Spanish Grammatical Gender Knowledge in Young Heritage Speakers

by

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ABSTRACT

Purpose: The present study examined grammatical gender use in child Spanish heritage speakers (HSs) in order to determine whether the differences observed in their grammar, when compared to Spanish monolinguals, stem from an incompletely acquired grammar, in which development stops, or from a restructuring process, in which features from the dominant and the weaker language converge to form a new grammatical system. In addition, this study evaluated whether the differences usually found in comprehension are also present in production. Finally, this study evaluates if HSs differences are the result of the input available to them.

Method: One-hundred and four typically developing children, 48 HSs and 58 monolingual, were selected based on two age groups (Preschool vs. 3rd Grade). Two comprehension and three production experimental tasks were designed for the three different grammatical structures where Spanish expresses gender (determiners, adjectives, and clitic pronouns). Linear mixed-models were used to examine main effects between groups and grammatical structures.

Results: Results from this study showed that HSs scored significantly lower than monolingual speakers in all tasks and structures; however, 3rd-Grade HSs had higher accuracy than PK-HSs. Error patterns were similar between monolinguals and HSs. Moreover, the commonly reported overgeneralization of the masculine form seems to decrease as HSs get older.

Conclusion: These results suggest that HSs' do not face a case of Incomplete Acquisition or Restructured Grammatical gender system, but instead follow a protracted language development in which grammatical skills continue to develop after preschool years and follow the same developmental patterns as monolingual children.

I dedicate this dissertation to my family who helped me in ALL things, great and small, but especially to my husband. I am truly thankful for having you in my life.

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"Knowledge is in the end based on acknowledgment" (Ludwig Wittgenstein)

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TABLE OF CONTENTS

Page

Page

Page

Page

LIST OF TABLES

LIST OF FIGURES

INTRODUCTION

By 2030, the number of Spanish-speaking children attending public schools in the US is expected to be 30% of the population under 8 years of age (Education, 2010; National Task Force on Early Childhood Education for Hispanics, 2007). Many of these children start formal education as primarily Spanish speakers but may rapidly switch to English dominance and become Spanish heritage speakers (HSs). HSs are bilingual speakers of a minority language (the heritage language), that was naturalistically acquired at home, and a dominant societal language. They can be either native speakers of the dominant language (simultaneous bilingualism) or early second language (L2) learners (sequential bilingualism) of the societal language (Kupisch & Rothman, 2016). Although minority languages have been long studied in sociolinguistics (Fishman, 2001), the study of HSs' grammar has significantly increased in the last two decades (Benmamoun, Montrul, & Polinsky, 2013b; Montrul, 2016b; Pascual y Cabo, 2015, 2018) in different fields, such as psycholinguistics, language teaching, and L2 acquisition. Despite the increase in research in HSs, most of the studies have focused on adult speakers (Leal Mendez, Rothman, & Slabakova, 2014; Montrul, 2014, 2016b, 2016a; Polinsky, 2008; Potowski, Jegerski, & Morgan-Short, 2009), and less research has been conducted on children who are also HSs (Cuza & Pérez-Tattam, 2016). From these studies, researchers have agreed that HSs' grammars differ from monolingual grammars, but why this is the case or how these differences arise is not yet well understood.

The educational system in the US has focused on developing HSs' linguistic skills in the majority language, English, with little or no support for Spanish, the heritage

language. For example, in Arizona, child's enrollment in a bilingual program is dependent upon demonstration of high level of English proficiency, and thus, HSs may have no access to home language instruction at school (Arizona Department of Education, 2000). The language of instruction may affect the development or maintenance of the heritage language. Previous research has found that HSs who are exposed to an L2, with no support for the heritage language, may undergo language attrition or language loss. In language attrition, not only grammatical skills in the heritage language stop developing, but some previously acquired grammatical forms decline over time (Cook, 2003). In language loss, children's linguistic abilities in the heritage language are diminished to the point that they cease to be spoken at all (Anderson, 1999a,b, 2001).

Children who are educated, at least partially, in their heritage language continue developing the heritage language and achieve higher scores on academic tests (Barnett et al., 2007; Restrepo et al., 2010). Maintaining and developing the heritage language are important aspects for continuing communication in the home, predicting L2 acquisition, and transmitting their culture. This in turn helps HSs obtain higher academic achievement (Kohnert et al, 2005). Therefore, understanding the linguistic mechanisms that underlie HSs' performance and the relationship to the dominant language becomes extremely important for pedagogical, theoretical, and clinical reasons.

At the pedagogical level, we need to understand how HSs' grammar differs from monolinguals' grammar for improving or maintaining the native language of HSs. By identifying the grammatical aspects that differ from monolinguals and what patterns HSs

have in their grammar, we can identify the specific properties of the language that need to be targeted, emphasized, and developed in classroom settings. Design of language proficiency tests or curricula must consider evidence of the key differences in HSs' grammar. In dual programs, HSs and second language (L2) learners are sharing classrooms; therefore, it is important to design curriculum that enhances the particular needs of HSs while they interact with L2 learners, who may need a different type of support for their language development.

