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Adverb placement among heritage speakers of Spanish

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This study examines verb-adverb word order among heritage speakers of Spanish using an acceptability judgment task and a selection task in affirmative and negative sentences. Heritage speakers of Spanish show reaction patterns to stimuli fundamentally similar to those of the monolingual comparison group, but with several subtle differences. In affirmative sentences, they show a slightly higher preference for the options that are consistent with both the Spanish and the English grammars (in affirmative sentences, adverb-verb-object), and their judgments span a smaller range vis-à-vis native speakers. In negative sentences, heritage speakers of Spanish also generally coincide with monolingual speakers, but their acceptability of the negation-adverb-verb-object option (ungrammatical in monolingual Spanish) is higher than in the monolingual comparison group. We hypothesize that, first, heritage speakers of Spanish maximize bilingual compatibility: they prefer options that are compatible with the structural analysis of both languages. This hypothesis is consistent with previous findings showing that both languages are activated in parallel. Second, we explain the results in negation sentences as lexical indeterminacy: negation can have its lexically specified selectional properties as in English or as in monolingual Spanish, allowing for two alternative analyses. Hence, feature values in the lexicon may be transferred, whereas full functional categories are not. Transfer can be indirect in the form of smaller rating spans, a by-product of being a proficient bilingual: by maximizing compatibility with both languages, speakers extend the range of grammatical options in the language, but at the same time, their less certain judgments reflect this parallel activation.

Keywords: Language transfer; word order; verb-raising; Spanish; heritage speakers

1 Introduction

Heritage speakers of Spanish in contact with English face different grammatical analyses for verb-adverb placement in each of their languages. On the one hand, adverbs like *frequently* precede the verb in affirmative clauses in English, a language that has been called affix-lowering or more neutrally, non-raising (Emonds 1978; Pollock 1989; Embick & Noyer 2001). On the other hand, monolingual Spanish is usually considered a verb-raising language (Zagona 2002), although the adverb may precede or follow the verb (Camacho & Sánchez 2017). The question we explore in this paper is how heritage speakers resolve this contact situation. In particular, our first question is whether we find any differences between monolingual and heritage speakers of Spanish, given that the latter have access to two mental grammars and presumably activate them simultaneously (see below). Second, assuming that we do find some differences, how can these differences be explained and what do they suggest for a general theory of transfer when two languages become in contact?

The paper is organized as follows: in Section 2, we review the syntactic analysis of verb-raising in English and Spanish, arguing that the different structures create a potential ambiguity for the processing of the input in Spanish by heritage speakers. Section 3 reviews previous studies on verb-raising in second language learners (L2) and heritage speakers, Section 4 presents the study, followed by results in Section 5 and a discussion in Section 6.

2 Verb movement in English and Spanish

In English, adverbs precede the main verb both in affirmative and negative clauses:[1]

(1)   a.   John often reads books.
       b.   *John reads often books.

(2)   a.   John doesn't often read books.
       b.   *John doesn't read often books.

In contrast, in Spanish, adverbs can precede or follow the verb in affirmative clauses and must precede the main verb in negative clauses (Camacho & Sánchez 2017). Additionally, the adverb can also appear clause-finally (see fn. 1):

(3)   a.   Juana frecuentemente lee   libros.
             Juana often   reads books
             'Juana often reads books.'

       b.   Juana lee   frecuentemente libros.
             Juana reads often   books
             'Juana often reads books.'

(4)   a.   Juana no lee   frecuentemente libros.
             Juana not reads often   books
             'Juana doesn't often read books.'

       b.   *Juana no frecuentemente lee   libros.
             Juana not often   reads books
             'Juana doesn't often read books.'

Since Emonds (1978) and Pollock (1989), the English pattern has been taken to show that the verb (v) does not raise to tense (T), but rather, the tense affix lowers to v in (1)a, as seen in (5)a. In negative sentences, negation blocks lowering, triggering obligatory *do*-support, as in (5)b (but see Williams 1994 for an alternative view):

(5)   *English*
       a.   [$_{TP}$ John [$_{T'}$ t$_T$ [VP   often … read + T]]]
       b.   [$_{TP}$ John [$_{T'}$ do + T + Neg   [VP often … read]]]

More recent analyses of these data dispense with affix lowering in different ways (Koeneman & Neeleman 2001; Biberauer & Roberts 2010). For example, for Biberauer & Roberts (2010), English reflects an agreement relationship between the auxiliary in T and finite v. In languages like French or Italian, v-raising is the consequence of having finite vs that are compound elements made up of v + T.

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[1] In both English and Spanish, the adverb can also appear VP-finally (*John reads books often*). Because this position offers no variation across the two languages, and because we assume that it involves a different derivation, we will not consider it in the paper.

Matushansky (2006: 104) notes that verb-raising has no interpretive consequences, suggesting that it is not a syntactic operation (see Chomsky 2000). In Embick & Noyer (2001), verb movement is the result of a post-syntactic operation, *Morphological Merger*, and the way this operation takes place leads to the v-raising vs. non-v-raising language distinction.

Spanish is usually considered a verb-raising language (Suñer 1994; Zagona 2002; among others). However, as Ayoun (2005) notes, word order is fairly flexible with respect to verbs and adverbs, so she considers Spanish a hybrid language (from the point of view of verb movement):

(6) a. Juana frecuentemente lee   libros.
         Juana frequently   reads books
         'Juana frequently reads books.'

     b. Juana lee   frecuentemente libros.
         Juana reads frequently   books
         'Juana frequently reads books.'

Camacho & Sánchez (2017) conducted an experimental study with Peruvian monolingual Spanish speakers that confirmed this flexibility, but also showed a preference for verb-adverb order over adverb-verb order. In the authors' account, the verb (v) always raises and adjoins to tense (t). This results in a syntactically incorporated v + t complex. Assuming that raising leaves a copy in the original site, the resulting chain has two parts: the lower v and the higher v + t, as in (7)a. When this syntactic structure is spelled out, one of the copies must be deleted, as indicated in (7)b–c with a crossed symbol. If the higher copy of that chain is spelled out, the order is verb-adverb, as seen in (7)b; if the lower copy is spelled out, the order is adverb-verb, as in (7)c.

(7) a. After syntax: Juana [$_{TP}$ v + t adv [$_{VP}$ v libros]]
     b. Higher-copy spell-out: Juana lee frecuentemente l̶e̶e̶ libros
     c. Lower-copy spell-out: Juana l̶e̶e̶ frequentemente lee libros

However, the two spell-out options have different consequences. If we assume that morphemes that spell out different syntactic heads require those heads to be adjacent, only the higher-copy spell-out fulfills that condition, because v + t appear adjacent as a result of v adjoining to t. In order to spell-out the lower copy, a further, postsyntactic, operation is required: t must lower back to v, as in (8)b.

(8) a. Higher-copy spell-out: v + t ...v̶   → lee frecuentemente
     b. Lower-copy spell-out: v̶ + t̶ ...v-t → frecuentemente lee

In this sense, lower-copy spell-out is computationally more costly because it involves one further morphological operation of adjoining t to the lower v-head. This is why monolingual speakers of Spanish prefer the higher-copy spell-out, as Camacho & Sánchez (2017) note.[2]

In negative sentences, English and Spanish also pattern differently: Spanish requires higher-copy spell-out, whereas English inserts an auxiliary *do*:

(9) a. *Juana no frecuentemente lee   libros.
         Juana not frequently   reads books

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[2] An anonymous reviewer raises the question of learnability implications of this view. Since both options are still available in the input, learners will still be able to learn them.

     b.   Juana no lee   frecuentemente libros.
           Juana not reads frequently   books
           'Juana doesn't frequently read books.'

