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Abstract

This study examines the potential effects of crosslinguistic influence in the acquisition of subject–verb inversion in Spanish matrix and embedded *wh*-questions among Spanish heritage language learners living in the United States. The results from an acceptability judgment task and a written production task administered to 17 US-born heritage speakers indicate crosslinguistic influence effects. The effects are more evident with embedded interrogatives than with matrix questions. A follow-up study with the heritage speakers also shows less inversion behavior with embedded questions in oral production but higher performance levels than in written production. The findings are discussed in relation to interface vulnerability approaches and current debates on the selective nature of crosslinguistic influence in L2 and bilingual development.

Keywords

crosslinguistic influence, interface hypothesis, Spanish heritage speakers, subject–verb inversion

Introduction

Previous research in second (L2) and bilingual language acquisition has long debated whether crosslinguistic influence might be selective. Some early research from the 1980s and 1990s observed that the lexicon and morphology (i.e. subject–verb agreement and gender) were highly vulnerable to transfer effects, while syntactic domains were less problematic (e.g. Håkansson, 1995; Lambert & Freed, 1982). More recently, Sorace et al. have reexamined this issue from a generative grammar framework (e.g. Sorace, 2000, 2004, 2005). They suggest that linguistic properties in which the syntax interfaces with external domains, such as pragmatics (syntax–discourse interface and external interfaces), are inherently more complex and, therefore, more permeable to emerging optionality (divergence from target first language (L1) forms) among immigrants undergoing L1 attrition and to residual optionality (divergence from target L2 forms) among near-native L2 learners.¹ In contrast, purely syntactic features or syntax–semantic interface structures are hypothesized to be resistant to L2 influence. This is known as the *Interface*

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Hypothesis (e.g. Serratrice, Sorace, & Paoli, 2004; Sorace, 2005; Tsimpli & Sorace, 2006; Tsimpli, Sorace, Heycock, & Filiaci, 2004).

The syntax–discourse interface encompasses structures that require the integration of both syntactic and discourse-pragmatic knowledge, such as the production and distribution of subject pronouns in Spanish and Italian. It integrates interpretative components associated with the logical-form (LF) level of syntactic representations (discourse-pragmatic knowledge) with core syntactic operations in the computational system (Argyri & Sorace, 2007, p. 79). The general argument is that areas where different grammatical modules interact are more difficult to acquire since this is where crosslinguistic influence is more likely to occur. The syntax proper (i.e. syntactic properties of subjects in Spanish) may be well established but pragmatic/discourse requirements (when to use an overt subject in Spanish) will show persistent problems. This proposal has been recently extended to instances of incomplete acquisition among heritage language learners in the United States. It is hypothesized that incomplete acquisition at interfaces might be more pronounced (e.g. Montrul, 2009). Incomplete acquisition refers to the interruption of native language development in early childhood due to reduced input and intense exposure with a dominant language (e.g. Montrul, 2004, 2008). Heritage language learners are second- or third-generation immigrants who were raised in a home environment where a heritage language was spoken in addition to the majority language (e.g. Montrul, 2004; Potowski, Jegerski, & Morgan-Short, 2009; Silva-Corvalán, 1994). In most cases, they acquire productive and receptive skills in the heritage language at home but do not receive formal instruction until later in life in high school or university.

The objective of this study is to examine the interface hypothesis further and specifically its claim that the syntax proper is spared from crosslinguistic influence and consequent variability. I draw on previous research in L2 and child bilingual acquisition to present and discuss new data on the acceptability and production (written and oral) of subject–verb inversion in matrix and embedded *wh*-questions in Spanish. Interrogative subject–verb inversion is obligatory in non-Caribbean Spanish. In both matrix and embedded argument *wh*-questions, the main verb must always appear before the subject, as represented in (1a) and (1b) below:

(1)a. ¿Qué compró María? (matrix *wh*-question)

what bought María

What did Mary buy?

b. Me pregunto qué compró María (embedded *wh*-question)

me wonder what bought María

I wonder what Mary bought

This grammatical area is a good testing ground on which to examine the supposedly unproblematic nature of narrow syntax because it is a syntactic phenomenon not driven by pragmatic/discourse factors (for similar argument for subject–verb inversion in Greek *wh*-questions, see Argyri & Sorace, 2007). The study therefore examines (a) the extent to which heritage language learners have difficulty with subject–verb inversion in both types of *wh*-questions; and if so (2) whether these difficulties can be accounted for in terms of crosslinguistic influence (e.g. Jarvis & Pavlenko, 2008; Pérez-Leroux, Cuza, & Thomas, in press). If narrow syntactic properties are unproblematic,

as proposed by interface vulnerability accounts, heritage language learners are predicted not to show difficulties with subject–verb inversion in Spanish. Since this syntactic operation has little pragmatic or discourse implications, it should be resistant to crosslinguistic influence and potential variability. Target acquisition and maintenance would be expected. However, English-dominant heritage speakers of Spanish may also show difficulties with interrogative inversion in Spanish due to crosslinguistic influence of different options in English (no inversion) and reduced access to relevant input in the Spanish-developing grammar.

It could be assumed that subject–verb inversion in *wh*-questions is intrinsically discourse linked because the complementizer system expresses *force* distinguishing declaratives from interrogatives, and as such, it determines the discourse properties of the sentence (e.g. Rizzi, 1999). However, this does not mean that subject–verb inversion in Spanish interrogatives is licensed by discourse factors in the same sense of what seems to be operational in Sorace's line of research (e.g. purely discourse-oriented phenomena like distribution of overt subjects in Italian). Although the complementizer system expresses force in distinguishing clause types, lexical verb movement in Spanish *wh*-questions is fully syntactic as opposed to interface driven. This is a syntactically motivated phenomenon, although with natural discourse motivations (e.g. getting more information on a topic, showing interest in a conversation, and indicating doubt or uncertainty).

The study is structured as follows: Section 'The issue of transfer selectivity' examines previous research regarding the role of transfer among bilingual speakers. Section 'Subject–verb inversion in Spanish interrogatives' presents the syntactic framework adopted in this study, learnability implications, research questions, and the hypotheses of this study. Section 'Study 1' presents study 1, followed by the results and discussion. Section 'Study 2' presents and discusses the results of study 2, a follow-up study testing the oral production of subject–verb inversion among the heritage speakers.

The issue of transfer selectivity

Some previous research

The role of crosslinguistic influence and language interaction in bilingual development is an area of research that has sparked a great deal of interest among researchers over the last five decades. Since the seminal work of Weinreich (1953), researchers in the fields of L2 acquisition (e.g. Coppieters, 1987; Gass & Selinker, 1992; Jarvis & Pavlenko, 2008; Liceras, 1989; Montrul & Slabakova, 2003; Schwartz & Sprouse, 1996) and L1 attrition/incomplete acquisition (e.g. Köpke, 2004; Montrul, 2002, 2004, 2009; Pavlenko, 2000; Rothman, 2009b; Schmid, 2002; Silva-Corvalán, 1994) have been interested not only in examining what gets transferred but also, more importantly, in how the process works. Specifically, researchers have investigated the role of conflating variables in the extent of transfer including the typological complexity of the two languages (e.g. Müller & Hulk, 2001; Sánchez, 2003; Yip & Matthews, 2009), the role of age of onset of bilingualism (e.g. Bylund, 2009; Montrul, 2008; White & Genesee, 1996), and the effect of language dominance in the directionality and frequency of transferred elements (e.g. Kim, Montrul, & Yoon, 2010; Liceras & Díaz, 1998).