At the theoretical level, studying the linguistic skills of HSs is crucial in our understanding of how HSs differ from child and adult monolinguals, how language develops in minority contexts, how heritage bilingual children become fluent bilinguals or not, and how they are similar or different from L2 speakers. HSs' grammar exhibits structural differences that may be attributed as structural changes when compared to monolinguals (Otheguy & Zentella, 2012; Polinsky, 2008) and have been reported as simplified with less complex structures (Montrul, 2008; Montrul, 2014). Studying HSs' grammatical development helps us to better understand whether language contact influences development in the home language and to investigate if HSs may develop core aspects of the heritage language. By examining the Spanish grammatical system of HSs, we will improve our understanding of aspects of grammatical competence that may be vulnerable to change in heritage grammars. This study aims to provide evidence that the grammar of HSs is not incomplete, as stated by some authors (Montrul, 2008, 2016), but develops in a different manner from monolingual speakers (Pascual y Cabo, 2013, 2018).

This study argues for a grammatical system that has been restructured in a way that resembles the dominant language.

At the clinical level, implications for this study center in the correct identification of language disorders. One important aspect that clinicians consider when assessing children for language disorders is the rate of grammatical expressions. Usually HSs produce higher rates of ungrammatical sentences than monolingual speakers. Studies in language disorders have reported that HSs are at risk of being misdiagnosed as having language impairment because their linguistic characteristics resemble those of monolingual children with language impairment (Barragan, Castilla-Earls, Martinez-Nieto, Restrepo, & Gray, 2018)(Barragan, Castilla-Earls, Martinez-Nieto, Restrepo, & Gray, 2018). Examining the linguistic variability found in HSs' grammar will help us characterize their linguistic profile and their grammatical performance during language interactions. These characterizations may help clinicians to determine HSs' typical grammatical development, and the language status of the speakers.

Researchers have found that HSs often produce constructions considered non-canonical because these differ from the common structures produced by monolinguals (Cuza & Pérez-Tattam, 2016; Montrul, 2016; Morgan, Restrepo, & Auza, 2013; Restrepo & Gutiérrez-Clellen, 2001). In Spanish, grammatical gender marking is an early acquired linguistic structure and highly prominent in discourse. However, it has been found that grammatical gender errors are among the most frequent type of errors in the Spanish of early sequential Spanish-English bilingual children, Spanish-speaking children with language impairment, Spanish L2 learners, and Spanish HSs (Bedore & Leonard, 2005;

Bedore & Leonard, 2001; Bruhn de Garavito & White, 2002; Cuza & Pérez-Tattam, 2016; Franceschina, 2005; Montrul, 2008; Montrul, Foote, & Perpiñán, 2008; Morgan, Restrepo, & Auza, 2013; Restrepo & Gutiérrez-Clellen, 2001). For example, HSs may produce ungrammatical constructions in articles *la*$_{\text{Fem}}$ *carro*$_{\text{Masc}}$ 'the car', (Restrepo & Gutiérrez-Clellen, 2001), clitic pronouns (*la*$_{\text{Fem}}$ *agarró* [*el gato*$_{\text{Masc}}$] '[he] grabbed it$_{\text{Fem}}$ [the cat$_{\text{Masc}}$]' (Morgan, Restrepo, & Auza, 2013), and adjectives (*un carro*$_{\text{Masc}}$ *chiquita*$_{\text{Fem}}$ 'a small train' (Cuza & Pérez-Tattam, 2015), while monolingual speakers rarely produce gender errors. Therefore, it is important to understand how a highly common structure such as grammatical gender marking seems to be highly affected in bilingual contexts. Examining the differences in grammatical gender performance when compared to monolingual speakers will improve our understanding of aspects of grammatical competence that may be vulnerable to change in heritage grammars.

Although researchers have proposed different explanations to the grammar in HSs, the first and most influential one is the Incomplete Acquisition (IA) approach (Montrul, 2008) that states that differences arise because some structures never develop completely due to insufficient input in the target language. Therefore, some grammatical structures become fossilized. More recently, researchers in the field of heritage languages have tried to understand the potential sources of these differences (Kupisch & Rothman, 2016; Pascual y Cabo, 2018; Pascual y Cabo & Rothman, 2012), and have proposed new approaches that attempt to explain these differences. These researchers argue that HSs' may construct a different grammatical system, due to the bilingual environment where they grow up (Pascual y Cabo, 2018; Pires & Rothman, 2009). Pires and Rothman (2009)

propose the “Missing Input Competence Divergence” theory where differences from monolinguals are viewed as dialectal, as they arise because of qualitative differences in the input HSs receive from speakers who may face language attrition in that language. Another explanation is that there is no developmental stop (as in the IA approach), but rather HSs have followed a different developmental path, where some structures are reorganized in a way that differs from monolinguals, and development continues towards a steady state grammar (Putnam & Sánchez, 2013).

In the case of grammatical gender marking, HSs may begin following the same developmental path as monolinguals; however, at a certain point and due to the natural crosslinguistic influence of bilingualism, the dominant language’s lack of gender distinction may permeate the grammatical gender system of Spanish. In this way, the masculine-feminine distinction that is present in all Spanish nouns may become unclear for HSs. It is also possible that development continues on this path as it does in monolinguals, but at a slower rate, which could be a case of protracted language development (Castilla-Earls et al., 2015; Morgan, Restrepo & Auza, 2013). The goal of the present study is to fill the gap regarding the developmental path that HSs may take in the acquisition of grammatical gender.

This project examines grammatical gender use in Spanish HSs in order to determine whether the differences observed in their grammar, when compared to monolinguals, are due to a reorganization of their linguistics system or the result of an incompletely acquired grammar. In addition, this study evaluates whether these differences are present only in production or both in comprehension and production.

Below I first describe how the two languages interact in a bilingual speaker and several factors that affect bilingual language development. I then frame two important approaches that explain linguistic variation in HSs. Specifically, I address how Spanish grammatical gender works and review previous studies on grammatical gender in bilingual children. Finally, I present the current study and discuss its potential for clarifying the use of grammatical gender in Spanish HSs in the US.