(10)   a.   *John not often read books.
         b.   John doesn't often read books.

In order to account for the negation patterns, Camacho & Sánchez (2017) make an additional assumption. Following Williams (1994), they suggest that negation has different lexical specifications in each language: it selects for a category with the feature [–T] in English, but for a category with the feature [+V] in Spanish. This explains why, for example, English can have negation appear as a determiner in nominal expressions as in *no children,* whereas Spanish cannot (*no niños*). If we assume that selection requires immediate locality, then only [–T] categories can appear next to negation in English and only [+V] categories in Spanish. As a result, when the verb raises to T in Spanish negative sentences, the selectional restrictions will be satisfied. In English, on the other hand, T must raise higher than negation.

    A heritage Spanish speaker has two grammars that must be consistent with the input she receives in each language. Whenever she hears Spanish input (as many do in this context, since they may have monolingual Spanish parents) with the verb-adverb word order in affirmative sentences, the question is whether the English grammar will in any way influence how that input is represented or parsed. It could be analyzed as in the monolingual Spanish grammar (overt V-raising + lower-copy spell-out) or as in the English grammar (no V-raising). If such influence exists, we would expect it to surface in some noticeable way.

    In negative sentences, on the other hand, the linear input in Spanish will not be compatible with English grammar, because Spanish lacks *do*-support. In this case, we would not expect noticeable effects in the heritage speaker patterns. The question we raise in this paper is the following: given that the Spanish input is partially consistent with the English grammar (in the verb-adverb orders), do we find evidence of English-grammar influence in the heritage grammar?

3 Contact effects in bilingual grammars

3.1 Adverb raising in contact grammar

Several studies have addressed verb-raising in second language acquisition, mostly with English-French language pairings (Hulk 1991; White 1991; Herschensohn 1998; Ayoun 2003; Herschensohn & Arteaga 2009; Guijarro-Fuentes & Larrañaga 2011; among others). White (1991) tested whether francophone learners of English as a second language would reset the verb-raising parameter from French to English, and whether overt instruction on this topic would make a difference. All the participants (age 11–12) completed a pretest on adverb placement using three different tasks. One subgroup was subsequently instructed on adverb placement, the second group on question-formation. Both groups completed two retests using the same tasks: one after two weeks and one five weeks later. In addition, the younger children in the group who were overtly instructed on adverb placement were subsequently post-tested after a year. The two groups showed significant differences in the retests: those exposed to overt instruction on adverb placement had significantly better results on both post-tests.

    Mandell (1998) investigated the acquisition of adverb placement, optional inversion in yes/no questions and word order in wh-questions illustrated in (11), by L1-English L2-Spanish learners at four levels of instruction (second-semester, fourth-semester, sixth-semester and fifth year and above).

(11)   a. ¿Habla María ruso?
                speaks María Russian
                'Does María speak Russian?'

         b. ¿María habla ruso?
                María speaks Russian
                'Does María speak Russian?'

         c. ¿Qué compra María?
                what buys   María
                'What does Maria buy?'

The order seen in wh-questions in (11)c has been usually analyzed as part of the same parameter as adverb placement, involving verb-raising. In this study, participants performed better on the question items than on the adverb placement items.

Herschensohn (1998) conducted a production study with two different intermediate level groups of L2-French L1-English learners in order to test L2 acquisition of inflection, negation and adverb placement in French. She found a much higher rate of errors for adverb placement (18.3%) than for inflection (2.5%) or negation placement (2.7%). The high rate of accuracy for negation suggests that L2 learners have abandoned the L1 parameter, but the adverb-placement error rate indicates they have not yet fully acquired the L2 setting. The author proposed a model of L2 acquisition that reflects this pattern: L2 acquisition proceeds in stages linked to specific morpholexical constructions, so that there is an initial loss of the L1 parameter value followed by a period of feature underspecification and, finally, target L2 setting. For French adverb placement, this means adopting the value of French negation first (*pas* before *jamais*) and then target adverb placement.

Ayoun (2005) used four different tasks (a scaled grammaticality judgment task, a preference/grammaticality judgment task, a production task and a magnitude estimation acceptability task) to test 15 low-intermediate L2-Spanish L1-English learners on adverb and negation placement in finite and nonfinite contexts. Participants had higher accuracy rates in negation placement (both with finite and nonfinite verbs), and lower accuracy rates with adverb placement in finite contexts. The lowest scores were on adverbs in nonfinite contexts.

Bruhn de Garavito (2002) compared early bilinguals and L2-Spanish L1-English learners in an acceptability judgment task that tested subject-verb inversion in questions and verb-raising with "short" adverbs (*rápido* 'fast') and manner adverbs (*cuidadosamente* 'carefully'). For short adverbs, L2-learners differed from monolingual speakers in ungrammatical sentence rating, and both L2 speakers and bilinguals differed from monolingual controls in grammatical sentence ratings. For long adverbs (similar to the ones tested in the current study), bilinguals differed from monolinguals in grammatical sentences, and they differed from L2-learners in ungrammatical sentences. In fact, compared to the other groups, bilinguals found verb-adverb sentences slightly less acceptable. Bruhn de Garavito (2002: 93) suggested that bilinguals "may simply be taking advantage of the different possibilities offered by UG, perhaps for pragmatic purposes".

Guijarro-Fuentes & Larrañaga (2011) addressed the question of whether L2 learners and native speakers show significant differences at the morpho-syntactic level, and how these morpho-syntactic features correlate with the acquisition of abstract syntactic features. It was assumed in this study that L2 divergence from the target might be due to difficulties in the realization of the morphology, rather than to the absence of functional categories or syntactic features. Four groups of L1-English/L2-Spanish participants (beginner, low-intermediate, intermediate and advanced speakers) and a native speaker group completed four experimental tasks and a proficiency test. The experimental part included two

grammaticality judgment tasks, a translation/production one, and another one where participants had to distinguish between finite and non-finite forms and person/number features on verbs. Their results confirmed parameter resetting, in the sense that L2 speakers showed evidence of verb-raising with adverbs and questions, but they also found significant differences based on proficiency. Additionally, they found no correlation between recognition of person/number morphology and knowledge of syntax. Notice that this study compared verb-adverb-object order (*Juana escribe rápidamente la carta* 'Juana quickly writes the letter') with verb-object-adverb order (*María comprende el alemán claramente* 'María understands German clearly'), although the latter option (vp-final position) might not be generated in the same position as the former option (verb-adverb-object).

In sum, previous studies have found that verb-raising in general is acquired fairly successfully. At the same time, these studies, with the exception of Guijarro-Fuentes & Larrañaga (2011), have shown that adverb placement is less robust than with monolingual speakers.

3.2 Crosslinguistic interference in bilingual grammars

The nature and the extent of crosslinguistic influence in bilingual grammars remains a central research concern. The starting point is the observation that certain linguistic varieties spoken by bilingual speakers differ from the corresponding monolingual varieties in ways that make them closer to the grammar of the other language spoken by those bilingual speakers. Many authors have suggested explanations for why and how this process takes place, and we can distinguish at least three different sides to the problem: first, whether crosslinguistic influence is restricted to certain areas of the grammar, second, why interference happens predominantly in bilinguals and, finally, whether the interference mechanism operates on what speakers hear, or whether it operates on structures/representations (or some combination of both).