With respect to structural complexity, early research documented differences in the permeability of some areas but not others, a discussion that has stirred a great deal of controversy to this day (e.g. Andersen, 1982; Håkansson, 1995). For example, Andersen (1982) suggested, based on personal observation of the language development of his children and other subjects, that quick retrieval of lexical items and idiomatic phrasing in ongoing speech production is much more

affected by transfer than morphosyntactic or phonological features. Moreover, he argues that complex areas of the grammar or “weak points” that took much longer to acquire should be the hardest to maintain and consequently lost first. The selective nature of transfer and the extent to which different linguistic subsystems are affected was also examined by Håkansson (1995). The author investigated whether some areas of the grammar, such as syntax and morphology, are more affected by crosslinguistic influence than other areas. The results from composition tests administered to five bilingual Swedish expatriates showed severe difficulties in their written production of noun phrase morphology (noun–adjective agreement) in Swedish. However, the participants showed no difficulty with V2 word order.

In more recent research, Sorace et al. have brought back the discussion of transfer selectivity to the forefront of current language acquisition and bilingualism research (e.g. Serratrice et al., 2004; Sorace, 2000, 2004, 2005; Sorace & Filiaci, 2006; Tsimpli & Sorace, 2006). In contrast with earlier studies, Sorace frames the discussion from a generative grammar perspective in the form of the *Interface Hypothesis*. As mentioned earlier, the argument is that areas of the grammar where the syntax interfaces with pragmatic factors (syntax–pragmatics interface) are more difficult to acquire and easier to lose. However, the syntax proper is acquired easily and remains unproblematic. In a study examining the distribution of overt subject pronouns in Italian, Sorace (2000) found that Italian near-native speakers of English and English-speaking learners of Italian overgeneralize Italian overt pronouns in contexts where the null option is normally preferred by monolingual speakers. Moreover, the author found that both bilingual groups optionally produce preverbal subjects in focus contexts, where monolingual speakers prefer the postverbal option. However, Sorace found no difficulty with the null-subject status of the Italian grammar. Only the distribution of overt pronominal subjects, a syntax–discourse interface condition, showed difficulties. The author concludes that “L1 attrition, like L2 residual optionality, seems to be restricted to the interface between syntax and discourse/pragmatics constraints; it does not seem to affect the computational system itself” (p. 724). Within this view, complex grammatical structures requiring the integration of syntax and discourse factors might be affected by transfer while the syntax proper should remain stable.

The validity of the interface hypothesis was examined in Argyri and Sorace’s (2007) study with Greek–English bilingual children. The authors tested the knowledge of both syntax–pragmatic interface structures (distribution of subject pronouns) and narrow syntactic structures (subject–verb inversion in *what*-embedded questions, clitic placement) in Greek by English–Greek bilingual children. In contrast to what was expected, English-dominant bilingual children showed transfer effects from English in their acceptability and production of preverbal subjects in Greek *what*-embedded questions. Argyri and Sorace argue that these difficulties with narrow syntactic properties stem from processing difficulties rather than representation deficits and the amount of L2 input received. In more recent work, Wilson, Sorace, and Keller (2008) argue that processing difficulty at the interface is more involved not due to representational issues but due to differences in the allocation of attention resources. Competing constraints in the L1 and the L2 may cause L2 learners to allocate processing resources differently than monolingual native speakers.

In the case of incomplete acquisition, Montrul (2004) examined the variable distribution of overt subject pronouns as well as direct and indirect object pronouns among Spanish heritage language learners in the United States. Following Sorace’s framework, Montrul analyzed the properties regulated by syntactic and pragmatic factors, such as the pragmatic distribution of null and overt subjects, as well as the use of the preposition *a* with animate direct objects and semantically based clitic doubling. Montrul found no difficulties regarding the syntax of subjects and objects. However, she did find difficulties and convergence patterns to English in the discourse–pragmatic

distribution of objects and in the pragmatic Topic and Focus features that regulate overt and null subjects. There was an overproduction of overt subject pronouns by intermediate heritage speakers, in contrast with monolinguals and advanced heritage speakers who preferred the null option. Montrul (2004) concluded that her results “further confirm that while syntactic features of subjects and objects remain intact, the grammars of lower proficiency heritage speakers show erosion or incomplete knowledge of both pragmatic and semantic features of subjects and objects...” (p. 127).

Sorace’s proposal is not without its skeptics. Many researchers question the universality of an interface vulnerability account (e.g. Bohnacker, 2007; Ionin & Montrul, 2010; Ivanov, 2009; Pérez-Leroux et al., in press; Rothman, 2009a; Slabakova & Ivanov, in press). For instance, Bohnacker (2007) examined whether syntactic structures in lower structural projections (e.g. VP) were in fact unproblematic and thus acquired earlier when compared to higher functional projections (e.g. CP), which are arguably more vulnerable and difficult to acquire (e.g. Platzack, 2001). The author tested the adult L2 acquisition of German and Swedish V2 constraints, VP headedness, and verb-particle constructions. In contrast with Platzack’s (2001) proposal, the author found that Swedish-speaking L2 learners of German and German-speaking L2 learners of Swedish acquired V2 constraints from very early on. However, they failed to reach native-like attainment of syntactic properties, such as transitive verb-particle constructions in Swedish and nonfinite verb and object/complement placement (OV) in German, which according to Platzack are nonproblematic or invulnerable domains (lower structural level). Bohnacker concludes that syntactic structures at lower structural levels are also difficult to acquire and that upper level constructions are not deterministically vulnerable or problematic.

Similar results against the interface hypothesis were found by Rothman (2009a). The author investigated the acquisition of the distributional properties of null versus overt subject pronouns in Spanish among intermediate and advanced English-speaking learners. The results showed difficulties among the intermediate learners in the two interpretation tasks and in the translation task but target performance among the advanced learners. Rothman proposes that in contrast with interface vulnerability approaches, syntax-pragmatic interface phenomena are not inevitably predetermined to fossilization. Another study testing the universality of interface vulnerability accounts is the study by Pérez-Leroux et al. (in press). The authors examined the extent to which the syntax proper is spared from transfer effects among 23 Spanish-English bilingual children. Specifically, Pérez-Leroux et al. investigated the effects of syntactic transfer in clitic placement reconstruction contexts (clitic climbing), an optional word order not associated with pragmatic or discourse factors. An elicited imitation task showed a significant bias toward forward repositioning (enclisis), in contrast with the established monolingual norm favoring a preverbal position (proclisis). Couched within current minimalist assumptions, the authors argue that transfer is not limited to syntax-pragmatic interface structures.

In a more recent study with Spanish heritage speakers in the United States, Montrul and Ionin (2010) examined the distribution of definite articles in Spanish and English. In Spanish, definite plural nouns allow for a generic or specific interpretation according to the pragmatic context. In English, definite plural nouns are specific. Moreover, definite articles in Spanish are used in inalienable contexts as in *María levantó la mano* (“Mary raised her hand”). Data from an acceptability judgment task (AJT), a truth value judgment task, and a picture-sentence task showed transfer effects from English into Spanish in the interpretation of definite articles with a generic interpretation but no difficulties with the distribution of definite articles in inalienable possession contexts. The authors concluded, against interface vulnerability approaches, that syntax-semantic interface phenomena are also affected by transfer in heritage language development.

In sum, an interface vulnerability approach to crosslinguistic influence argues for difficulties affecting primarily syntax–pragmatics interface structures and not core syntax. This is arguably due to the complexity of interface-related structures and processing factors. However, the claim that difficulties are restricted to the syntax–discourse interface is not clear, and current research in L2 acquisition and bilingual development has indicated otherwise. To investigate this issue further, this study tests the knowledge of subject–verb inversion in Spanish, a syntactic operation not driven by pragmatic constraints, among US-born Spanish heritage speakers. The following section presents the syntactic description adopted in this study. This is followed by the learnability implications, the research questions of the study and the hypotheses.