Bilingual effects in minority contexts

Language interaction in bilingualism. Over the past decade, several authors have demonstrated that bilinguals always have both languages active. Studies using behavioral techniques or/and imaging have reported that this dual language activation is present to some degree, even when the speaker is using only one of the languages (Kroll, Dussias, Bogulski, & Kroff, 2012) and thus, "switching off" or inhibiting one of the languages while using the other is difficult (Costa, 2005; Kroll, Bobb, & Wodniecka, 2006; Marian & Spivey, 2003). To illustrate, studies in word recognition have used cognates, words whose form and meaning are similar across languages (e.g. *animal* in Spanish and English) and homographs, words whose form is similar, but differs in meaning (e.g. *pan* in Spanish means bread). Bilinguals are faster at recognizing cognates than non-cognates or control words (Dijkstra, Grainger, & Van Heuven, 1999). These results suggest that both languages are active during the task where cognates' convergence of form and meaning facilitates recognition. Similar results have been found when bilinguals read, listen, or plan speech in either of the two languages (Kroll & Ma,

2017). Moreover, effects have been found not only from the native language (L1) to the L2 but from the L2 to the L1 (Lagrou, Hartsuiker, & Duyck, 2011).

This parallel activation of the two languages in a bilingual speaker creates a bidirectional interaction, with the influence of the L2 on the L1 similarly to the way the L1 influences the L2 (Dussias, 2003; Kroll, Dussias, Bogulski, & Kroff, 2012). Researchers have used several terms when talking about this interaction between the two languages; it has been labeled as language transfer, interference (Muller, 1998), convergence (Sánchez, 2004) or crosslinguistic influence (Jarvis & Pavlenko, 2008; Serratrice, 2013). For the present study I will adopt the term crosslinguistic influence, as I consider it a more comprehensive term where all existing linguistic knowledge play an important role in the development of both languages.

Studies in the 80s mainly focused on the effects of the L1 on the L2 (Dechert & Raupach, 1989; Gass & Selinker, 1992), especially during the early stages of L2 acquisition. For example, speakers of languages that do not use determiners frequently omit the use of determiners in their L2 mirroring L1 grammatical forms (White, 2003). More recently, researchers have also considered the effects of the L2 on the way speakers use and continue developing their L1 (Bergmann, Nota, Sprenger & Schmid, 2016). Similarly, the effects of the L2 can be observed in L1 maintenance and development. Adult bilingual speakers, for example, may show differences from monolingual speakers in accessing and processing information, perhaps due to a constant inhibition of the L1 (Gathercole & Thomas, 2009; Schmid & Köpke, 2013).

This crosslinguistic effect between the two languages does not always influence in the same manner and does not happen randomly (Kupisch, Bayram & Rothman, 2016). According to Serratrice (2013), the effects of one language on the other can be expressed in terms of quantitative or qualitative differences. Quantitative differences show a process of reinforcing a structure seen in monolingual speakers and may result in a faster development of certain structures (Kupisch, 2007). Examples from Spanish speakers in English contact situations are the overuse of overt subjects in Spanish (Paradis & Navarro, 2003) or the tendency to reposition preverbal clitics to post-verbal position (Pérez-Leroux, Cuza, & Thomas, 2011). Both overt subjects and post-verbal clitics are also found in the grammar of Spanish monolingual speakers, but bilingual speakers may rely more on these than their counterparts, presumably because English does not have these options. Qualitative differences are constructions typically not found in monolinguals of the same dialect, such as the subject-verb inversion in questions of Mexican Spanish (e.g. ¿*Qué tú quieres*? 'What do you want?' (Montrul, 2008), or the use of the English possessive form 's (e.g. **la perro's casa* 'the dog's house'). Moreover, researchers argue that the constant interaction between languages may have positive or negative effects on bilingual language acquisition (Serratrice, 2013).

Positive crosslinguistic effects (Serratrice, 2013) happen when forms in the two languages align. For example, the use of plural markers can be facilitated by positive effects in Spanish-English bilinguals. On the contrary, negative crosslinguistic effects happen when forms between the two languages do not match. Grammatical gender is a case of mismatch of grammatical forms between English and Spanish. While English

mainly makes no use of the grammatical gender distinction, Spanish determiners, adjectives and accusative clitics must always agree with the gender of the noun to which they refer. This makes grammatical gender a major challenge for English-Spanish bilingual speakers and Spanish L2 learners (Franceschina, 2005; McCarthy, 2008).

In bilingual language acquisition, simultaneous or sequential bilingualism may have different outcomes. In simultaneous bilingualism, children acquire both languages from birth; therefore, input in each language is always reduced when compared to monolinguals. In sequential bilingualism, children receive more input in one of the languages during the first years of life. Some studies in HSs have reported that simultaneous bilinguals are more likely to produce utterances that persistently differ from monolingual speakers of the minority language, while attaining native-like competence in the dominant language (Montrul, 2004). In contrast, sequential bilinguals show a better maintenance of the heritage language, but may show lower L2 performance, especially if it was acquired after puberty (Montrul & Potowsky, 2007).