The first question (about the locus of interference) has received much attention in the last two decades. One influential school of thought predicts that grammars interact more productively *at an interface* – that is, whenever two linguistic modules are involved (see Serratrice & Sorace 2003; among others). Although under this view all interfaces should be vulnerable, most studies have focused on linguistic aspects that involve syntax and pragmatics (Hulk & Müller 2000; Serratrice & Sorace 2003; Serratrice, Sorace & Paoli 2004; among others). Despite the fact that no clear and conclusive consensus has emerged from the body of research that tested the interface hypothesis, it is still worth exploring which interfaces might be difficult for a bilingual speaker. After all, in order to produce or understand any clause, one must use different modules (syntax, semantics, phonology, pragmatics, etc.), but interference does not always happen. The interface hypothesis relies on the idea that sharing information across two different modules that are *simultaneously* activated is inherently more difficult.

In addition to predicting *where* interference may happen, one would also like to understand *why* it happens between grammars in contact. One possible explanation is the idea that bilingual grammars are activated simultaneously, which has been supported by several studies (Loebell & Bock 2003; Meijer & Fox Tree 2003; Hartsuiker, Pickering & Veltkamp 2004; Hartsuiker & Pickering 2008).

Finally, whether crosslinguistic influence results primarily from superficial input (henceforth superficial crosslinguistic influence) or on structural representations (structural crosslinguistic influence) also remains unclear. For example, Pérez-Leroux, Cuza & Thomas (2011) explored the acquisition of clitic placement in the so-called clitic-climbing contexts among simultaneous and consecutive Spanish-English bilingual children. In a clitic-climbing context, a clitic pronoun can appear in two positions: before

a tensed verb form (*lo quiero hacer* 'I want to do it') or after the non-finite form (*quiero hacerlo* 'I want to do it'). This study showed that monolingual Spanish children have a clear preference for preverbal (proclitic) placement, whereas bilinguals show a significant bias toward post-verbal repositioning, namely enclisis. Notably, only the post-verbal order overlaps with English order. The underlying assumption here is that children are sensitive primarily to superficial word order, since the structural analysis of full DPs and clitics is different (for one, clitics have very strict restrictions regarding their attachment to a verbal projection, and DPs do not).

Müller & Hulk (2001) propose a more explicit relationship between structure and input with respect to crosslinguistic influence. Specifically, they argue that interference is possible when a syntactic construction in language A allows for more than one grammatical analysis and language B contains positive evidence for one of these analyses. For example, Romance languages can have what looks like a null object in two different (but constrained) structures. The first one involves a true null object, generally interpreted as generic and licensed by an operator, and the second one involves a fronted object, as in clitic left-dislocated structures, where a clitic licenses the argumental object. In Germanic languages, on the other hand, null objects are much more common. From the point of view of the child's grammar, the two Romance constructions could be ambiguous, but in contact with German, the null-object analysis is reinforced in Romance. In this sense, the linear input from Germanic, language B in this case, favors one of the existing structures in Romance, language A, but no structural transfer or grammatical convergence happens. Both of these cases are likely to be instances of superficial transfer.

We investigate verb-raising specifically because it can elucidate some of these issues. First, the alternative word orders are not associated with different pragmatic conditions, as is the case of clitic-climbing, so they are not interface-related structures in the relevant sense. Second, because Spanish always raises the verb in the syntax, as seen in (7)a above, if bilingual speakers show acceptance of both word orders (verb-adverb and adverb-verb), this entails that their grammar is, for all relevant purposes, identical to the monolingual grammar; hence, there is no structural interference. The alternative to this conclusion would be that those speakers have two contradictory representations, one for verb-adverb order, with obligatory syntactic verb-raising, consistent with monolingual Spanish, and one for the adverb-verb order, with no verb-raising, consistent with English. Accepting this alternative would lead to issues regarding mental representations of two contradictory grammars, and would also require a strong inhibitory control mechanism. Third, because Spanish and English do not have any common linear order in negative clauses, there can be no direct, superficial crosslinguistic interference in such cases. In sum, our study will shed additional light on whether interference is restricted to the interfaces and the role of superficial input in triggering interference.

3.3 Hypotheses

To recap the syntactic analysis, verb-raising is obligatory in Spanish, followed by deletion at two possible sites, which yields the verb-adverb order and adverb-verb order. No raising is possible in English, yielding adverb-verb order. In negative sentences, only the higher copy can be deleted in Spanish (because negation selects for $+v$ in that language), whereas in English, an auxiliary must be inserted.

If crosslinguistic influence is limited to interfaces, we should not observe any effects in the patterns of bilingual heritage speakers, because verb-raising does not have pragmatic or semantic interface effects.

(12)   Hypotheses
   a)   Bilingual heritage speakers of Spanish will show no direct structural interference with respect to word order (adverb-verb or verb-adverb).
   b)   Bilingual heritage speakers of Spanish may show superficial interference based on the input from English in affirmative sentences.
   c)   Bilingual heritage speakers of Spanish will show no superficial interference from English in negative sentences.

According to hypothesis (12)a, bilingual speakers should accept both word orders in affirmative sentences and only negation-verb-adverb in negative sentences. According to hypothesis (12)b, they may show higher acceptability for adverb-verb in affirmative sentences due to the availability of that order in the English input. According to hypothesis (12)c, there should be no superficial interference in negative sentences, because the English input is not consistent with any order in Spanish.

4 The study

We recruited 34 college-age heritage speakers (HS) of Spanish in New Jersey and 30 monolingual comparison speakers of Spanish from a university in Lima, Peru. The HS group completed two online experimental tasks, and the comparison group completed the same tasks in written, offline format.[3]

   In Task 1, an acceptability judgment task (AJT), participants judged several sentences on a scale of –5 to 5.[4] These included affirmative and negative sentences with the adverbs in (13), presented in the orders in (14), where S stands for subject, Adv stands for adverb, V stands for verb, Neg stands for negation, and O stands for object. In total, we included 60 test items (5 adverbs × 4 orders × 3 tokens each) and 15 fillers. To recap, the orders in (14)a, b and d are possible in Spanish, whereas (14)c is ungrammatical. In English, only the equivalent of (14)a is grammatical, as discussed earlier. In affirmative sentences, the verb cannot raise (so the equivalent of (14)b would be ungrammatical), and in negative sentences, *do*-support is required.

(13)   *Siempre* 'always', *cuidadosamente* 'carefully', *frecuentemente* 'frequently', *perfectamente* 'perfectly', *completamente* 'completely'

(14)   a.   SAdvVO
             Silvia frecuentemente visita la   isla   por trabajo.
             Silvia frequently   visits the island for work
             'Silvia frequently visits the island for work.'

        b.   SVAdvO
             Ana prepara frecuentemente los exámenes durante el día.
             Ana prepares frequently   the exams   during the day
             'Ana frequently prepares the exams during the day.'

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[3] The experimental setting in Lima made it easier to complete the tasks in writing, while the US setting favored the online format. Given the nature of the task, we do not believe this introduces any noticeable differences.

[4] An anonymous reviewer questions whether a scale including negative values can prime a reject response. Moors et al. (2014) note that respondents tend to use the lower categories less frequently when bipolar scales (such as the one used here) are used, compared to agreement scales (where all values are positive). Since we are not making absolute claims derived from the scale's values, this issue should not affect our conclusions.

    c.   SNegAdvVO
       Ana no frecuentemente contesta las respuestas difíciles.
       Ana not frequently   answers the answers   difficult
       'Ana doesn't frequently answer the difficult answers.'

    d.   SNegVAdvO
       Gustavo no come frecuentemente comida típica.
       Gustavo not eats frequently   food   typical
       'Gustavo doesn't frequently eat typical food.'

We presented the test items as a part of an ongoing story that created the relevant linguistic background, and participants were asked whether they would say or whether people they know would say and accept the test item, regardless of whether individual words might be from a different variety, to minimize the chance of lower ratings based on variation in individual lexical words. An initial sentence setting the context was given first (see (15)a), followed by the test item, illustrated in (15)b.