Subject–verb inversion in Spanish interrogatives

The syntax of inversion in Spanish and English wh-questions

Subject–verb inversion in argument *wh*-questions has a different syntactic behavior in English and Spanish (e.g. Baauw, 1998; Pesetsky & Torrego, 2001; Rizzi, 1996; Zagona, 2002). In Spanish, the lexical verb always moves above the subject (COMP position). This is applicable to both matrix and embedded questions. In English, in contrast, the lexical verb remains in situ. For matrix questions, the auxiliary raises to COMP position, and there is no raising in embedded questions. Table 1 summarizes these differences.

As shown in Table 1, in both English and Spanish matrix questions, there is raising, the auxiliary *do* in English and the lexical verb in Spanish (the C position is filled by a finite element). With embedded questions though, Spanish and English diverge. The Spanish word order (... WH + V + S) is ungrammatical in English. This is the crucial distinction that I examine in this study.

I follow Rizzi's (1996) T°-to-C° movement proposal that crosslinguistic differences regarding subject–verb inversion in interrogatives depend on the strength of an interrogative feature ([+wh/Q]) in C° (the head of the complementizer phrase). This feature may trigger verb movement in the overt syntax (e.g. Adger, 2001; Chomsky, 1995; Radford, 1997; Rizzi, 1996).² In Spanish, the *wh*-word moves as an operator to the [Spec, CP] position (sentence initial position) and the finite verb raises first to the head of the inflectional phrase [T°] and then subsequently raises to C° (the position right after the *wh*-word) to check its strong *wh*-feature [+wh/Q feature]. The subject remains in situ at [Spec, TP], yielding the [WH-(Aux)-V-Subject] word order (e.g. Ayoun, 2005; Rizzi, 1996; Torrego, 1984; Zagona, 2002). This is applicable to both matrix and embedded questions. In English, there is also *wh*-movement to [Spec, CP] in matrix and embedded questions. However, in contrast with Spanish, the lexical verb remains in situ and only the auxiliary verb

Table 1. English and Spanish matrix and embedded *wh*-questions

<i>Wh</i> -question type	Grammatical	Ungrammatical
Matrix <i>wh</i> -question		
Spanish	¿Qué compró Juan?	*¿Qué Juan compró?
English	What did John buy?	*What John bought?
Embedded <i>wh</i> -question		
Spanish	Me pregunto qué compró Juan.	*Me pregunto qué Juan compró.
English	I wonder what John bought.	*I wonder what bought John.

moves up in matrix questions. In this case, there is auxiliary inversion in the form of *do* support or dummy *do*. The finite auxiliary *do* generates in T° (head INFL position within TP), checks its Spec features and then moves to C° position (head of CP). In embedded questions, there is no verb raising from T° to C° (auxiliary or lexical verb) since [Q] is weak, and therefore, no movement is required or triggered (2b) (e.g. Adger, 2001; Radford, 1997).³

To summarize, Spanish and English show different syntactic options in terms of subject–verb placement in *wh*-questions. In Spanish, all argument *wh*-questions (matrix and embedded) present an obligatory subject–verb inversion. The lexical verb must raise from T° to C°. The C° position is always filled by an element moved from T°. In English, subject–lexical verb inversion is not allowed. The finite verb always remains in situ and subject–auxiliary verb inversion (*do*-support) is required with matrix questions but not with embedded questions. In English-embedded questions, the C° position remains empty. Given these syntactic differences, I would expect English-dominant heritage speakers of Spanish to show more difficulty with the acquisition of subject–verb inversion with embedded questions due to structural crosslinguistic influence from English.

Learnability considerations

The L1 acquisition of subject–verb inversion in Spanish interrogatives is unproblematic. Spanish monolingual children develop subject–verb inversion simultaneously with the appearance of *wh*-questions during an early age (e.g. Grinstead & Elizondo, 2001; Pérez-Leroux, 1993; Pérez-Leroux & Dalouis, 1998). For Spanish heritage language learners, the acquisition task is more challenging. Prescriptively, heritage language learners have to learn that in Spanish, the main verb must appear immediately after the *wh*-word in both matrix and embedded *wh*-questions. This syntactic operation is not operative in English, and therefore, there is a potential transfer from English into Spanish, crucially with embedded questions. Moreover, heritage speakers may be exposed to reduced input of these structures leading to the nonspecification of L2 options.

Mandell (1998) examined the L2 acquisition of this syntactic property as part of the *Verb Movement Parameter* (e.g. Pollock, 1989) among English-speaking learners of Spanish at different levels of language development. The results from a timed grammaticality judgment task and a timed dehydrated sentence task (DST) showed a gradual parameter-resetting pattern among the L2 learners. In a DST, the participant is presented with scrambled constituents separated by slashes and asked to combine them to form a logical sentence. The results showed obligatory inversion with *wh*-phrase fronting, optional inversion with *yes/no* questions, and optional adverbial placement between lexical verbs and object determiner phases (DPs). The author, however, did not test the acceptability or production of inverted (grammatical) *wh*-questions or inversion with embedded questions. Similar results were found by Bruhn de Garavito (2001) while examining the acquisition of verb raising among early and late Spanish–English bilinguals. The results from a preference task showed no inversion problems with matrix questions among early and late bilinguals. The author did not test the knowledge of inversion with embedded questions, as in the case of Mandell's study, which has been shown to be more derivationally complex and thus more difficult to acquire (e.g. Jakubowicz & Strik, 2008).

Research questions and hypotheses

Assuming current proposals on the role of crosslinguistic influence which spares narrow syntax and previous research, the empirical question that I pose is whether Spanish heritage learners born

in the United States have difficulty with subject–verb placement in Spanish interrogatives. The fundamental research questions underlying the study are as follows:

1. In contrast with interface vulnerability accounts, is subject–verb inversion in Spanish interrogatives vulnerable to crosslinguistic influence and acquisition difficulties among Spanish heritage language learners?
2. If so, will the difficulties occur across the board or will one type of *wh*-question show more difficulty than the other? For example, will matrix questions be easier to acquire than embedded questions?
3. Can the potential difficulties, if any, be accounted for in terms of crosslinguistic influence from English?

If the Interface Hypothesis is correct and syntactic properties are not affected by crosslinguistic influence, Spanish heritage speakers should not have significant difficulties with subject–verb inversion. This syntactic operation should remain stable regardless of the presence of different parametric options in the L2 (English). However, it is also possible that subject–verb inversion is vulnerable to optional word order in a dominant L2 scenario. Crosslinguistic interference from English and restricted Spanish input and use may reinforce a *wh* + *subject* + *verb* word order bias in Spanish interrogatives. Moreover, if difficulties are found, I expect them to be more localized with embedded questions than with matrix questions. It is precisely in embedded questions that English and Spanish diverge. As discussed earlier, there is raising in matrix *wh*-questions in both English and Spanish. With regard to embedded questions, English neither has raising nor a trigger for *do* support. For Spanish, the lexical verb undergoes movement just as in matrix questions. It is precisely in embedded questions that English and Spanish diverge. Specifically, I hypothesize the following:

1. In contrast with interface vulnerability approaches, heritage speakers will show high levels of acceptance and production of ungrammatical *wh*-questions in Spanish (without subject–verb inversion) due to crosslinguistic influence from English where inversion does not take place.
2. The heritage speakers will have more difficulty with subject–verb inversion in embedded *wh*-questions than in matrix questions. It is precisely in embedded questions where English and Spanish differ the most.

