (DLI-7/8, MLE-7/8, DLI-5, MLE-5, SDBA) was coded to allow for a comparison in the descriptive statistics and individual analyses. Moreover, each HS participant’s grade group (5th grade versus 7th/8th grade) and school (DLI versus monolingual English) were included as categorical variables so that these two factors could be evaluated independently. Additional data from the

BESA proficiency task and language questionnaire were analyzed to generate a pair of continuous variables. Each participant's proficiency score was calculated as the number of expected answers on the BESA morphosyntax subsection (maximum 14; see Table 2), and frequency of use was operationalized by adding together the 1–5 Likert scales for the six contexts of language use from the questionnaire (maximum 30; see Table 2). Finally, lexical frequency was operationalized as the lemmatic frequency from the *Corpus del español* for each verb (see Table 3). All data were anonymized and uploaded to a GitHub repository (<https://github.com/pthane/DLI-Morphosyntax-2023>). Data analysis was carried out in RStudio (R Core Team, 2022) using the *lme4* (Bates et al., 2015), *lmerTest* (Kuznetsova et al., 2017), *performance* (Lüdtke et al., 2021), and *tidyverse* (Wickham et al., 2019) packages.

## 5.2 Descriptive analysis

HSs' and SDBAs' subjunctive production and selection are summarized by group in Figure 1, with percentages by group and task listed in Table 5 below. As anticipated, the SDBAs used the subjunctive invariably, confirming that the tasks elicited subjunctive morphology as expected. Since the HSs were the focal point of the present project, the SDBAs' data are not analyzed further.<sup>7</sup> These figures also show that the 7th/8th grade groups produced and selected more subjunctive than the 5th grade groups, implying that children develop knowledge of the volitional subjunctive with age. However, there were no discernible differences between children in the DLI and monolingual English schools. All HS groups selected the subjunctive more frequently on the selection task than they produced this structure.

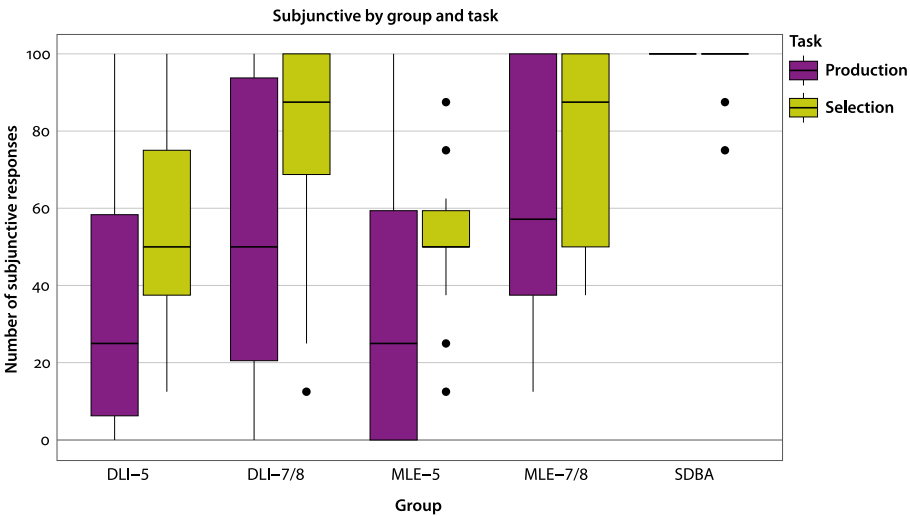
Figure 2 summarizes HSs' production and selection of volitional subjunctive by BESA proficiency, Figure 3 summarizes production and selection by frequency of use of Spanish, and Figure 4 outlines the role of lexical frequency on subjunctive production and selection. These figures point towards modest roles for proficiency and frequency of use of Spanish, but argue against any lexical frequency effects.

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7. Readers interested in exploring statistical differences between the HS groups and SDBAs are encouraged to review these data on the public GitHub repository for this project.