(15)   a.   Ayer   Mariana y   Valeria decidieron hacer una torta de chocolate.
           yesterday Mariana and Valeria decided   make a   cake of chocolate
           'Yesterday Mariana and Valeria decided to make a chocolate cake.'

        b.   **Ellas siempre preparan postres juntas.**
           they always   prepare   deserts together
           'They always prepare deserts together.'

In Task 2, we assessed participants' preferences for different word orders in affirmative and negative sentences. They read examples like (16) and could choose any of the options in (16)a–c. We used the same adverbs as in Task 1, and the answers included the word order variations shown in Table 1. In total, participants saw 10 testing conditions (5 adverbs × 2 polarity (affirmative vs. negative) sentences) and 4 distractors. Each participant could select more than one option in each item. Nine of the original 34 heritage speakers of Spanish dropped out of Task 2 without finishing it.

(16)   Todo el mundo sabe   que los impuestos son muy complicados.
       everyone   knows that the taxes   are very complicated
       'Everyone knows that taxes are very complicated.'

    a. *Obviamente, la gente completamente no rellena los formularios.
       obviously,   the people completely   not fills-out the forms
       'Obviously, people don't completely fill out the forms.'

    b. Obviamente, la gente no rellena completamente los formularios.
       obviously,   the people not fills-out completely   the forms
       'Obviously, people don't completely fill out the forms.'

    c. *Obviamente, la gente no completamente rellena los formularios.
       obviously,   the people not completely   fills-out the forms
       'Obviously, people don't completely fill out the forms.'

Table 1: Word order variations tested.

Affirmative	SAdvVO	SVAdvO	AdvSVO	SVOAdv
Negative	SNegAdvVO	SNegVAdvO	AdvSNegVO	SNegVOAdv

In addition to the two tasks, HS participants filled out a basic language background questionnaire and a proficiency test with 20 questions taken from the bilingual placement test developed at the University of Illinois-Chicago (Potowski, Parada & Morgan-Short 2012). In this test, participants must select one correct answer out of three options (all of which are possible words in Spanish).[5] The average score on the proficiency test was 16.6/20 ($SD = 2.6$).

For the basic language background questionnaire, participants responded to questions about language use at home, first language learned, age of acquisition of Spanish and a self-assessment of their ability to speak, understand, read and write in Spanish. The average self-rating for understanding was 9.29/10 ($SD = 1.1$) and for speaking 8.4/10 ($SD = 1.3$), suggesting that our participants are fluent and proficient heritage speakers of Spanish. In order to confirm this observation, we correlated the oral self-ratings with the proficiency test scores and found a positive correlation between speaking and proficiency ($r = 0.62, p < 0.01$), and understanding and proficiency ($r = 0.41, p < 0.01$).

Finally, we eliminated three participants based on the scores of the proficiency test and the background questionnaire: two of them scored below 12/20 on the proficiency test, and one was not an early bilingual. All others were exposed to Spanish at home from birth, either as the main language in the house, or in conjunction with English. Since these speakers live in the US, one can expect that they will be exposed to English to differing degrees.

5 Results

5.1 Task 1 (AJT)

Results for the first task (AJT) are shown in Table 2 and Figure 1. In this figure, Y in parenthesis next to the order type as in SVAdv(Y) stands for affirmative sentences and N stands for negative sentences. These results indicate that heritage and monolingual participants show a similar acceptability trend (i.e. the direction of the lines in Figure 1 is similar). Additionally, HS participants show a smaller ratings spread than the comparison group (i.e., the line is flatter). In affirmative sentences, Spanish comparison speakers have similar ratings for both orders, whereas heritage speakers prefer SVAdvO. In negative sentences, HS and Spanish comparison speakers have higher ratings for SNegVAdvO over SNegAdvVO. Arguably, monolingual and heritage speakers of Spanish have a very similar grammar.

A repeated-measures ANOVA with a 2 (Word Order: SVAdv vs. SAdvV) × 2 (Polarity: affirmative vs. negative) × 2 (Group: heritage vs. monolingual) factorial design showed statistically significant main effects for Word Order, $F(1, 59) = 63.93, p < .001$, and Polarity, $F(1, 59) = 122.19, p < .001$, and interactions between Word Order and Group, $F(1, 59) = 13.65, p < .001$, Polarity and Group, $F(3, 59) = 27.85, p < .001$, and Word Order × Polarity, $F(1, 59) = 47.50, p < .001$. Overall, the difference in mean ratings for HS speakers ($M = 1.87$) and the comparison group ($M = 1.71$) was not statistically

Table 2: Median ratings from Acceptability Judgment Task (Task 1), scale from −5 to 5.

	SVAdv(Y)	SAdvV(Y)	SVAdv(N)	SAdvV(N)
HS	2.37	2.14	2.05	.93
Comparison group	3.32	2.28	1.94	−.71

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[5] We chose this test over the more commonly used DELE because it was specifically designed for heritage speakers, and because it includes lexicon from a wider variety of dialects.
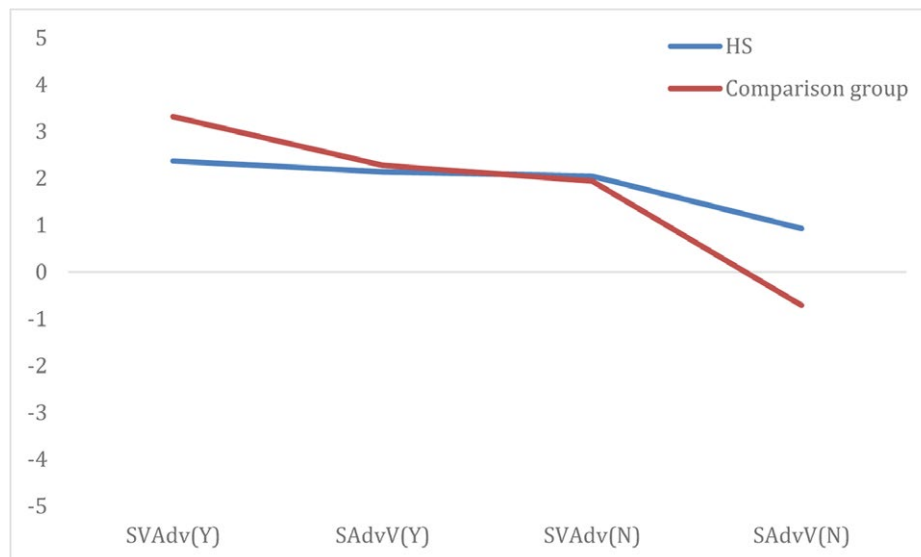
Figure 1: Median ratings for word order and polarity (HS and comparison group).

significant, $F(1, 59) = .376, p = .542$. The interaction between Word Order $\times$ Polarity $\times$ Group was not significant, $F(1, 59) = 47.50, p = .052$, with a Bonferroni adjustment. Because the three-way interaction was very close to statistical significance, we explored pairwise comparisons involving all three variables.

In general, the mean SVAdv ratings did not significantly differ for HS ($M = 2.21$) and the comparison group ($M = 2.63, p = .175$), whereas the mean SAdvV ratings were significantly higher in the heritage speakers group ($M = 1.53$) than in the comparison group ($M = .79, p = .02$). Affirmative sentences were rated significantly lower by HS participants ($M = 2.26$) than by the comparison group across the board ($M = 2.80, p = .004$), whereas negative sentences were rated significantly higher by HS participants ($M = 1.48$) than by the comparison group ($M = .62, p = .011$).