To investigate these hypotheses, two studies were conducted with 17 heritage speakers of Spanish. Study 1 examined the intuition and controlled written production of subject–verb inversion in Spanish. Study 2 consisted of a follow-up study with the heritage speakers only to examine their oral production. The methodology and results of these two studies are discussed in the next two sections.

Study I

Participants

A total of 27 ($n = 27$) participants took part in this study: 17 US-born heritage speakers of Spanish and 10 Spanish native speakers serving as controls. All participants completed a linguistic background questionnaire to determine the age of onset of bilingualism, occupation, length of residence in the United States, parents' L1, languages used at home and work, level of education, and language of instruction.

The heritage speaker group consisted of 17 university-educated heritage speakers of Spanish born in the United States. The participants were exposed to both English and Spanish from birth and were undergraduate students at a large research university and college in the US Midwest (age range at testing, 18–25 years). In 71% (12/17) of the cases, both parents were native speakers of Spanish, and in 24% (4/17) of the cases, only one parent was a Spanish speaker. One of the participants had English and Basque-speaking parents but he grew up speaking Spanish at home with Spanish caretakers. The parents' country of origin included Mexico, Guatemala, Nicaragua, Perú, and El Salvador. None of the participants' parents were from the Caribbean. This was done in order to control for dialectal differences regarding the lack of subject–verb inversion, which is grammatical in Caribbean Spanish (e.g. Ordóñez & Olarrea, 2006). In total, 59% of the participants spoke both languages during childhood and 35% spoke only Spanish. Their language of formal instruction in high school and university was mostly English (76% and 59%, respectively). Regarding language use, 29% of the participants reported speaking mostly Spanish or only Spanish at home, 24% reported speaking slightly more Spanish and 29% reported speaking equal English and Spanish. The majority reported speaking mostly English or only English at school (88%), work (65%), and in social situations (41%). A total of 53% of the subjects indicated that they feel more comfortable in English, while 41% indicated equally comfortable using either language.

To evaluate the participants' proficiency level in Spanish, they were asked to complete an independent proficiency test. The proficiency test consisted of a cloze passage with three multiple-choice options for each blank adapted from a version of the *Diploma de Español como Lengua Extranjera* (DELE) as well as a multiple-choice vocabulary section adapted from a Modern Language Association (MLA) placement test. Following previous research using the same methodology (e.g. Montrul & Bowles, 2009; Montrul & Slabakova, 2003), scores between 40 and 50 points were considered as the baseline for “advanced” proficiency level, scores between 30 and 39 points were considered as the baseline for “intermediate” proficiency, and scores between 0 and 29 points were considered as “low” proficiency. The average mean per group was 38 points.

The control group consisted of graduate students attending a large research university in the United States. They were from a variety of Spanish-speaking countries in Latin America. Their mean age at the time of testing was 28 years, and their mean length of residence in the United States was 1 year and 6 months. None of the participants were Caribbean Spanish speakers. Their language of instruction in high school was Spanish for most of the cases (80%) and in university it was both Spanish and English for the majority of the speakers (70%). Regarding language use, 70% indicated that they speak only Spanish or mostly Spanish at home, and 50% indicated to speak both languages in social situations. At school, 40% indicated to speak mostly English, 40% indicated to speak slightly more Spanish or mostly Spanish, and 20% indicated to speak equal English and Spanish.

Structures under analysis

To evaluate the participants' knowledge of subject–verb inversion in Spanish interrogatives, a total of 24 test items and 28 distracters were tested. The test tokens were divided by grammaticality and *wh*-question type: 12 grammatical items (6 matrix and 6 embedded) and 12 ungrammatical items (6 matrix and 6 embedded). The *wh*-extraction sites included inanimate direct objects (*¿Qué preparó Juan para cenar?* “What did John make for dinner”), animate direct objects (*¿A quién conoció Luis en París?* “Who did Luis meet in Paris?”), indirect objects (*¿A quién le entregó Rosa el violín?* “To whom did Rosa give the violin?”), prepositional phrases (*¿Para cuál compañía trabaja tu hermano?* “For what company does your brother work?”), prepositional verbs (*¿Con quién se*

casó María? “Who did Mary marry?”), and adjuncts (*¿Dónde compró Berta el periódico?* “Where did Bertha buy the newspaper?”). The test items (adapted from Licerias, 1997, and Cuza, 2001) included proper names and full DPs in subject position, as opposed to personal pronouns. Items were in the indicative mood to avoid any possible dialectal variation. Adjunct questions introduced by “why” (*por qué*) were excluded since subject–verb inversion is optional in this case (see Appendices 1 and 2 for a complete list of test items). The distracters included twenty items with variable adverb placement and eight items with preverbal and postverbal object pronouns in infinitival constructions.

Materials

Data elicitation included an AJT (Appendix 1) and a DST (Appendix 2). The AJT tested the participants’ acceptability of grammatical and ungrammatical subject–verb inversion in Spanish interrogatives. This was a pencil-and-paper task administered to each participant in person. There was a training/instruction section at the beginning of the test explaining the task and providing an example. The participants were instructed to read each sentence quietly and based on the scale provided indicate whether the sentence sounded *odd*, *slightly odd*, *more or less fine*, or *fine*, as shown below:

(2) Me pregunto qué Ernesto compró

me wonder what Ernest bought

“I wonder what Ernesto bought”

–2 (odd) –1 (slightly odd) 0 (I don’t know) 1 (more or less fine) 2 (fine)

In (2), the expected answer was –2 (odd) due to a lack of obligatory subject–verb inversion. If the participants thought the sentence sounded *odd* or *slightly odd*, they were asked to specify why they thought so. The participants in most cases underlined or circled their corrections. They also used an arrow indicating where the verb should have appeared in the cases of ungrammatical word order. The participants were also instructed to provide their first impression and not to make any corrections or go back to the previous sentences once they had made their choice. When the participants rejected the test sentences for reasons not related to subject–verb inversion (e.g. lexical choice, pronominal use, and punctuation preferences), the answer was not taken into consideration. An effort was made to avoid these instances, and participants were asked not to reject the sentences due to verb type, lexical choice, or punctuation issues. The participants read and judged all sentences silently. The investigator intervened if the participant had a question. There was no time limit.

The DST (also called slash-sentence test) tested the written production of *wh*-questions where subject–verb inversion was required. This task has been used successfully in previous L2 acquisition research and L2 classrooms (e.g. Guijarro-Fuentes, 2007; Mandell, 1998, 1999) to test knowledge of target word order. As with the AJT, this was a paper-and-pencil test administered in person. There was a training exercise at the beginning of the test and detailed instructions. Participants were asked to rewrite the sentences provided in a logical way. They were also asked to conjugate the verb form using the appropriate person and tense and to add any element that they thought was missing. The instructions did not ask the participants to pay attention to the word order since this

would have primed the results. Participants were presented with sentences with postverbal subjects (grammatical items, 12) and preverbal subjects (ungrammatical items, 12) as shown below:

(3) ¿/A quién/conocer/Luis/en Paris/?[gram., matrix, DO-animate]

To whom to meet Luis in Paris

“Who did Luis meet in Paris?”

a) ¿A quién conoció Luis en Paris? (grammatical rewrite)

b) *¿A quién Luis conoció en Paris?(ungrammatical rewrite)

(4)/No sé/a quién/Rosa/le entregar/el violín/[ungram., embedded, IO]

I don't know to whom Rosa it to give the violin

“I don't know to whom Rose gave the violin”

a) No sé a quién le entregó Rosa el violín. (grammatical rewrite)

b) *No sé a quién Rosa le entregó el violín. (ungrammatical rewrite)

Participants who had knowledge of subject–verb inversion were expected to rewrite the sentence with the verb before the subject, as in (3a) and (4a), for which they received a score of 1. Those who had difficulties with subject–verb inversion, or were undergoing attrition, were expected to rewrite the sentence with the subject before the verb, as in (3b) and (4b), for which they received a score of 0. Spelling errors or verb conjugation mistakes were excluded from the analysis. Only the correct verb–subject position was considered as the target pattern.