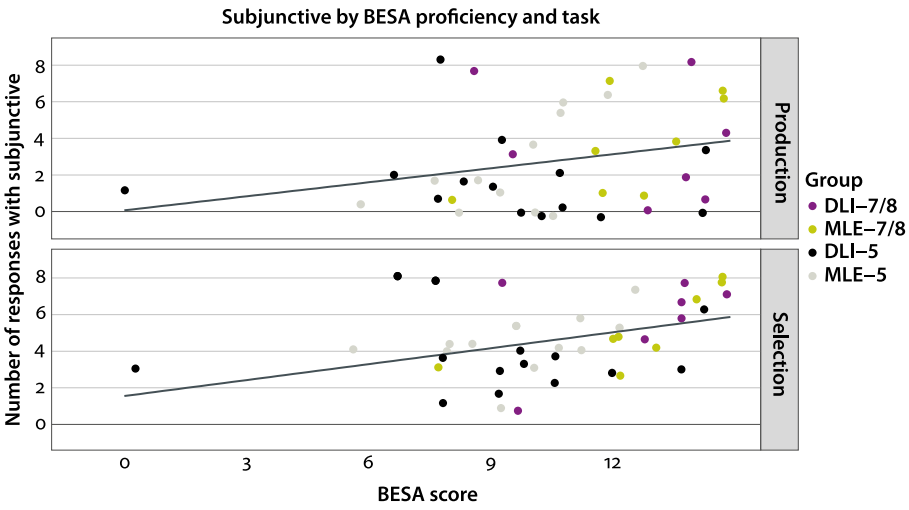
**Table 5.** Percentages and standardized deviations of subjunctive production and selection by group and task

Group	EPT		FCT	
	Mean	SD	Mean	SD
SDBA	100.0%	0.00%	98.0%	6.4%
DLI-7/8	55.4%	41.1%	77.3%	31.5%
MLS-7/8	64.1%	35.0%	76.0%	26.3%
DLI-5	37.2%	38.0%	55.3%	27.1%
MLS-5	32.1%	34.2%	50.9%	18.6%

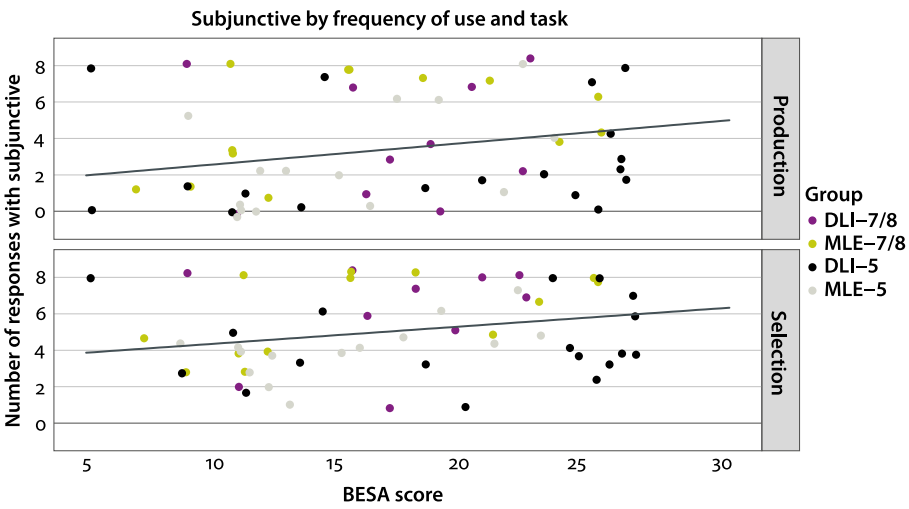


**Figure 1.** Percentages of subjunctive production and selection by group and task





**Figure 2.** Production and selection of volitional subjunctive by BESA proficiency



**Figure 3.** Production and selection of volitional subjunctive by frequency of use of Spanish

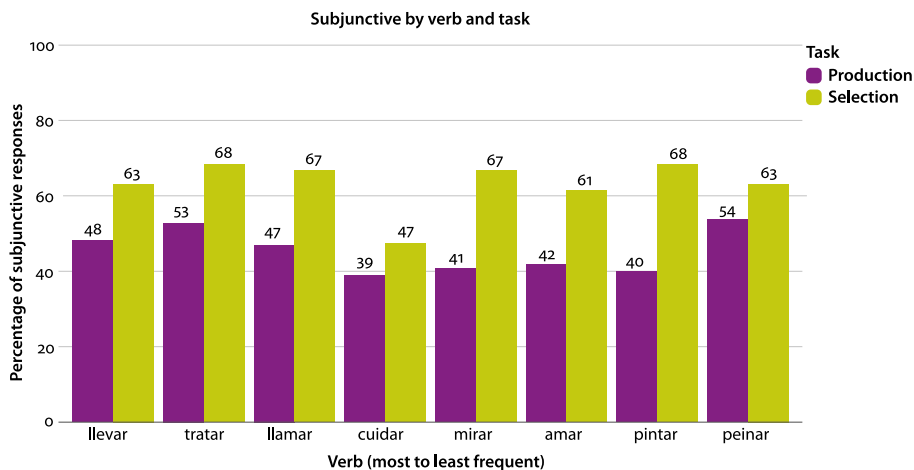


Figure 4. Production and selection of volitional subjunctive by verb, organized from most to least frequent as rated in the *Corpus del español*