Input and Age of L2 Exposure. In bilingualism, the amount of exposure to each language varies widely. Although for simultaneous bilinguals the exposure to each language is variable, in additive contexts, they initially develop similarly to monolingual children, and eventually develop high competence in the two linguistic systems. In minority contexts, where the native language is non-dominant and its use may significantly decrease over time and be restricted to home use, input and age of exposure may impact differently in sequential bilingualism (Montrul, 2008). When children's input in their L1 is reduced early in childhood and literacy is not developed in the language, the

L1 grammatical skills may be compromised (Montrul, 2008; Polinsky, 2006). It is the combination of these two factors, reduced input and age of L2 exposure, that leads HSs to face what Montrul (2008) calls “an incompletely acquired grammatical system” in the heritage language. Montrul (2016) summarizes the linguistic characteristics in HSs: the lexical repertoire tends to be reduced and is mostly related to common objects in the home (especially if there is no literacy in the heritage, language), simplified morphology in which unmarked forms are overgeneralized, especially in the nominal phrase (e.g. overuse of masculine in grammatical gender), reduced syntactic complexity (e.g. preference for strict word order), and slow speech rate when proficiency is limited.

Heritage languages and HSs

In the strictest definition, a heritage language is any language acquired from birth. Of course, this would make all L1s heritage languages and any native speaker a HS. However, defining these terms has been a controversial issue because their definition often depends on the discipline in which they are used. Wiley (2014) stated that defining heritage language is problematic in the same way of any attempt to apply a single label to complex situations. Fishman (2001) argued that heritage languages must include indigenous languages, immigrant languages, and colonial languages. Currently, the term “heritage language” identifies a language other than the dominant language in a certain social environment. Perhaps Rothman’s (2009) definition encompasses the nuances of the multiple interpretations of heritage language the best. Rothman states that:

> A language qualifies as a heritage language if it is a language *spoken at home* or otherwise readily available to young children, and crucially this language is *not a*

> *dominant language* of the larger (national) society […] the heritage language is acquired on the basis of an interaction with *naturalistic input*. (Emphasis mine, p. 156).

The minority/majority distinction stands out among the different definitions of what a heritage language is; however, defining who is a HS has been more difficult (Anderson & Lockowitz, 2009; Beaudrie & Fairclough, 2012; Carreira, 2004; Carreira & Kagan, 2011; Fishman, 2001; He, 2010; Polinsky, 2008; Polinsky & Kagan, 2007). Polinsky and Kagan (2007) proposed a broad and a narrow definition. The broad definition states that an individual can be considered a HS if he/she has a strong connection to the heritage language even if the individual does not have functional proficiency. Unlike the broad definition, the narrow definition requires that the speaker has some communicative competence considering that the heritage language "was first in the order of acquisition but was not completely acquired because of the individual's switch to another dominant language" (Polinsky & Kagan, 2007 p. 369).

In the United States, the term HS has been used for less than two decades. It usually refers to young adults (Benmamoun, Montrul, & Polinsky, 2013a,b), but has been recently applied to elderly speakers (Yager et al., 2015) and children (Guardado, 2002; Pascual y Cabo, 2018). Because of the need to maintain, revitalize, and develop appropriate curricula for these speakers, researchers in educational or sociolinguistic fields have adopted the broad definition (Beaudrie & Fairclough, 2012; Fishman, 2001; Polinsky & Kagan, 2007). Polinsky and Kagan (2007) also make a distinction between speakers *in the classroom* and speakers *in the wild*. The former referring to HSs who seek

to (re)learn or develop the heritage language and attend classes later in life. These speakers are referred as heritage language learners (Benmamoun, et al. 2013a,b). Speakers in the wild are those HSs who decide not to attend classes. As the target participants in the present study are children who do not attend classes in the minority language, only HSs are included.

Unlike educators and sociolinguists, linguists and language acquisition researchers favor the narrow definition, where speakers need to have some proficiency in the heritage language (Benmamoun et al., 2013a;b; Kupisch & Rothman, 2016; Montrul, 2016; Pascual y Cabo, 2015, among others). Valdés's (2001, p. 38) definition has been the most widely used: "a student who is *raised in a home* where a non-English language is spoken, who *speaks or merely understands* the heritage language, and who is to some degree bilingual in English and the heritage language" [emphasis mine]. As highlighted by Montrul (2016), Valdes's definition does not allow for applying the term in non-English speaking countries, but includes two important characteristics that give important operational criteria to consider: A HS is someone who grew up in a bilingual environment, and someone whose proficiency may vary. Based on this, Montrul (2016) gave a shorter and simpler definition: HSs are "early bilinguals of minority languages' (p. 17), but stated different characteristics of a HS:

a) A bilingual individual raised in a bilingual home and who has linguistic proficiency in the two languages.
b) The heritage language is a sociolinguistically minority language.
c) Although balanced-HSs may exist, they are usually dominant in the societal majority language.
d) The heritage language is often the weaker language.

e) Degree of proficiency ranges from minimal to fully fluent and native-like.
-Adapted from Montrul, 2016, p. 18.

In addition to the debate for a HS definition, some authors (Kupisch & Rothman, 2016) state that a HS definition should include if the acquisition of the dominant language took place simultaneously or sequentially, given that simultaneous bilingualism may impact the minority language more because the potential influence is present at all times. In the United States, many Spanish-speaking children live in a primarily monolingual home environment within a majority L2 society. These children may thus have had limited exposure to English, until the age of four, when they start formal education.

In the present study, I adopt Polinsky and Kagan's (2007) narrow approach, that requires HSs to have some communicative competence, and Kupish and Rothman's (2016) definition that considers simultaneous and sequential bilingualism:

> A HS is a native-speaker bilingual of a minority language spoken at home and either also a native speaker (in the case of simultaneous bilingualism, 2L1) or a child L2 learner of the majority language of the society in which she/he lives and becomes educated" (p. 8).