Results

AJT

Ungrammatical items. The results from the AJT on ungrammatical sentences showed low levels of accuracy by the heritage speakers and the control participants with both matrix and embedded ungrammatical items. These results are represented in Figure 1.

A multivariate analysis of variance (ANOVA) test conducted on the average number of responses per ungrammatical conditions with group as the independent factor and *wh*-type (matrix and embedded) as the dependent factor showed significant differences between the heritage speakers and the controls with both matrix ($F(1, 25) = 9.53, p < .005$) and embedded questions ($F(1, 25) = 58.92, p < .000$). The control group significantly outperformed the heritage speakers with both sentence types, confirming hypothesis 1.

To examine these results further and determine whether there was a difference in the individual treatment of matrix versus embedded questions among the heritage speakers, an individual analysis was conducted within groups per embedded and matrix ungrammatical conditions. To calculate individual results, I employed the following criteria to classify the speakers: Three out of six

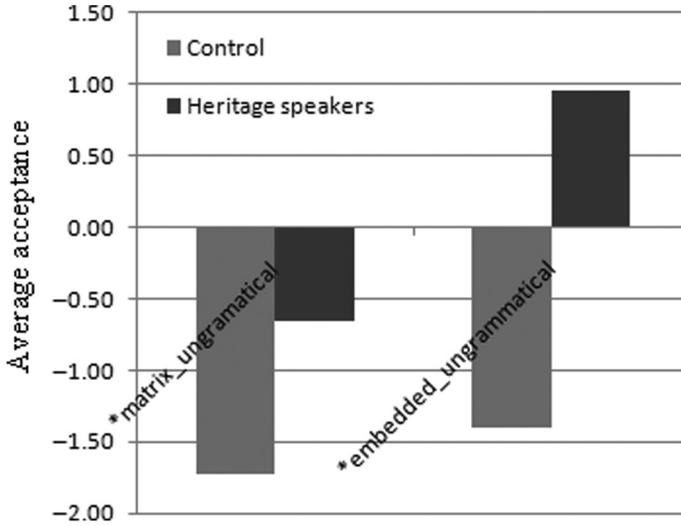


Figure 1. Acceptability judgment task: average acceptance scores for ungrammatical conditions per group.

accepted answers (“fine” or “more or less fine”) established that the participant failed to recognize the ungrammatical word order (accepted behavior speakers). Three out of six accepted answers represented the cutoff point for unsure behavior speakers, and two or less accepted answers represented the cutoff point for rejected behavior speakers. Table 2 displays these results.

Individual results showed more difficulties among the heritage speakers with embedded questions than with matrix questions, as predicted. In total, 70% (12/17) of the participants rejected the ungrammatical sentences and only 24% (4/17) accepted them. However, with embedded questions, 76% (13/17) of the heritage speakers accepted embedded questions without subject–verb inversion. A closer look at the individual data shows homogenous behavior among the heritage speakers in their judgments of matrix ungrammatical questions. In total, 11 of the 12 “rejected” speakers rejected 5–6 matrix questions (out of 6) and one subject rejected 4. The heritage speakers were also homogenous in the degree of rejection. In total, 8 of the 12 rejected speakers judged most of the ungrammatical items as “slightly odd” (–1). With embedded items, they were also quite homogenous in their responses. In total, 11 out of 13 “accepted” speakers accepted 5–6 items, while 2

Table 2. Acceptability judgment task: individual results within group per matrix and embedded ungrammatical questions

Group	Accepted	Unsure	Rejected
Heritage speakers			
Matrix	24% (4/17)	6% (1/17)	70% (12/17)
Embedded	76% (13/17)	12% (2/17)	12% (2/17)
Controls			
Matrix	0% (0/10)	10% (1/10)	90% (9/10)
Embedded	0% (0/10)	0% (0/10)	100% (10/10)

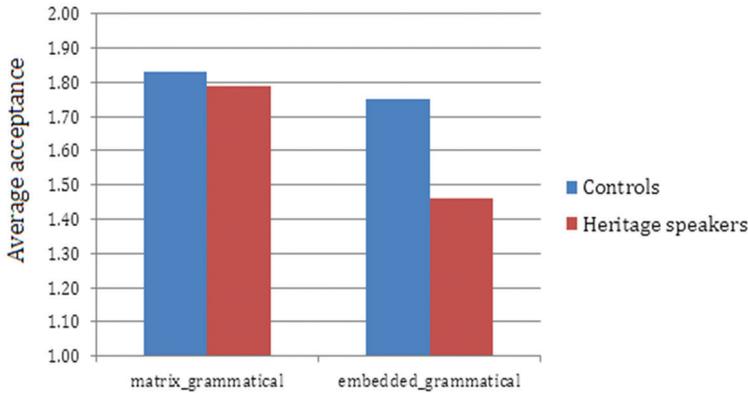


Figure 2. Acceptability judgment task: average acceptance scores for grammatical conditions per group

accepted only 4 items. The controls showed ceiling performance at the individual level with both matrix and embedded questions. An important difference between the controls and the heritage speakers is that most of the control participants judged the ungrammatical questions (matrix and embedded) to be completely odd (-2), rather than slightly odd (-1). The results from the heritage speakers were consistent with hypothesis 2, which expected more difficulty with embedded questions than with matrix questions.

Grammatical items. The results from the acceptability of matrix grammatical sentences showed no considerable differences between the heritage speakers and the controls. With embedded questions, however, the controls showed higher levels of acceptance than the heritage speakers. Figure 2 represents the results.

An ANOVA test conducted on the average number of responses per grammatical conditions with group as the independent factor and *wh*-type (matrix and embedded) as the dependent factor did not show significant differences between the heritage speakers and the controls with matrix questions ($F(1, 25) = .292, p = .594$). With embedded questions, the results missed significance ($F(1, 25) = 3.64, p = .068$). Although the heritage speakers were not significantly different from the controls in their judgments of matrix or embedded grammatical questions, the heritage speakers treated both types of questions differently. An ANOVA test performed on the results of each type of question showed significant differences for the advantage of matrix questions ($F(32) = 8.12, p = .008$). In contrast with the control subjects, three heritage speakers rejected item [22] (*No recuerdo a quién le ha prestado Elena el diccionario*, “I don’t remember to whom Elena lent the dictionary”) and six participants judged it to be fine.

DST

Ungrammatical items. The objective of this task was to examine the written production of subject–verb inversion in Spanish. The results showed low levels of target subject–verb inversion by the heritage speakers, crucially with the embedded questions. The results are represented in Figure 3.

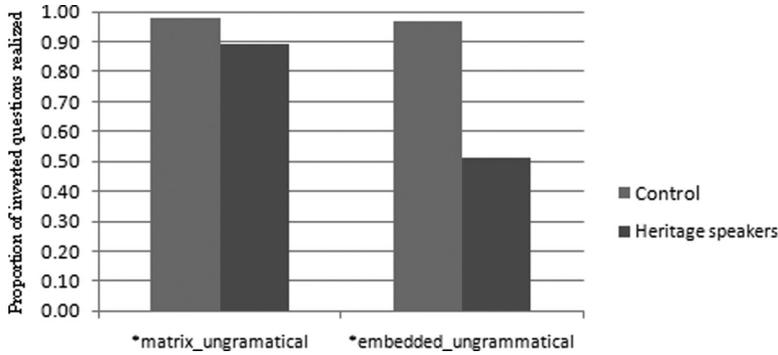


Figure 3. Dehydrated sentence task: proportion of target inversion per ungrammatical items per group.