5.3 Individual analyses

Additionally, individual analyses were conducted by calculating the total number of subjunctive forms that each participant produced and selected. 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 HSs’ grammar, and instead points towards the conclusion that these bilinguals map this feature onto morphology variably, as feature-oriented accounts predict (Lohndal & Putnam, 2021, 2024; Putnam & Sánchez, 2013).

Six participants produced and selected the subjunctive in all 16 contexts. These participants’ characteristics are listed in Table 6. That 5/6 of the participants were in the 7th/8th grade group further implies an effect for age, but there were no clear trends involving school, proficiency, frequency of use of Spanish, or parental bilingualism. In fact, three of these participants, one of whom attended the DLI school, reported never using Spanish at school.<sup>8</sup>

In comparison, there were three children, whose characteristics are summarized in Table 7, who selected the subjunctive in two instances and did not produce it. All three of these children were in the 5th grade age group. Furthermore, these participants reported using Spanish outside of school in less than half of their interactions, which also aligns with the prediction that low exposure to Spanish modulates subjunctive production and selection.

8. This may appear counterintuitive; however, students’ frequent use of English during Spanish instructional time is well-documented (Ballinger & Lyster, 2011; Hamman, 2018; Potowski, 2004).

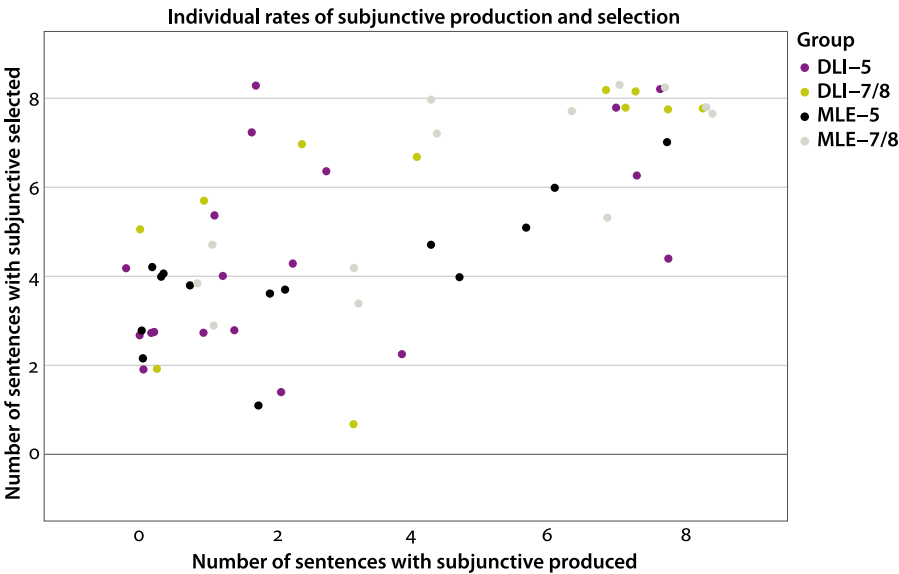


Figure 5. Individual rates of production and selection of subjunctive by participant.<sup>9</sup>

Table 6. Characteristics of HS children who produced and selected subjunctive mood at ceiling<sup>\*</sup>

Part.	Group	Freq. of use	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
H8Mo2	MLE-7/8	11/25	0/5	14/14	1 Spanish only, 1 bilingual
H8Mo6	MLE-7/8	15/25	0/5	14/14	Both Spanish only
H8M13	MLE-7/8	13/25	2/5	12/14	Both bilingual


<sup>\*</sup> In Tables 6 and 7, “freq. of use” refers to the five contexts of language use targeted on the language questionnaire except for “at school,” which is represented separately to the right.


9. The *geom\_jitter* layer was applied to this graph to slightly displace points along the *x* and *y* axes to enhance visibility of each participant’s data. Therefore, each of these points should be approximated to the nearest available integer.