We now turn to pairwise comparisons for the three variables. First, in affirmative sentences, mean SVAdv ratings were statistically significantly lower for HS ($M = 2.37$) than for the comparison group ($M = 3.32, p = .005$, all results are Bonferroni adjusted for multiple comparisons). By contrast, in negative sentences mean SVAdv ratings were not significantly different for each group ($M = 2.05$ for HS and 1.94 for the comparison group, $p = .774$). Second, in affirmative sentences, mean SAdvV ratings were not significantly different ($M = 2.14$ for HS vs. 2.28 the comparison group, $p = .620$), whereas in negative sentences mean SAdvV ratings were significantly higher for HS ($M = .92$) than for the comparison group ($M = -.71, p < .001$). Third, in negative sentences HS rated SVAdv higher ($M = 2.05$) than SAdvV ($M = .93, p < .001$), as did the comparison group ($M = 1.94$ vs. $M = -.71, p < .001$).

In sum, HS speakers differed significantly from the comparison group in SAdvV word order and in polarity. Specifically, in affirmative sentences they rated SVAdv significantly lower than the comparison group, and in negative sentences they rated SAdvV significantly higher. Finally, in negative sentences both groups preferred SVAdv over SAdvV.

5.2 Task 2 (preference task)

Task 2 involved selecting up to three different word order alternatives: SAdvVO, SVAdvO and AdvSVO, both in affirmative and negative sentences. Since the sentence-initial position of the adverb is not assumed to be derived by verb movement, we will disregard those results for this study, and we present results for the first two orders.

Figure 2 presents the means of items that were preferred by group and sentence-type. HS speakers selected verb-adverb word order in negative sentences (SVAdv[N]) and verb-adverb word order in affirmative sentences (SVAdv[Y]) less frequently than the comparison group, but they selected adverb-verb word order in affirmative sentences (AdvV[Y]) and adverb-verb word order in negative sentences (SAdvV[N]) more frequently than the comparison group.

A binomial logistic regression analysis was conducted to assess the effects of three independent variables – Sentence Type, Group and Adverb on the likelihood that a given answer would be preferred or not. Sentence Type had four levels – SVAdv(Y), SAdvV(Y), SVAdv(N) and SAdvV(N), and Adverb had 5 levels – *frecuentemente* 'frequently', *cuidadosamente* 'carefully', *perfectamente*, 'perfectly', *cuidadosamente* 'carefully' and *siempre* 'always'. The logistic regression model was statistically significant, $\chi^2(11) = 197.792$, $p < .001$. The model accounted for 22.3% of the variance in selection (Nagelkerke R^2) and correctly classified 65.5% of cases. Sensitivity was 50.5%, specificity was 78.8%, positive predictive value was 67.9%, and negative predictive value was 64.1%. Group, Sentence Type and Adverb were statistically significant at all levels. SAdvV(N) was the base-line value for Sentence Type and comparison speakers were baseline for Group. The significant effects of the independent variables are summarized in Table 3.

Figure 3 shows the interaction between preferred means and Sentence Type by Group. For affirmative sentences, the change in word order is positive for both groups, although
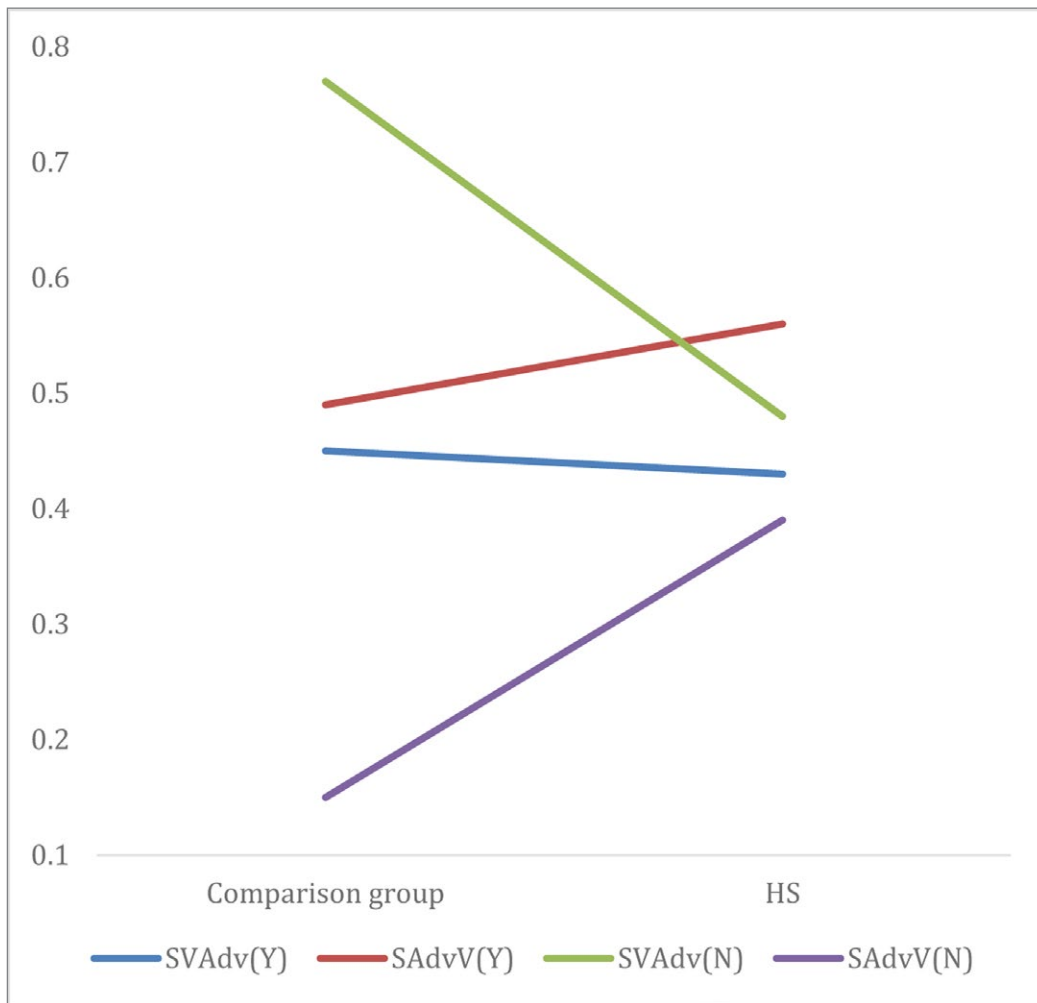

Figure 2: Mean selections by group and sentence type.

Table 3: Effect of Sentence Type, Adverb Type and Group on selection of an answer item.