Since this task measured a binary outcome computed as 0 (no inversion and ungrammatical) or 1 (inversion and grammatical), the scores were transformed to arcsine values before performing the parametrical tests. The transformed scores were submitted to a multivariate ANOVA test with *wh*-type (ungrammatical matrix and ungrammatical embedded) as the dependent variables and group as the independent factor. The results showed no significant difference between the two groups with matrix questions ($F(1, 25) = 2.72, p < .112$), in contrast to what was expected. However, with embedded questions both groups behaved significantly different ($F(1, 25) = 23.96, p < .000$). Thus, hypothesis 1 was partially confirmed.

In order to examine the individual variation within groups, an individual analysis was conducted per group and *wh*-type. As in the AJT, individual results showed more prominent difficulties with subject–verb inversion in embedded questions than with matrix questions. In total, 71% of the heritage speakers produced five to six target inverted matrix questions. A total of 29% were less sure, with either three or four target productions. With embedded questions, however, there were more considerable difficulties at the individual level, confirming hypothesis 2. Only 29% of the participants behaved target like with either five or six inverted embedded questions. The control participants were target like with both matrix and embedded ungrammatical questions. Only one participant produced four out of six inverted embedded questions. Table 3 represents the results.

It was striking to see how the heritage speakers who showed an inversion behavior in the production of matrix questions behaved in an opposite manner with embedded questions. For instance, participants HS2 and HS8 inverted six and five matrix questions, respectively, but failed to invert

Table 3. Dehydrated sentence task: individual target production of inverted questions for the ungrammatical word order condition

Number of target inversion (6 items)				
Groups	5–6	3–4	1–2	0
Heritage speakers				
Matrix	71% (12/17)	29% (5/17)	0% (0/17)	0% (0/17)
Embedded	29% (5/17)	29% (5/17)	24% (4/17)	18% (3/17)
Controls				
Matrix	100% (10/10)	0% (0/10)	0% (0/10)	0% (0/10)
Embedded	90% (9/10)	10% (1/10)	0% (0/10)	0% (0/10)

a single embedded question (0/6). Similarly, participants HS10 and HS13 inverted six and five matrix questions but inverted only one and two embedded questions, respectively. Subjects HS3 and HS4 inverted three matrix questions each but only inverted 1/6 and 0/6 embedded questions, respectively. These results clearly indicate more difficulties in the acquisition of embedded questions than matrix questions.

Regarding item interaction, 11 heritage speakers did not invert with item [46] (**No tengo idea a quién Margarita conoció en la fiesta*, “I don’t have any idea whom Margarita met at the party?”). Seven of them also failed to invert with item [23] (**Ana se pregunta con quién su ex-esposo vivirá ahora*, “Ana wonders with whom her ex-husband would live now?”). Nine speakers did not invert with item [14] (**No sé a quién Esteban le prestó la sombrilla*, “I don’t know who Esteban lent the umbrella”). It appears as if inversion in *wh*-questions with indirect object extraction is less obligatory in the contact grammar of these bilingual speakers.

Grammatical items. Regarding grammatical items, the heritage speakers showed lower levels of accuracy than the control group with grammatical embedded questions but had no difficulties with matrix questions. Figure 4 shows the results.

As in the case of the ungrammatical items, the obtained scores were transformed into arcsine values before performing the parametrical tests. An ANOVA test with *wh*-type (grammatical matrix and grammatical embedded) as the dependent variable and group as the independent factor was conducted. The results showed significant difference between the two groups with embedded grammatical questions ($F(1, 25) = 5.4, p < .028$). There were no significant differences with matrix questions ($F(1, 25) = 1.26, p = .272$).

To examine the results further, an individual analysis was conducted. The results showed no considerable variation among the heritage speakers and the control participants with matrix grammatical questions. The majority of the heritage speakers were in the range of five to six inverted matrix questions out of six. With embedded questions, the heritage speakers showed much lower production of inverted questions, as in the case of embedded ungrammatical items. Eight participants inverted only four items and one inverted only three items. The control participants showed lower number of inverted embedded questions but not due to lack of inversion but due to the use of other structures. For instance, three control participants had difficulties with item [34] (*Pregúntale con quién irá Elena al cine*, “Ask him/her with whom Elena is going to the movies”). The

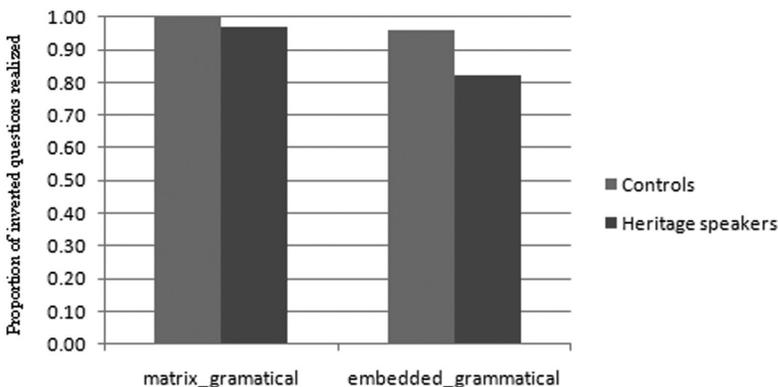


Figure 4. Dehydrated sentence task: average score of target inversion per grammatical conditions per group.

Table 4. Dehydrated sentence task: individual target production of inverted questions for the grammatical word order condition

Number of target productions (6 items)				
Groups	5–6	3–4	1–2	0
Heritage speakers				
Matrix	94% (16/17)	6% (1/17)	0% (0/17)	0% (0/17)
Embedded	47% (8/17)	53% (9/17)	0% (0/17)	0% (0/17)
Control				
Matrix	100% (10/10)	0% (0/10)	0% (0/10)	0% (0/10)
Embedded	40% (4/10)	60% (6/10)	0% (0/10)	0% (0/10)

participants rewrote this sentence as *Pregúntale a Elena con quién irá al cine*, “Ask Elena with whom she is going to the movies.” Another control participant rewrote two sentences as matrix questions instead of embedded questions. The results are shown in Table 4.

Regarding item interaction, nine of the heritage speakers had difficulty with item [16] (*No sé dónde compra Nancy el periódico*, “I don’t know where Nancy buys the newspaper”). They rewrote the DP Nancy before the verb following the English word order. A similar but smaller interaction was observed with item [34] (*Pregúntale con quién fue Elena al cine*, “Ask him/her with whom Elena went to the movies”) and item [21] (*No recuerdo a quién le ha prestado Elena el diccionario*, “I don’t remember to whom Elena lent the dictionary”).

Discussion

It is clear from the results that Spanish heritage speakers have more difficulties with embedded questions than with matrix questions, confirming hypothesis 2. Although the control group significantly outperformed the heritage speakers in both matrix and embedded questions in the acceptability task, the lack of inversion was much more pronounced in embedded questions at the individual level. These results are not surprising. It is precisely in embedded questions where English and Spanish entail a different grammatical mechanism: obligatory inversion in Spanish (T° to C°) and no movement in English, as discussed in section “Subject–verb inversion in Spanish interrogatives.”

The results suggest that in contrast to interface vulnerability approaches, the syntax proper is also affected by crosslinguistic influence in the absence of pragmatic extensions among Spanish heritage speakers. This is more prominent with embedded questions. Reduced exposure to the relevant input may also cause these structures from being completely specified. However, these results have to be taken with caution. The tasks employed were all written tasks. There is the possibility that the heritage speakers were not quite familiar with the written Spanish norm, even after exposure to academic Spanish at the university level. An obvious question then is whether similar difficulties are also present in oral production. A follow-up study was conducted to examine this issue.