**Table 7.** Characteristics of HS children who produced and selected the fewest instances of subjunctive mood

Part.	Group	Freq. of use	School use	BESA	Parental languages
H5B18	DLI-5	9/25	2/5	9/14	Both Spanish only
H5Mo1	MLE-5	10/25	2/5	14/14	Both Spanish only
H5Mo2	MLE-5	12/25	1/5	7/14	Both Spanish only

5.4 Inferential statistics

 To further evaluate these data, a Generalized Linear Mixed Methods (GLMM) binomial logistic regression model was necessary. The binary dependent variable was the suppliance of subjunctive mood as described in Section 5.1. HSs’ data from both the production and selection task were incorporated in the same model. The predictors for the GLMM model were school group (DLI versus monolingual English), age group (5th grade versus 7th/8th grade), BESA proficiency score, frequency of use, task (production versus selection), lexical frequency, and three two-way interactions: school group by age group, school group by task, and frequency of use by task. The latter three variables (proficiency, frequency of use, and lexical frequency) were continuous, so they were standardized to refit them along the same scale in the statistical modeling.

 Given there were numerous predictors and interactions necessary to address the RQs, nested model comparisons were carried out through pairwise comparisons to determine the model of best fit. Pairwise comparisons were conducted manually by adding one predictor into each model and comparing these models using the ANOVA function in RStudio. In the pairwise comparisons, the model with random intercepts for participant and item and fixed effects for school, grade group, proficiency, frequency of use, and task accounted for the greatest amount of variance ( $AIC=949.18$ ,  $\chi^2=17.87$ ,  $p<.0001$ ). Finally, this model, which contained random intercepts only, was compared to a similar model with the same fixed effects but with participant and item as random intercepts and random slopes, following Cunnings (2012). The second model failed to converge, so the first model containing participant and item as random intercepts only was retained.

The final GLMM model (conditional  $R^2=0.530$ , marginal  $R^2=0.198$ ) contained school, grade group, frequency of use, BESA proficiency, and task as predictors with participant and item as random intercepts. The 5th grade group and the production task were set as reference levels. The model revealed main effects for the 7th/8th grade group ( $\beta=1.47$ ,  $SE=0.46$ ,  $p=.0013$ ), frequency of use ( $\beta=0.52$ ,  $SE=0.23$ ,  $p=.0220$ ), and the selection task ( $\beta=1.13$ ,  $SE=0.20$ ,  $p<.0001$ ).

These results imply that older HSs show stronger knowledge of subjunctive mood, that frequency of use modulates subjunctive knowledge, and that participants were more likely to select the subjunctive than they were to produce it. These findings are consistent with the data reported in Figures 1 and 3.

## 6. 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 adopts a novel approach by evaluating HL exposure through different methods of schooling. Moreover, it evaluated lexical frequency effects with bilingual children, **which is largely novel** (but see Goldin et al., 2023 for an analysis with two lexical items). There were five RQs, the first of which investigated whether HSs in a DLI program differed from other HSs in a monolingual English school in their command of the volitional subjunctive. It was predicted that participants in the DLI school would recognize and produce this structure more consistently than monolingually-educated peers. Contra the predictions, there were no differences observed between the HSs in the DLI program and those in the monolingual English school. On the surface, this finding does not support theories of language acquisition that posit a central role for exposure and activation (e.g., Putnam & Sánchez, 2013), a result that merits further discussion below.


The second RQ evaluated whether proficiency and frequency of use would affect rates of subjunctive production and selection. It was predicted that both variables would affect the production and selection of the volitional subjunctive, although only frequency of use accounted for speakers' mood tendencies. Therefore, participants' overall patterns of language use predicted their command of the volitional subjunctive, but proficiency did not, which partially supports the hypothesis. The finding that frequency of use was predictive of individual differences in subjunctive production and selection aligns with Putnam and Sánchez's (2013) model.

The third RQ evaluated the role of age in the HL acquisition of the volitional subjunctive. It was predicted that older children would have greater volitional subjunctive production and selection, which is consistent with results. These findings align with a growing number of studies on other areas of the Spanish inflectional system revealing protracted HL development in childhood (i.e., Corbet & Domínguez, 2020; Cuza & Miller, 2015; Cuza & Solano-Escobar, 2023; Martínez Nieto & Restrepo, 2022; Montrul & Potowski, 2007; Montrul & Sánchez-Walker, 2013; Thane, 2024b). The data from the present study extend these findings to the

Spanish subjunctive and echo the role of age found in Portuguese HSs' acquisition of this structure.