	B	S.E	Wald	df	Sig.	Odds ratio
Group (HS)	1.404	.306	20.991	1	.000	4.071
Clause-type			104.560	3	.000	
SVAdv(Y)	1.760	.292	36.302	1	.000	5.810
SAdvV(Y)	1.817	.292	38.700	1	.000	6.150
SVAdv(N)	3.197	.313	104.328	1	.000	24.465
Adverb			54.078	4	.000	
Siempre	−1.087	.216	25.345	1	.000	.337
Cuidadosamente	−1.238	.217	32.561	1	.000	.290
Frecuentemente	−1.481	.220	45.522	1	.000	.227
Perfectamente	−1.195	.217	30.416	1	.000	.303
Group * Clause-type			49.708	3	.000	
Group(HS) by SVAdv(Y)	−1.504	.398	14.285	1	.000	.222
Group(HS) by SAdvV(Y)	−1.063	.397	7.156	1	.007	.345
Group(HS) by SVAdv(N)	−2.834	.413	47.140	1	.000	.059
Constant	−.859	.262	10.713	1	.001	.424
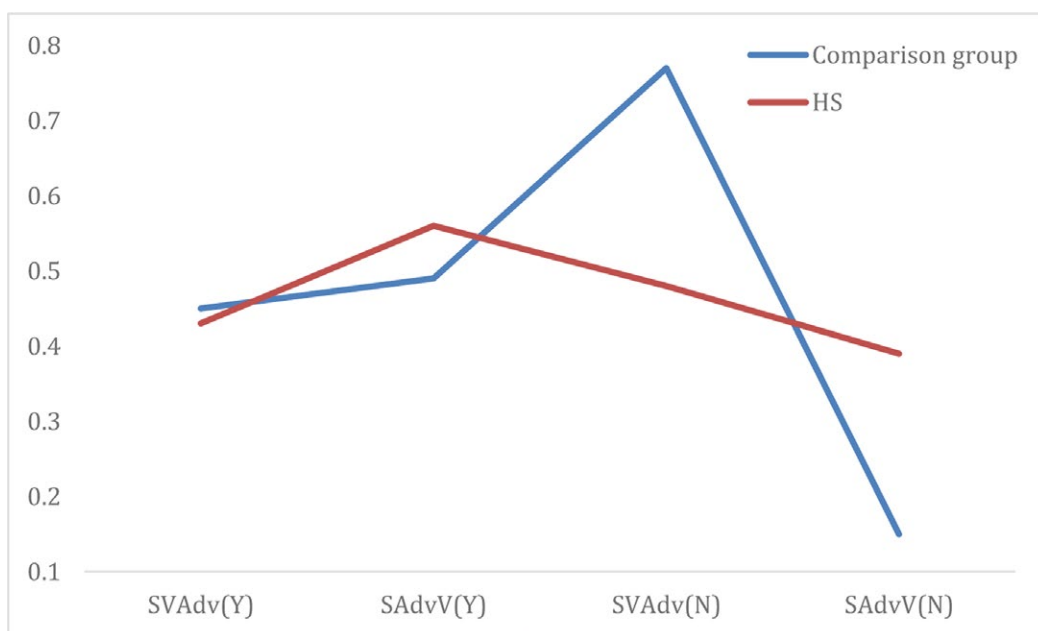
Figure 3: Preferred answers (means) by Sentence Type for both groups.

more pronounced for the HS group. In fact, the interaction between SAdvV(Y) and HS is not statistically significant when compared to the baseline SVAdv(Y). With respect to negative sentences, the slope between SVAdv(N) and SAdvV(N) is also descending, but much more so for the comparison group than for the HS speakers. In fact, the interaction between Group (HS) and SVAdv(N) compared to SAdvV(N) is statistically significant.

These results suggest that the overall patterns are not very different for HS and comparison speakers, as seen in the direction of the slopes in Figure 3. Furthermore, both HS and the comparison speakers selected SAdvV(Y) more frequently than SVAdv(Y), and SVAdv(N) vs. SAdvV(N). HS speakers had a much higher preference for SAdvV(Y) compared to the

comparison group, and the comparison group had a much higher preference for SVAdv(N) compared to the HS group.

6 Discussion and analysis

6.1 General discussion

The hypotheses presented in (12) above are repeated in (17).

(17)   Hypotheses
         a)   Bilingual heritage speakers of Spanish will show no direct structural interference with respect to word order (SAdvV or SVAdv).
         b)   Bilingual heritage speakers of Spanish may show superficial interference based on the input from English in affirmative sentences.
         c)   Bilingual heritage speakers of Spanish will show no superficial interference from English in negative sentences.

Results from this study partially confirm Hypothesis a), because the overall patterns for both groups were not significantly different. The means for SVAdv(Y) did not significantly differ in Task 1, and there was no interaction between Group (HS) and SVAdv(Y) in Task 2, either. In this sense, that part of the grammar (i.e. overt raising and high spell-out) is attested for HS, as it is for comparison speakers. However, SAdvV(Y) had a significantly higher mean for HS speakers than for the comparison group in Task 1, and a higher (although not significant) mean selection in Task 2. This suggests a slightly divergent pattern for HS speakers and comparison speakers for this particular order. Furthermore, this linear order is the only one compatible with English, suggesting possible crosslinguistic influence. These results also confirm Hypothesis b), an issue we will return to below.

Finally, these results are partially consistent with Hypothesis c), because both groups preferred SVAdv(N) over SAdvV(N) in both tasks. However, HS speakers accepted the second alternative more than the comparison group. In Task 1, they rated SAdvV(N) significantly higher than the comparison group, and in Task 2, they selected that option more frequently than the comparison group. Once again, the overall grammatical patterns (as seen in these results) seem very similar, but require some explanation as to why the SAdvV(N) patterns diverge. Furthermore, the situation is more complicated in negative sentences, because SAdvV(N) is not a possible word order in English, therefore direct crosslinguistic influence cannot be assumed in this case.

Note also that HS speakers' response patterns are flatter in both tasks. If we look at Figure 1 and Figure 3, the slope of the lines for HS speakers is less pronounced than for the comparison group, a fact that we will try to explain below.

In sum, we suggest the generalizations in (18):

(18)   a.   HS and comparison speakers have similar trends with respect to word order, both in affirmative and negative contexts.
        b.   HS speakers of Spanish have higher acceptability rates and higher preference rates in the context where Spanish and English linear orders are compatible.
        c.   HS speakers accept SAdvV(N) at higher rates than the comparison group, and this linear order is incompatible with English.
        d.   Overall, HS speakers' response patterns are flatter than those of comparison speakers.

As noted, in affirmative sentences, heritage speakers of Spanish show a relatively higher preference for options that are consistent with the linear orders of both languages in contact (adverb-verb in the affirmative), although the alternative option (verb-adverb) is also possible. Recall that Camacho & Sánchez (2017) propose movement of v in the syntactic component for both orders, as in cf. (19)a. The SVAdv order results from spell-out of the higher v + T copy, as in (19)b, whereas the SAdvV order implies morphologically-triggered lowering of T to adjoin it to the lower v-copy, indicated in (19)c, and spell-out of that lower copy:

(19)   a. $[_T$ V + T $[_{VP}$ adv   V   DP]

       b. $[_T$ V + T $[_{VP}$ adv   V   DP]
            lee   frecuentemente   libros

       c. $[_T$ V̵ + T $[_{VP}$ Adv   V-T DP]
            frecuentemente lee libros

The latter option is computationally more costly than the alternative (high spell-out) option, because it involves T-lowering.

Because HS speakers are bilinguals, we assume that both of their grammars are simultaneously activated, as shown by previous research. For example, Hartsuiker et al. (2004) found syntactic priming effects of Spanish on English. In their study, bilinguals had to describe the contents of a card in English, and the type of clause they used was affected by whether they heard a similar type of clause in Spanish before the description. In particular, the frequency of English passives increased after hearing Spanish passives.

Our results can be interpreted as a way to facilitate processing in a context where two grammars are simultaneously activated: the SAdvV input is consistent with the structural representation of Spanish and English, both of which are activated to some degree. This is not to say that the same linear input is mapped to identical representations, only that the input is consistent with each language's structurally distinct representation.