Even though defining what a HS is varies among researchers or disciplines, the general consensus is that the ultimate attainment of HSs usually differs from that of monolinguals and may resemble more the language of L2 speakers (Bruhn de Garavito & White, 2002; O'Grady, Kwak, Lee, & Lee, 2011). Why this is the case is not yet fully understood. While some authors claim that HSs face a case of incomplete acquisition

(Benmamoun et al., 2013b; Benmamoun, Montrul, & Polinsky, 2013a; S. Montrul, 2008, 2016b; M. Polinsky, 2008; Silva-Corvalan, 2016), others state that their linguistic system is not incomplete, just different (Pascual y Cabo & Rothman, 2012; Rothman, 2007) or that it has undergone a restructuring process (Cuza & Pérez-Tattam, 2016; Pascual y Cabo, 2013; Putnam & Sánchez, 2013). I now turn to each of these proposals.

Theoretical approaches

The sources of the differences in HSs' grammar when compared to monolingual's end state have been explained in terms of (a) incomplete acquisition (Montrul, 2008) in which development stops due to limited input, (b) language attrition in which previously acquired linguistic representations erode in the speaker's system (Cook, 2003), (c) this erosion could even get to the point where these representations are completely lost (Anderson, 1999a, 2001), (d) input delimited (Pascual y Cabo, 2013, 2018) in which differences are viewed as dialectal as they arise because of qualitative differences in the input HSs receive (from attriters). In this view, HSs fully acquired the heritage language that is a variety of the monolingual norms, or (e) different path of acquisition (Putnam & Sanchez, 2013), in which HSs have a complete grammar that developed differently from monolinguals. It differs from other proposals because there is no stopping in development or reversal, instead, there is a change in development. Below I describe: (a) the incomplete acquisition approach, that has been the most accepted among researchers, but which may not be appropriate for all children and (b) Putnam and Sanchez's model (2013) that provides an explanation of a potential path of language development that HSs may follow.

Incomplete Acquisition (IA) in Child Bilingualism. In L1 acquisition, it has been stated that children acquire language in an effortless manner that does not require explicit teaching; acquisition takes place on the basis of the abundant, rich and frequent input children receive during speech interactions (Clark, 2009; Guasti, 2002; Lust, 2006; Tomasello, 2003). This process is not error-free, as all children go through different stages where errors are seen as developmental manifestations, because the grammatical system has not been completely acquired (Montrul, 2008). However, typically developing children usually master most of the constructions of their L1, by age four (Guasti, 2002; Meisel, 2011). The critical period hypothesis (, Lenneberg, 1967) has been used as an explanation of why this is a successful and relatively fast process. According to the critical period hypothesis, there is a biologically determined decline in sensitivity to language input after puberty. Therefore, in order to fully develop a grammatical system, children must be exposed to the corresponding input before puberty.

The critical period hypothesis was later extended to studies in L2 acquisition (DeKeyser, 2000; Johnson & Newport, 1989; Johnson, 1992; Schachter, 1990; Sorace, 1993), where the ultimate attainment in adult native speakers has often served as the comparison point, as well as the target outcome for L2 speakers' performance. According to these studies (DeKeyser, 2000; Johnson, 1992; Johnson & Newport, 1989), the speaker's age at the time of L2 acquisition is fundamental for achieving native-like competence. If it starts before puberty, the individual may achieve full L2 competence, otherwise he/she may always produce ungrammatical constructions, showing a case of incomplete L2 acquisition. Following Schachter's (1990) Incompleteness Hypothesis for

late bilingualism (L2 acquired after puberty), Sorace (1993) stated that, when an incompletely acquired grammatical structure is needed, its use will be probabilistic showing no concrete patterns because speakers randomly use it.

Montrul (2008) argued that L2 studies on adults have found similar conclusions to DeKeyser (2000): L2 speakers may achieve high and sophisticated L2 knowledge, but few will attain native-like performance. For example, Franceschina (2005) examined the linguistic performance in a highly proficient L2-Spanish speaker who persistently produced gender and number agreement errors in the L2, showing that these grammatical aspects were not completely acquired even at high proficiency levels. Moreover, Montrul argued that the same incompleteness of late bilingualism may also exist in the early bilingualism of HSs whose input in the heritage language is reduced before the closure of the critical period. Like L2 speakers, HSs produce utterances with grammatical errors, even at older ages than monolinguals who typically stop producing these errors. Moreover, these errors often occur in areas that seem to be vulnerable to incomplete acquisition in minority contexts, such as grammatical gender where speakers tend to produce a high number of errors (Anderson, 1999; Gathercole, 2002) or the subjunctive mood in Spanish where speakers tend to substitute the use of subjunctive for the indicative mood (Montrul, 2007; Silva-Corvalán, 1994).

Montrul (2008) claimed that “just as there [are] age effects in L2 acquisition, there are also age effects, ..., in L1” (p.1). For Montrul, the interaction of limited input and age of exposure is responsible for the possible incomplete acquisition outcome in the heritage language of HSs. The younger the child is when exposure to the L1 becomes

limited, the more likely he/she is to fail to fully acquire the L1, such as grammatical gender in this case. In a longitudinal study of two Spanish-speaking siblings who migrated to the US at 4 and 6 years of age, Anderson (1999; 2001) reported that after two years of high exposure to English, the younger child produced more gender errors than the older child whose exposure to the L2 took place later in her linguistic development.