The fourth RQ evaluated whether HS children would show asymmetrical productive and receptive knowledge of the volitional subjunctive. Putnam and Sánchez's (2013) theory posits stronger receptive than productive knowledge for speakers with less-frequent exposure, so it was predicted that HSs with lower reported use of Spanish and who attended the monolingual English school would show stronger performance on the selection task than in production. However, HSs as a whole selected the subjunctive more frequently than they produced it, regardless of exposure patterns. These task asymmetries are also consistent with Perez-Cortes' (2016) study on the subjunctive mood; however, unlike in Perez-Cortes (2016), frequency of use did not modulate these asymmetries.

Finally, RQ5 addressed the role of lexical frequency in the production and selection of subjunctive mood in volitional clauses. Based upon previous studies on the subjunctive, as well as on adult and child HSs, it was predicted that participants in this study would produce and select the subjunctive more consistently with more-frequent lexical items. However, this result was not upheld, and there was no discernible role of lexical frequency. This is *contra* previous research as well as Putnam and Sánchez's (2013) predictions.

Together, these findings partially support Putnam and Sánchez's (2013) account of HL acquisition and maintenance in the context of child HL acquisition. The effects for frequency of use of Spanish and for asymmetries between production and selection support the central tenet of these researchers' framework, that exposure modulates HL acquisition. However, the positive role of age suggests that HSs do not reassemble the mood feature  or experience greater difficulty mapping it onto morphological forms over time due to increased exposure to English. Rather, the data here point towards the protracted development of subjunctive mood. This finding is particularly surprising when considering that the DLI-7/8 group had experienced a drop in exposure to Spanish at school, yet still produced and selected more subjunctive mood when compared to the DLI-5 group that still received immersion in Spanish. This is inconsistent with what has been documented with younger HSs (Anderson, 2001; Merino, 1983; Silva-Corvalán, 2014). Therefore, attrition and subsequent reacquisition of subjunctive mood could occur, but testing this possibility would require younger participants who may have found these tasks to be unwieldly lengthy. Furthermore, there was no role of lexical frequency in the present study, which does not align with Putnam and Sánchez's (2013) predictions.

Considering these results, one possibility is that Putnam and Sánchez's (2013) predictions run in reverse in the initial yet protracted development of Spanish morphosyntax. Specifically, HSs may develop stronger receptive knowledge

before they consistently map syntactic forms onto morphology in language production. This differs subtly from Putnam and Sánchez's (2013) predictions, as these researchers argue that HSs begin to experience optionality in production before experiencing a shift in underlying syntactic knowledge. The rate of child HSs' development is likely modulated by patterns of exposure, as found in the present study and by Flores et al. (2017) in Portuguese. Recent research on bilingual children's and adults' acquisition of the differential object marker in Spanish (Thane, 2024a, 2024b) has also advanced similar claims. Individuals who have greater exposure consequently experience less crosslinguistic influence from English, so they may map the subjunctive mood feature onto subordinate verbs earlier and with greater consistency than children with lower exposure. Studies pointing towards protracted HL development continue to amass, so this explanation provides a possibly promising account for these findings. More research comparing children's productive *and* receptive knowledge across a broader age range would be crucial to test this possibility.



This explanation does not **incorporate** lexical frequency, which is an important component of Putnam and Sánchez's (2013) model. The present study differs from previous work on adult HSs that has reported frequency effects in HSs' command of subjunctive mood, grammatical gender, differential object marking, preterit aspect, verbal agreement morphology, and imperative commands (e.g., Giancaspro, 2020; Goldin et al., 2023; Hur, 2020; Hur et al., 2020; López Otero, 2023; Perez-Cortes, 2022; Thane, 2023b). It is difficult to interpret why lexical frequency did not affect participants' mood selection in the present study, but one possibility is that a subset of only eight verbs is not sufficient to observe this effect. Therefore, future studies would be well advised to incorporate more lexical items; however, doing so makes the experimental tasks lengthy, which is often problematic in child language acquisition research.

In addition, it should be noted that while Putnam and Sánchez's (2013) framework correctly predicted differences between individual HSs, the groups as a whole exhibited optionality in both tasks. This supports theories of HL acquisition that argue that as a group, HSs develop morphosyntactic systems that exhibit greater variability than would be found across speakers dominant in the same language (i.e., Montrul, 2008, 2009, 2013). However, the individual analyses show that all HSs produced and recognized the subjunctive in at least two contexts, which suggests that this structure is not completely absent from any speaker's grammar. Rather, most HSs experience persistently variable form-function mappings, which Lohndal and Putnam (2021) argue is typical in HL acquisition.