In this sense, although SAdvV is more computationally costly in the Spanish grammar (as argued earlier), it is also more compatible with the bilingual's activation of the two grammars, hence selected more frequently and judged more acceptable than the alternative (SVAdv). Put in other terms, the relatively higher rating for SAdvV order by HS speakers reflects the optimal computational solution to the analysis of the input, because that order is consistent with two distinct structural representations (no v-raising in English and v-raising + low-copy spell-out in Spanish). In this connection, we are not arguing for syntactic transfer (or transfer of values of functional features), but rather only for an increased preference for an option that is still compatible with monolingual Spanish grammar (SAdvV).[6]

In negative sentences, things become more complicated, because neither of the linear input options is compatible with the English grammar. As we have already mentioned, this language requires *do*-support and the available alternatives in Spanish do not have it:

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[6] This conclusion should be taken tentatively, because we do not know whether bilinguals of different types of proficiency and/or onset of bilingualism pattern similarly. In particular, it is possible that more balanced bilinguals could show patterns closer to monolingual Spanish. In other words, the issue of how processing demands interact with reaction patterns is more complex than what we can address in this paper (thanks to Liliana Sánchez and Tania Leal, p.c. for independently pointing this out).

(20)   a.   John doesn't frequently read books.

     b.   *John doesn't read frequently books.

     c.   *Juana no frecuentemente lee   libros.
          Juana not frequently   reads books
          ('Juana doesn't frequently read books.')

     d.   Juana no lee   frecuentemente libros.
          Juana not reads frequently   books
          'Juana doesn't frequently read books.'

Although we did not include an option that could be analyzed as having *do* support (**Juana hace no frecuentemente leer libros* 'Juana does not frequently read books'), our strong intuition is that it would be highly dispreferred, because it would involve transfer of a full functional word (but see González-Vilbazo & López 2012 for cases where code-switching involves an auxiliary *hacer* in Spanish).

In negative sentences, HS speakers show the same pattern as monolingual Spanish participants (preference for SVAdv[N] over SAdvV[N]), although the first option is rated lower in comparison to monolingual speakers, and is also selected less frequently. Furthermore, HS speakers rated the second option (SAdvV[N]) higher and selected it more often than the comparison group. As we said, neither option (SAdvV[N] or SVAdv[N]) is consistent with English (**she not eats frequently apples*, **she not frequently eats apples*).

Recall that negation involves different selectional restrictions in English (+V) and in Spanish (–T) in Camacho & Sánchez' (2017) analysis. Furthermore, English requires the auxiliary *do*, as seen in Table 4.

We propose that the different patterns that HS speakers show in negative sentences relate to the (lexical) selection properties associated with negation. Following the idea that functional features drive much of language variation (in line with Borer 1984 and Chomsky 2001), we suggest that Neg can oscillate between selecting for –T and +V in the HS grammar. When its setting is +V (the monolingual Spanish setting), the order is NegVAdv, because negation must be adjacent to the verb. On the other hand, when the setting is –T (the English pattern setting), negation need not be adjacent to V and the order is NegAdvV. Like before, both orders involve overt V-to-T raising, with different spell-out options. Additionally, the order NegVAdv is less costly because it does not involve T-lowering. In essence, a HS speaker would differ from a monolingual Spanish speaker in having a variable selectional setting for negation: +V or –T.[7] In this particular instance, having two settings for a functional category mitigates the computational cost of having two simultaneously activated grammars. If this account is right, we expect HS negation

Table 4: Negative sentences.

	Monolingual Spanish	English	HS
Verb-raising	✓	✗	✓
Neg selection	+V	–T	?
Do-insertion	✗	✓	✗

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[7] This idea can be interpreted in two ways: either some speakers have +V and others –T, and our results are simply the consequence of averaging those two sets of speakers out, or individual speakers can oscillate between +V and –T. We leave this issue open for future research.

to appear in a wider set of contexts than it would in monolingual Spanish, for example as a negative quantifier (**no clases fueron suspendidas*), although we don't have specific evidence for this one way or another. In this sense, Albirini & Benmamoun (2015) analyze two types of negation (continuous and discontinuous) in heritage Egyptian Arabic, and note that speakers diverge with respect to discontinuous forms compared to monolingual controls. Their account suggests that this asymmetry is due to the different lexical and selectional properties of each type of negation.

Turning now to the issue of HS speakers' flattened responses, we would like to propose an explanation based on the analysis we have just developed. Our proposal is that heritage speakers have either two different structural analyses for the same input (in the affirmative sentences) or two different lexical specifications for negation. These processing and lexical ambiguities allow bilingual speakers to accept a wider range of possibilities than monolingual speakers, as we have shown, but they also make their judgments less certain. Both orders NegAdvV and NegVAdv are possible in the HS's grammar because Neg is ambiguously specified (+v or –t), but this very fact makes the speaker's reaction to such a stimulus less categorical. If an acceptability judgment involves deciding whether a given construction can be generated by a certain grammar, the fact that the bilingual speaker maximizes different forms of compatibility with her two grammars also makes her less certain about whether any given stimulus can be generated by one of those two grammars.

In sum, we propose that v-raising in HS speakers is subject to three potentially conflicting constraints:

(21)   a.   A preference for higher spell-out whenever syntactic movement takes place (due to the higher cost of lower spell-out based on the need to lower t to v).

           b.   A preference for linear inputs compatible with the structural representations from each language (driven by bilingual cross-language activation).

           c.   The indeterminacy of the lexical feature specification of negation.

As a result, HS speakers have a preference for SVAdv and SNegVAdv, which is consistent with monolingual Spanish and with constraint (21)a, but also a tendency to accept SAdvV orders, which is consistent with the English and Spanish grammars and with constraint (21)b above. In negation sentences, both (21)a and b account for HS speakers' preference for SNegVAdv, which is consistent with monolinguals' preferences, but also for a higher preference for SNegAdvV, compared to monolingual Spanish speakers.

6.2 Implications of this study for theories of transfer

The results of this study (and our interpretation of those results) have interesting implications for transfer. We have suggested that heritage Spanish may have an ambiguous lexical specification for NEG (+v selection or –t selection), with one of the settings transferred from English. This suggests transfer and variability of lexical specifications of functional categories. If the interpretation of the results is correct, then the logical conclusion will be that shifting individual features or feature values of a functional item is possible or easier, but changing full functional categories is not. This conclusion is consistent with Lohndal & Westergaard (2016). This study of heritage Norwegian spoken in the US found that gender on indefinite articles is more vulnerable than on the noun, because indefinite articles are independent words, whereas gender on nouns is an affix.

It is a longstanding observation that functional categories are robust and not easily changed across time: new determiners, new prepositions and new complementizers do not

frequently enter into the grammar; new auxiliaries tend to involve modality or aspect, but not frequently tense. On the other hand, it is not unusual for a given determiner to acquire (or lose) semantic content.

A second conclusion from this study is that there may be less direct forms of transfer connected with the very nature of being bilingual. An important part of being bilingual consists of managing two active parallel grammars, activating certain features and inhibiting others. This cognitive activity shapes the bilingual linguistic space in ways fundamentally different from that of a monolingual speaker.

6.3 A note on individual adverbs

Although the general picture presented above holds well, different adverbs display different patterns. Most notably, *no siempre* 'not always' has higher acceptability rates than other Neg + Adv combinations, both in heritage speakers and monolingual speakers. We believe that this is due to the peculiarities of *siempre* 'always', in the sense that negation can take scope over this adverb but not others (unless contrastively). The data for individual adverbs from Task 1 is presented in Table 5 and in Figures 4 (affirmative sentences) and Figure 5 (negative sentences).

In Figures 4 and 5, each set of columns represents a word order for each group. In affirmative sentences, we see once again roughly similar patterns across groups, so that, for example, both HS and monolingual Spanish speakers rate *siempre* 'always' slightly higher than the other adverbs in SAdvV order (first two groups of columns in Figure 4). *Completamente* 'completely', on the other hand, is rated negatively by HS speakers, and slightly positively by the comparison group.