According to IA, some grammatical structures, especially in morphology, do not fully develop, but rather will stabilize in a simplified form and remain this way into adulthood, as seems to be the case for grammatical gender in Spanish HSs. Under this approach, the grammatical gender system faces a case of IA as children start its developmental process but never master it completely and continue forming ungrammatical constructions even at older ages. This approach will be examined in this study.

In theoretical and conceptual terms, some authors have recently argued against the IA approach (Kupisch & Rothman 2016; Pascual y Cabo, 2018; Pascual y Cabo & Rothman, 2012; Pires & Rothman, 2009; Putnam & Sánchez, 2013), because the term incomplete acquisition refers to a linguistic outcome, which may be inaccurate for speakers who are still in the acquisition process. They state that HSs' grammar is not incomplete, but rather different from that of monolingual speakers, and this difference may be better explained by other approaches. Even though they acknowledge the importance of input in language development, they emphasize that limited input is not sufficient to explain the grammatical differences observed in HSs. Moreover, in many cases HSs are children of immigrant parents who may also face language attrition, where

some previously acquired structures show a decline, because of the linguistic context. If this is the case, the quality of input HSs receive differs from the input available in monolingual contexts (Pires & Rothman, 2009). Saying that these children did not acquire a complete grammar may be erroneous because they acquired what was available in their input. Putnam and Sánchez's (2013) model (described below) seems to provide a more complete explanation for HSs development.

Putman and Sánchez -A Feature Re-assembly Model. This model proposes that due to differences in use for each language, HSs' grammar may restructure and form a new system that eventually develops into a complete grammatical system. Under this approach, changes in HSs' grammar can be tracked as this model explains the process in development and not only the outcome. Putnam and Sánchez's (2013) model distinguishes input as simple linguistic data available to listeners from activation. They state that what really supports the development of the grammatical system is the frequency of activation during both production and comprehension, that is, input and output frequency. In this sense, Putnam and Sánchez argue that not all exposure to input involves processing of input. While comprehension is mainly driven by frequency of activation (the more frequent a word is the more likely it is to be processed for comprehension), production is guided by semantic and syntactic constraints. Therefore, comprehending input is argued to involve fewer cognitive resources than producing language. In this way, input should not be considered the only factor influencing language development.

The considers the constant interaction of the two languages and the logical crosslinguistic influence between them. Following Lardiere's (2009) Feature Reassembly Hypothesis (FRH), Putnam and Sánchez propose that the constant crosslinguistic influence from the dominant language may result in the gradual restructuring of values in the heritage language towards values from the dominant language. The FRH (Lardiere, 2009) was originally developed to explain ultimate attainment for adult L2 learners. This hypothesis postulates that L2 speakers initially look for morpholexical correspondence from the L1 to assemble lexical items in the L2. Although L2 speakers acquire the grammatical knowledge of the target structures, the frequent L2 errors that are observed are seen as a failure to access the correct information in real time. That is, L2 speakers are able to acquire the grammatical representations but may fail to produce them because of heavy processing demands during conversation. Further, L2 speakers' greater difficulties lie in assembling a combination of features into new configurations in order to match those of the target language.

According to the FRH, even if the two languages do not share the same grammatical structure, as is the case of grammatical gender between Spanish and English, L2 Spanish speakers will be able to reconfigure their grammatical system as their proficiency increases. Importantly, the FRH provides the basis for Putnam and Sánchez's (2013) model where they view the HSs' grammar as a gradual developmental process, in which the activation for production allows speakers to construct the associations of forms to be available for retrieval. The lower activation for production may weaken the availability of grammatical features in the heritage language, which in turn may lead to

the progressive reassembly from the dominant L2. Putnam and Sánchez's model represents a shift from the IA approach given that it explains HSs' grammar as a gradual restructuring process beginning with difficulties in retrieving L1 features during production to fully mirroring L2 structures onto L1 structures.

Recently, the FRH has been used to investigate acquisition patterns of child L2 acquisition (Zdorenko & Paradis, 2012) and young HSs (Cuza & Perez-Tattam, 2016). Zdorenko and Paradis (2012) investigated the use of English articles in child L2 learners from four different L1 backgrounds (Mandarin/Cantonese Chinese, Hindi/Urdu/Punjabi, Arabic, and Spanish). In English the article 'the' and 'a' express number (singular vs. plural) and definiteness (definite vs. indefinite). Using a story-telling task, the authors investigated the acquisition of definite and indefinite article in L2-English children (age 5;0 – 6;11) with different length of exposure to the L2. Children were assigned to a group according to how the L1 realizes articles. They found that, in line with the FRH, the acquisition of articles was more difficult for children whose L1 features (-definite) do not match L2 features (+definite). In addition, the most common error was the misuse of the article 'the' that works as the default value. Moreover, accuracy was found to improve with additional L2 exposure.

In order to explain why L2 speakers tend to overgeneralize the masculine form, in the case of the grammatical gender errors observed, Harley and Ritter's (2002) morphological hierarchical structure is particularly relevant in the domain of gender agreement. Formal linguistic features such as person, number, and gender have the following implicational relationship: Person > Number > Gender. That is, languages that

have grammatical gender must also have number and person, but not all languages that mark person and number have gender. For example, Spanish generally marks both number and gender in determiners, but English only marks number. Within each feature, there are marked and unmarked values. Marked feature values contain additional structures compared to the unmarked counterpart that represent default values. In this hierarchy, for Spanish, third person is the default value for person, singular is the default value for number, and masculine is the default value for gender. Default values are acquired earlier, and speakers tend to be more accurate when producing unmarked values than when producing marked values (Romanova & Gor, 2016). This hierarchical representation helps explain the over-use of masculine forms usually reported in Spanish L2 adult speakers (Alarcón, 2011; McCarthy, 2008; S. Montrul et al., 2008) and bilingual Spanish-English children (Cuza & Pérez-Tattam, 2016; Montrul & Potowski, 2007).