Study 2

Participants

The same heritage speakers who completed study 1 also completed the follow-up study. The structures tested were the same as those tested in study 1 but with a reduced number of test items (see Appendix 3 for complete list of items). The participants were interviewed individually by the investigator.⁴

Methods

To test the oral elicitation of subject–verb inversion, the participants were asked to complete a story and question task (e.g. Crain & Thornton, 1998; Thornton, 1990) and an oral sentence completion task. Both tasks were presented together using PowerPoint. There were 12 test situations (6 per task) and 6 distracters. Both tasks consisted of short stories followed by a prompt. The stories and prompts were read out loud to the participants by the interviewer. The participants were also asked to follow on a laptop computer screen. The complete testing protocol was recorded using a Sony portable digital recorder.

Following the methodology from Thornton (1990), the story and question task provided the appropriate situation to produce a matrix question. The stories and prompts were devised to elicit questions introduced by *qué* (“what”), *a quién* (“to whom”), *con quién* (“with whom”), *cuándo* (“when”), and *dónde* (“where”). The participants were instructed to read and listen to the story and then follow the prompt, which required the participant to ask a question, as shown in (5) below:

(5) Story and Question Task

Juan te compró un regalo para navidad. Tú no sabes qué es pero tu amiga Rosa sí sabe.

“John bought you a present for Christmas. You don’t know what is but your friend Rosa does know.”

Investigator: Pregúntale a Rosa qué (prompt)

“Ask Rosa what”

Expected response: ¿Qué me compró Juan para Navidad?

“What did John buy me for Christmas?”

In (5) the expected answer was a matrix question with inverted subject–verb order. The sentence completion task (6) provided the appropriate context to elicit embedded *wh*-questions introduced by *qué* (“what”), *where* (“dónde”), *cuánto* (“how much”), *cuándo* (“when”), *where* (“dónde”), and *a quién* (“to whom”). The participants were instructed to read and listen to the story and answer a question by completing the sentence provided. Half of the sentences were introduced by *Yo no sé...* (“I don’t know...”) plus a *wh*-word and the other half by *No estoy seguro...* (“I’m not sure...”) plus a *wh*-word. A nonfinite verb was also provided between parentheses with each sentence. The participants were asked to conjugate the verb in the most appropriate form:

(6) Sentence Completion Task

Tu hermano se compró un carro deportivo muy lindo. Tu amigo Carlos te pregunta cuánto pagó pero tú no sabes.

“Your brother bought a very nice sports car. Your friend Carlos asks you how much he paid but you don’t know.”

Investigator: Respóndele a Carlos completando la oración siguiente

“Answer Carlos completing the following sentence”

No sé cuánto... (pagar)

“I don’t know how much...” (“to pay”)

Expected response:...pagó mi hermano por su carro.

“...my brother paid for his car.”

In (6), the expected answer was an embedded *wh*-question with target subject–verb inversion. The preambles and prompts were read as many times as the participant needed. Target responses (inversion pattern) received a score of 1 and nontarget responses (no inversion pattern) received a score of 0.

Results

There were six scenarios in which matrix inverted questions were expected to occur in the *story and question task* and six scenarios in which inverted embedded questions were expected in the *sentence completion task*. Each response was scored as 0 for noninversion and 1 for target inversion. To obtain the proportion of matrix and embedded inverted questions produced, I divided the total number of inverted items by the total number of questions produced per participant and then pooled by group. For instance, if the participant did not produce a matrix question according to the preamble provided, the response was discarded from the total six. The same procedure was followed for the embedded questions. As in the case of the AJT and the DST, the heritage speakers showed higher levels of target production with matrix questions (mean score, 0.88/1) than with embedded questions (mean score, 0.82/1), as shown in Figure 5.

It appears as if embedded questions are characteristically more difficult to process than matrix questions in both written and oral production. Since the results were contingent on inversion (score, 1) versus noninversion (score, 0), the proportions of inverted matrix and embedded questions realized were transformed to arcsine values before conducting any parametric test. The transformed

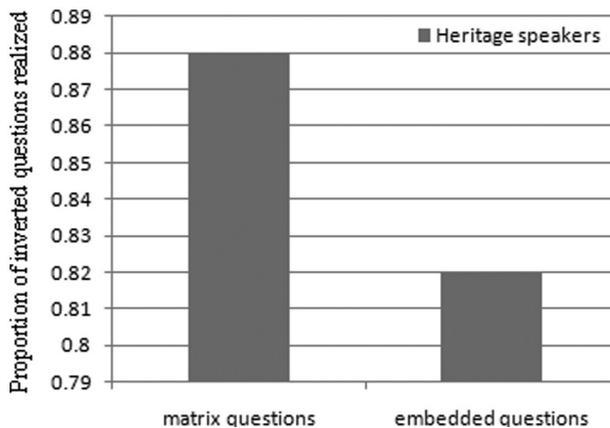


Figure 5. Elicited production task: proportion of target inverted questions.

scores were then submitted to a univariate ANOVA test to measure if the participants treated both *wh*-types in a significantly different manner. The results showed no significant differences between the two question types ($F(32) = 1.67, p = .206$). The heritage speakers treated matrix and embedded questions similarly, disconfirming hypothesis 2. Moreover, an ANOVA test testing the level of target inversion with ungrammatical embedded questions in the DST with the level of inversion with embedded questions in the oral task showed significant differences ($F(32) = 8.80, p < .006$). The heritage speakers did significantly better in the oral production of embedded questions than in their written production.

Discussion

The participants' performance in the oral production task was more target like than in the acceptability task and the written production task. These results do not strongly support hypothesis 1. However, further examination with a control baseline is necessary to arrive to definite conclusions. The data also show more difficulties with embedded questions than with matrix questions, as in the previous tasks, but the differences between the two conditions were not significant, in contrast to what was predicted in hypothesis 2. The fact that the heritage speakers did better in this task is understandable. In contrast with typical L2 learners, heritage speakers are more competent orally than they are in the written norm. For the most part, they speak the heritage language fluently and take language courses to improve written skills. The written production task was also more complex than the oral task. It required the participants to organize the scrambled words in a logical order, conjugate the main verb appropriately, and add any missing elements. The oral task, in contrast, was shorter than the written task, and all the items were preceded by a preamble, something missing in the written production task. The presence of a discourse context might have made it easier for the learners to come up with target inversion and show more sensitivity to this syntactic mechanism.

Conclusion

This study examined the role of crosslinguistic influence in the acquisition of subject–verb inversion in Spanish *wh*-questions, a narrow syntactic property with no pragmatic or discourse motivations. Data from 17 US-born heritage speakers of Spanish indicate low levels of performance in the target acceptability and written production of obligatory subject–verb inversion in Spanish. The learners' difficulties were more prominent with embedded questions than with matrix questions, as expected. It is argued that these difficulties stem from crosslinguistic influence from English which entails different syntactic options regarding inversion, particularly so with embedded *wh*-questions. In addition to crosslinguistic influence from English, reduced input and use of the relevant structures may have also influenced the results preventing recovery from L1 transfer effects (e.g. Cuza & Frank, 2011; Yuan, 1997). Generally speaking, embedded questions are less common in day-to-day input than matrix questions. In the oral task, the participants' performance was more target like, which is not what was expected.