In negative sentences, on the other hand, the patterns differ more clearly. First, comparison speakers rate *siempre* 'always' very differently from all other adverbs, but not the HS speakers. Second, patterns across groups are very similar in SVAdv(N) order.

7 Conclusions

Our study of verb-adverb order aimed to contribute to the growing literature on the syntactic properties of bilingual grammars, particularly when the grammars of the two languages in contact do not overlap. Our findings suggest that heritage speakers react to stimuli in similar ways as monolingual comparison speakers do, but with several subtle but important differences. First, in affirmative sentences, they show a slightly higher preference for the options that show linear orders consistent with both the Spanish and the English grammars. Second, in negative sentences, the heritage speakers show a pattern consistent with monolingual speakers, but they also accept items with orders that are not

Table 5: Acceptability judgments (−5 to 5) for HS and comparison speakers by adverb, order and polarity.

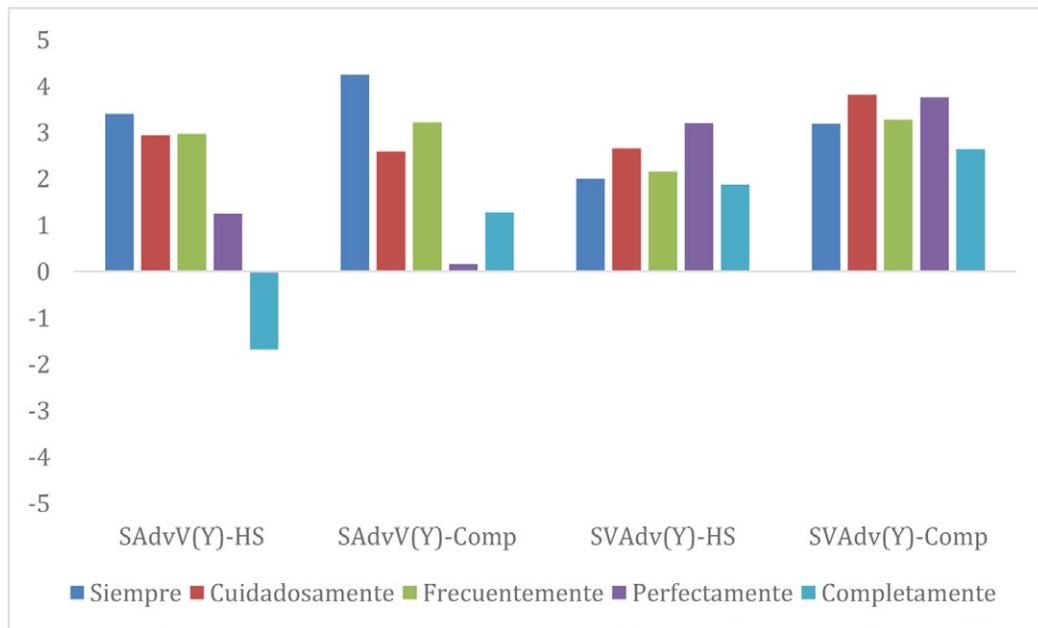|	*Siempre*	*Cuidadosamente*	*Frecuentemente*	*Perfectamente*	*Completamente*
SAdvV(Y)-HS	3.40	2.94	2.97	1.24	−1.68
SAdvV(Y)-Comp	4.24	2.59	3.21	0.16	1.27
SVAdv(Y)-HS	2.00	2.65	2.15	3.20	1.87
SVAdv(Y)-Comp	3.18	3.81	3.27	3.76	2.64
SAdvV(N)-HS	1.19	−0.89	1.13	0.26	0.98
SAdvV(N)-Comp	2.44	−2.47	−0.92	−2.10	−2.01
SVAdv(N)-HS	1.55	2.08	2.26	2.29	2.38
SVAdv(N)-Comp	1.64	2.60	2.07	1.99	2.01

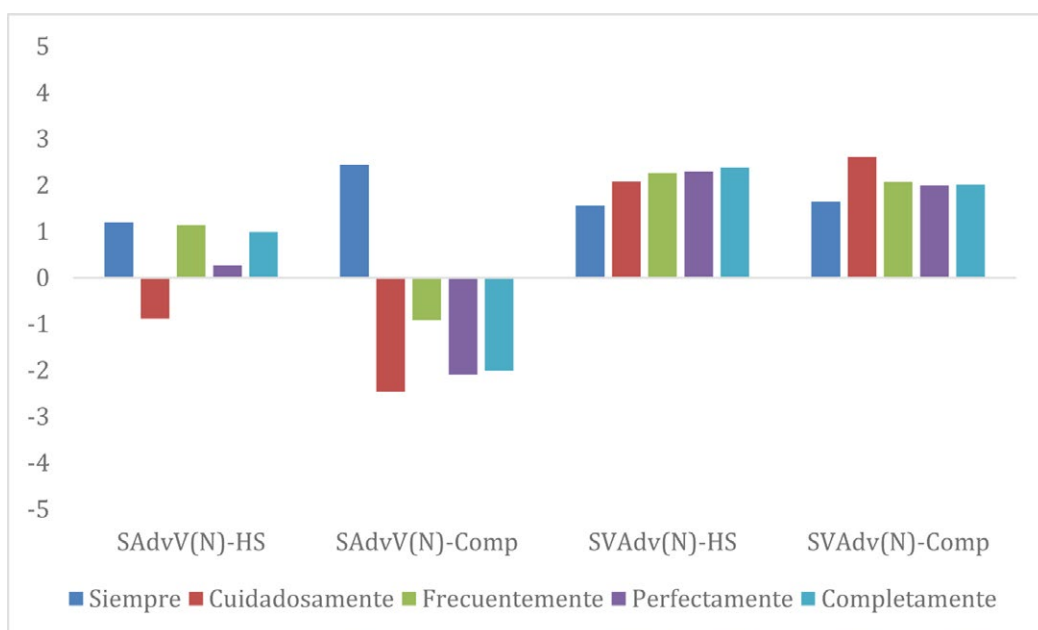**Figure 4:** Individual adverb acceptability by order and group (affirmative).

Figure 5: Individual adverb acceptability by order and group (negative).

directly consistent with either monolingual grammar. Third, their reaction to stimuli is less sharp than the comparison group's reactions. Our account relies on three ideas: to begin with, HS speakers maximize bilingual compatibility, that is, they prefer options that are compatible with the structure available in each of the languages. This follows from the fact that both languages are activated in parallel, so compatible stimulus facilitates processing. Second, we suggest that the results in negation sentences can be explained if the selectional features of negation are transferred, allowing for two alternative analyses. This, in turn, implies that feature values of functional categories may be transferred or remapped. Finally, we have suggested that transfer can be indirect in the form of less categorical ratings or patterns. We have argued that this effect may also follow from being

bilingual: by maximizing compatibility with both languages, speakers extend the range of grammatical options in the language, but at the same time, their judgments become less certain because the space of grammatical constructions is larger.

Abbreviations

Adv = adverb, AJT = acceptability judgement task, Comp = comparison group, DP = determiner phrase, HS = heritage speaker, L1 = first language, L2 = second language, N = negative clause, Neg = negation, O = object, S = subject, SAdvV(N)/SNegAdvVO = subject-negation-adverb-verb-object order, SAdvV(Y)/SAdvVO = affirmative subject-adverb-verb-object order, SVAdvO/SVAdv(Y) = affirmative subject-verb-adverb-object order, SVAdv(N)/SNegVAdvO = subject-negation-verb-adverb-object order, T = tense, V = verb, VP = verb phrase, Y = affirmative clause.

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Competing Interests

The authors have no competing interests to declare.

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