In relation to L2 to L1 influences, Cuza and Perez-Tattam (2016) investigated gender assignment and agreement in 32 Spanish-HSs in the US and 19 monolingual children in Mexico (age 4;7 to 9;1). The authors used a picture naming task and found significant differences between HSs and monolinguals: HSs were less accurate in their use of gender assignment and agreement and overgeneralized the masculine value when using noun+adjective constructions; however, children were more accurate in the use of noun+adjective agreement than in the use of determiner+noun assignment. Cuza and Perez-Tattam concluded that the FRH can explain these differences: as children were restructuring the morphological characteristics in Spanish to the L2 characteristics, they failed to recognize the feminine gender. The studies of Zdorenko and Paradis (2012), in

child L2, and Cuza and Pérez-Tattam (2016), in child L1-HS, both provide important evidence in favor of the FRH in child bilingualism, where acquisition patterns in both L1 and L2 can be explained by crosslinguistic effects, even in young bilinguals.

It is also possible that neither of these theories explain the grammatical gender errors usually observed in HSs. HSs may be following a developmental pattern similar to monolinguals, but at a slower rate due to insufficient language use, and no literacy support in the heritage language (Castilla-Earls et al., 2015; Morgan et al, 2013; Restrepo et al, 2010). Even though the dominant language could still have an effect in the heritage language (Serratrice, 2013), it may only slow it down instead of halting it completely.

Gender

Semantic or natural gender corresponds to the gender of animate entities, usually showing a transparent relationship between the noun and the gender of the entity: feminine for females and masculine for males. In addition to natural gender, some languages have grammatical gender. In languages with grammatical gender, nouns are assigned to classes (Foley & Van Valin, 1984:339), and this class is reflected in the forms that are taken by other elements syntactically related to it (Matthews, 1997:248), such as adjectives and determiners, that match the gender of the noun (Crystal, 2003). This assignment can be considered an arbitrary distinction that does not add semantic or pragmatic information (Nichols, 1992). Corbett (2015) stated “as a technical linguistic notion, gender is about agreement” (p. 3), where nouns control agreement targets such as articles, determiners, adjectives, and anaphoric pronouns (Franceschina, 2005). Importantly, in highly inflected languages, such as Spanish, it represents an important

role in language comprehension as it helps to disambiguate antecedents. For example, in a sentence such as *la maestra vio al chico contenta/o* 'the teacher saw the boy happy$_{Fem/Masc}$', the gender expressed in the adjective helps to identify the appropriate referent. Thus, gender also contributes to discourse cohesion by establishing grammatical dependencies across sentences (Crystal, 2003).

Gender in Spanish and English. Spanish and English differ in how they express gender. English has mainly a natural gender distinction: female or male. Some lexicalized nouns exist, such as waiter / waitress, or some exceptions such as boats that are often referred to as feminine, but this is only for animate entities that are assigned to one of the three gender categories (masculine, feminine, or neuter). Moreover, the grammatical gender system is limited: Elements in the noun phrase do not show concord with the noun (e.g. a happy woman, a happy man); however, singular third person pronouns are marked for gender (e.g. her, him, it).

In contrast to English, Spanish systematically exhibits grammatical gender in addition to natural gender (Zagona, 2003). Spanish nouns are assigned either to the feminine or masculine category. While animate entities show correspondence between natural and grammatical gender, inanimate nouns only use grammatical gender, and their assignment to masculine or feminine seems to be arbitrary. Despite this arbitrariness, noun categorization into feminine or masculine follows a general pattern based on the morphological characteristics of the noun. Canonical nouns typically end with *o* or *a*. Nouns ending with *o* usually fall into the masculine category (e.g., *carr**o*** – 'car'), while nouns ending in *a* are usually categorized as feminine (e.g., *sill**a***-'chair'). Noncanonical

nouns are those whose categorization does not reflect the noun ending and could belong to either masculine or feminine. The ending of these nouns could be a consonant (e.g., *lapi**z*** 'pencil$_{Masc}$'), another vowel (e.g., *postr**e*** 'dessert$_{Masc'}$), or they could be exceptions to the general pattern, such as *man**o*** 'hand' with an ending in **o** but categorized as feminine, and *fantasm**a*** **-** ghost' categorized as masculine.

Teschner and Russell (1984) reported that 96.3% of feminine nouns end in *a* and 99.9% of masculine nouns end in *o,* making gender a reliable pattern in Spanish. Spanish speakers may use different sources to acquire gender, such as semantic information (natural gender) or grammatical information (word ending). Researchers have found that, when assigning gender to nouns, Spanish-speaking children, at three years of age assign gender based on word endings rather than semantic transparency. This high regularity of noun endings (masculine -o, feminine -a), and the productivity of the Spanish gender system facilitate its early acquisition (Pérez-Pereira, 1991).