Before addressing limitations, it is important to contemplate the implications of the absence of the predicted effect for DLI on subjunctive mood knowledge. A widespread assumption is that DLI assures continued HL acquisition (e.g.,

Lindholm-Leary and Genesee, 2014, p.169; Potowski, 2007a, p.188), but this effect is not observed in this study. It is likely that factors beyond input quantity are necessary to support HL acquisition and maintenance. Firstly, it is likely that output is equally crucial, which aligns with recent research that has found that rates of production affect HS children's morphosyntactic development (Goldin, 2021; Sánchez et al., 2023). This is particularly plausible given that some DLI students report never using Spanish at school, a finding that is consistent with previous research that has shown that children in bilingual schools frequently avoid Spanish even when receiving instruction in that language (Ballinger & Lyster, 2011; Hamman, 2018; Potowski, 2004). Moreover, Montrul and Perpiñán (2011) argue that explicit instruction provided advanced proficiency adult second language learners with an advantage in subjunctive knowledge over proficiency-matched HSs. Together, these findings along with those of the present study imply that for HSs, simply overhearing Spanish is insufficient for acquiring less-frequent structures such as the subjunctive, even in the case of DLI. Rather, output is a necessary ingredient of HL acquisition and maintenance, as in second language acquisition (Swain, 1993), and explicit instruction may be necessary to acquire some structures in bilingual contexts, as Montrul and Perpiñán (2011) argue. The DLI environment could consequently be adapted to be more conducive to output and explicit instruction.



An additional consideration is the role of input providers in DLI programs. Teachers in some immersion programs are HSs or learners of Spanish themselves. Since these populations have been demonstrated to show variable knowledge of subjunctive mood, as reviewed previously, they could transmit a qualitatively different mood system to bilingual children. 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.

Before concluding, it is critical to recognize key limitations. Firstly, the present study used only canonical *-ar* verbs, yet Giancaspro et al. (2022) found that adult HSs are more likely to use the subjunctive with verbs with irregular subjunctive stems. While it is prudent to control morphological regularity for methodological reasons, such a decision may have undervalued HSs' production and selection of the subjunctive in this study. Furthermore, while not the focal point of analysis, the strong intensional verb *creer* (*to believe*) could still imply contexts of doubt and consequently may have also inadvertently triggered subjunctive use in unexpected contexts. Additionally, it may have been helpful to incorporate a group of bilingual children dominant in Spanish, as well as other age groups of bilingual children, to most fruitfully compare these populations. Another possibility is that the present study did not fully control for all possible contexts of HL use; this is particularly plausible considering the brevity of the language ques-



tionnaire. Most importantly, this study had a limited sample of bilingual children from only two schools, which required grouping seventh and eighth-grade students into a single category. The absence of a meaningful effect for school type based upon observations in a single DLI program need not be taken as an argument against the effectiveness of bilingual education, particularly considering the extralinguistic benefits of this method of schooling (see Lindholm-Leary, 2018 for a review of academic benefits).

## 7. Conclusion

The present study concentrated on Spanish HSs' acquisition of the subjunctive mood in volitional clauses using production and selection 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. The influence of exposure on subjunctive production and asymmetrical productive versus receptive knowledge that HSs exhibited align with Putnam and Sánchez's (2013) activation approach to HL acquisition. 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 in HL acquisition. Moreover, lexical frequency did not align with the findings, contra Putnam and Sánchez's (2013) predictions. Since children's subjunctive knowledge increased with age, there was no evidence of feature reassembly or increasing optionality due to sustained activation of English. Rather, Putnam and Sánchez's (2013) feature-oriented model that emphasizes patterns of exposure may also be relevant in the context of protracted development, a possibility that deserves testing through future studies. This is not incompatible with alternative feature-based accounts that argue that the reassembly of features can be subsumed under more general accounts of syntax and morphology (Lohndal & Putnam, 2024), as the same structure-building (or *reassembly*) primitives may be involved in the initial yet protracted development of HLs.

## Data availability statement

All anonymized data and coding for analysis are available on a public GitHub repository (<https://github.com/pthane/DLI-Morphosyntax-2023>), as approved by Rutgers University IRB #Pro2021001902.



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