In contrast with interface vulnerability accounts claiming no difficulties at the syntax proper, the results of this study suggest that the syntax is also vulnerable to crosslinguistic influence despite no discourse or pragmatic extensions. As far as heritage language development is concerned, acquisition difficulties do not appear to be constrained by one type of interface structure versus another, confirming recent research in heritage language development (e.g. Montrul & Ionin, 2010)

and child bilingual acquisition (e.g. Pérez-Leroux et al., in press). Although the heritage speakers performed much better in the oral task than in the acceptability and written production tasks, it is clear that difficulties with the target acquisition of obligatory inversion in Spanish are persistent in the grammar of heritage speakers. These results also suggest that the difficulties heritage speakers have do not necessarily stem from an interrupted development during childhood but rather from crosslinguistic influence from the dominant language. The participants' performance in the oral task indicates that the syntactic mechanism for subject–verb inversion is in place, albeit permeated by crosslinguistic influence effects from the dominant L2. These effects are more robust in the learners' acceptability intuitions and written production. Future research would benefit from examining further the performance differences that heritage speakers have across different language skills and syntactic properties.

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Notes

1. L1 attrition refers to the diminishing linguistic ability some native speakers have of previously established grammatical properties (e.g. Köpcke & Schmid, 2004; Schmid, 2002, 2010).
2. The literature presents different analyses to account for subject inversion in Spanish interrogatives (e.g. Barbosa, 2001; Goodall, 2004; Zubizarreta, 1998). However, for the purpose of this study, Rizzi's syntactic formulation is optimal to exemplify the main parametric differences between the two languages.
3. Although T° to C° movement in embedded questions is possible in some English dialects (see Pesetsky & Torrego, 2001), this is not characteristic of standard American English, the dialect the participants were exposed to in this study.
4. Unfortunately, the initial control participants were not available to complete the study 2.

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Appendix I

List of test items for AJT

Grammatical matrix

1. ¿Qué preparó Juan para cenar?
2. ¿A quién entregó Rosa el violín?
3. ¿Con quién se casó María?
4. ¿Dónde compró Berta el periódico?
5. ¿Para cuál compañía trabaja tu hermano?
6. ¿A quién conoció Luis en París?

Grammatical embedded

1. José no sabía qué querían los estudiantes.
2. Nunca adivinarás a quién vio tu madre en el mercado.
3. No recuerdo a quién le ha prestado Elena el diccionario.
4. Pregúntale con quién fue Elena al cine.
5. No sé dónde compra Nancy el periódico.
6. Me pregunto con quién se casó Rosa.

Ungrammatical matrix

1. ¿Qué María te regalo para la Navidad?
2. ¿A quién tu hermana vio en la universidad?
3. ¿A quién Ernesto le mandó flores?
4. ¿Con quién Juan estudia todos los viernes?
5. ¿Dónde Ramiro compró el carro?
6. ¿Con qué Rodolfo sueña?

Ungrammatical embedded

1. No sé qué Víctor dijo del regalo.
2. No tengo idea a quién Margarita conoció en la fiesta.
3. No sé a quién Esteban le prestó la sombrilla.
4. Ana se pregunta con quién su ex-esposo vivirá ahora.
5. Dime a dónde Elisa va de vacaciones.
6. Me pregunto con quién Rodolfo sueña.

Appendix 2**List of test items for DST***Grammatical matrix*

1. ¿/Qué/preparar/Juan/cenar/?
2. ¿/A quién/conocer/Luis/París/?
3. ¿/A quién/entregar/Rosa/violín/?
4. ¿/Dónde/comprar/Berta/periódico/?
5. ¿/Para/cuál/compañía/trabajar/hermano/?
6. ¿/Con quién/casarse/Maria/?

Grammatical embedded

1. /José/no sabía/qué/querer/estudiantes/
2. /Nunca/adivinarás/a quien/ver/tu madre/mercado/
3. /No recuerdo/a quién/le/haber/prestar/Elena/el diccionario/
4. /Pregúntale/con quién/ir/Elena/al cine/
5. /No sé/dónde/comprar/Nancy/el periódico/
6. /Me pregunto/con quién/casarse/Rosa/

Ungrammatical matrix

1. ¿/Qué/Maria/te regalar/para/Navidad/?
2. ¿/A quién/tu hermana/ver/Universidad/?
3. ¿/A quién/Ernesto/le/mandar/flores/?
4. ¿/Con quién/Juan/estudia/todos/los viernes/?
5. ¿/Dónde/Ramiro/comprar/el carro/?
6. ¿/Con qué/Rodolfo/soñar/?

Ungrammatical embedded

1. /No sé/qué/Víctor/decir/del/regalo/
2. /No tengo/idea/a quién/Margarita/conocer/en la fiesta/
3. /No sé/a quién/Esteban/le prestar/la sombrilla/
4. /Ana/preguntarse/con quién/su ex-esposo/vivir/ahora/
5. /Dime/a dónde/Elisa/ir/vacaciones/
6. /Me/preguntar/con quién/Rodolfo/soñar/

Appendix 3**List of test items elicited production task**

(1) Juan te compró un regalo para navidad. Tú no sabes qué es pero tu amiga Rosa sí sabe.

Pregúntale a Rosa qué: ¿_____?[matrix]

(2) Rosa le prestó un libro a tu hermana y ahora te pide si tú se lo puedes devolver. Tu hermana lo guardó y tú no sabes dónde.

Respóndele a Rosa:(guardar)

No estoy seguro dónde_____. [embedded]

(3) Susana siempre saca buenas notas porque estudia con alguien muy inteligente. Tú no sabes con quién pero tu amigo José sí sabe.

Pregúntale a José con quién: ¿_____?[matrix]

(4) Tu mejor amiga Maria fue a una fiesta anoche y conoció a alguien muy interesante. Tú no sabes a quién pero Ernesto sí sabe.

Pregúntale a Ernesto a quién: ¿_____? [matrix]

(5) Quieres comprarle algo a tu novia/o por su cumpleaños. Ella/él quiere muchas cosas pero no estás seguro qué. Tu amiga te pregunta y tú le respondes.

Respóndele a tu amiga:(querer)

No estoy seguro/a qué_____ [embedded]

(6) Tu hermano se compró un carro deportivo muy lindo. Tu amigo Carlos te pregunta cuánto pagó pero tú no sabes.

Respóndele a Carlos.(pagar)

No sé cuánto _____.[embedded]

(7) Tu amiga Julia va de vacaciones a Europa dentro de poco. Tú no sabes cuándo, pero tu amigo Ramón sí lo sabe.

Pregúntale a Ramón cuándo: ¿ _____? [matrix]

(8) María regresa de Italia esta semana pero tú no estás seguro cuándo. Tu amigo Jorge quiere saber y te pregunta cuándo.

Respóndele a tu amigo Jorge.(regresar)

No estoy segura/o cuándo _____.[embedded]

(9) Antonio, tu compañero de oficina, ha salido de la oficina sin pedir permiso. Entra tu jefe y muy molesto te pregunta por Antonio pero tú no sabes.

Respóndele a tu jefe:(ir)

No sé a dónde _____.[embedded]

(10) Hoy tienes mucha hambre. Ahora estás en la universidad y llamas a tu mamá para saber qué cocinó. Tu hermano responde el teléfono.

Pregúntale a tu hermano qué: ¿ _____? [matrix]

(11) Tu hermano menor le regaló su violín a un amigo suyo pero tú no sabes a quién. Tu mamá está muy molesta por eso y te pregunta pero tú no sabes.

Respóndele a tu mamá:(regalar)

No sé a quién _____.[embedded]

(12) Tu amigo Carlos escondió tus llaves y tú quieres saber dónde. Tu amiga Lucy sabe dónde.

Pregúntale a Lucy dónde: ¿ _____? [matrix]

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