Gender in Spanish determiners and adjectives. Spanish adjectives and determiners must match in number and gender with the noun (Zagona, 2003). In language acquisition studies, gender assignment is the concord between the noun and determiner. Agreement, however, is the syntactic process in which adjectives agree with the gender of the noun. Gender assignment is evident in the noun phrase, where the gender of the determiner matches the gender of the noun (la-$_{fem}$ casa-$_{fem}$ – *the house*). Several authors have found that morphological cues on the determiner facilitate the processing of nouns (e.g., Dussias, Valdés Kroff, Guzzardo Tamargo, & Gerfen, 2013; Grüter, Lew-williams, & Fernald, 2012; Lew-Williams, C.; Fernald, 2007). In accessing a lexical form such as a

noun, its grammatical features (e.g., gender) are retrieved. This interpretable feature of the noun must match with the uninterpretable gender feature of the determiner (Chomsky, 1995, 2001).

Gender is also marked on adjectives. While there are some adjectives that are not overtly inflected for gender (*verde* 'green' is used indistinctively for masculine or feminine); most adjectives show gender and number agreement with the noun. For example, in *la casa*$_{\text{Fem}}$ *roja*$_{\text{Fem}}$ 'the red house', the interpretable feature of the noun (*casa*) that carries a feminine value must check the (uninterpretable) feature of the target adjective (*roja*) to satisfy full interpretation (Chomsky, 1995, 2001). In contrast to English, Spanish adjectives usually follow the noun (e.g. *la casa* ***roja*** 'the **red** house'). Additionally, Spanish allows the use of anaphoric adjectives with null nouns (e.g. *la casa*$_{\text{Fem}}$ *roja*$_{\text{Fem}}$ *ó la* $_{\text{fem}}$ *amarilla*$_{\text{Fem}}$ 'the red house or the yellow [one]'). In such cases, research has shown that gender features of the determiner and adjective allow the gender and number of the null noun to be recovered, helping young speakers, including young children, decide the referent of a noun (Arias-Trejo & Alva, 2012).

***Gender in Spanish Clitic pronouns*.** In Spanish, clitic pronouns are a very productive discourse element. The third person accusative pronouns represent a major challenge in the clitic paradigm because, in contrast with the other clitics, they have a more complex structure. The first and second person forms show agreement for person and number, while the third person forms also have to show agreement for gender ((Eisenchlas, 2003; *Mario me*$_{\textit{1PerSing}}$ *vio en el parque* / *Mario te*$_{\text{2PerSing}}$ *vio en el parque* / *Mario la*$_{\text{3PerSingFem}}$ *vio en el parque* [*a Karla*$_{\textit{Fem}}$] 'Mario saw me$_{\text{1PerSing}}$ at the park / Mario

saw you$_{2PerSing}$ at the park / Mario saw her$_{3PerSingFem}$ at the park'). Gender agreement is marked in both, animate and inanimate nouns, where feminine nouns are replaced by the accusative ***la*** (singular) or ***las*** (plural) and masculine nouns by the accusative ***lo*** (singular) or ***los*** (plural).

During speech interactions, participants need to process anaphoric referents in order to arrive at the appropriate selection of clitics. Following Nicol and Swinney (2003), in a given sentence (e.g. *necesito una silla*$_{\mathbf{Fem}}$ *ó un banco*$_{\mathbf{Masc}}$*, voy a comprar****la***$_{\mathbf{Fem}}$ *mañana* 'I need a chair or a bench, I will buy it tomorrow'), speakers identify words and their grammatical information (*silla*$_{NOUN,Fem,}$ *banco*$_{NOUN,Masc}$). The appearance of the clitic (*comprar****la***$_{\mathbf{Fem}}$) activates the set of potentially available antecedents (*silla, banco*) to be considered. Then, participants need to select which candidate must be kept according to grammatical information, such as gender (*silla*$_{\mathbf{FEM}}$), and/or semantic information.

Grammatical Gender in Bilinguals. In monolingual Spanish acquisition, gender emerges around 1:6 (e.g. Hernandez-Pina, 1984; Lleó, 1998, 2001; Mariscal, 1997). Research reports that, at early stages, children rely on noun morphological cues to assign gender (Pérez-Pereira, 1991). The determiner+noun assignment is acquired earlier than the Noun+Adjective agreement (Pérez-Pereira, 1991). Gender errors are infrequent, but when children make mistakes, there is a tendency to over-use the masculine form (Anderson & Lockowitz, 2009; Anderson & Souto, 2005). However, by age 4, monolingual children have mastered gender agreement in the different grammatical categories: determiners, adjectives and clitics (Castilla, Pérez-Leroux, & Perez-Leroux, 2010; Eisenchlas, 2003).

In contrast to native language development, grammatical gender is problematic for L2 (adult) speakers and bilingual children. L2 speakers, even at advanced proficiency stages, produce frequent grammatical gender errors (Franceschina, 2001; Montrul, 2008). Research has found that these speakers are also more accurate in gender assignment than in gender agreement (Bruhn de Garavito & White, 2002). Gender errors are higher in cases where nouns are not transparently marked, especially in the context of feminine nouns (Alarcón, 2011; Montrul, 2008). Additionally, L2 speakers seem to operate with a masculine default value that is over-generalized to feminine contexts (Franceschina, 2005; McCarthy, 2008; White, Valenzuela, Kozlowska–Macgregor, & Leung, 2004). This overgeneralization of the masculine form has been found in studies examining determiners (Bruhn de Garavito & White, 2002; White et al., 2004), adjectives (Renaud, 2014), and clitics (McCarthy, 2008). Research has found that gender errors arise during oral production and comprehension tasks (McCarthy, 2008; White et al., 2004).

Using both comprehension and production tasks, White et al. (2004) analyzed Determiner+Adjective assignment in two groups of L2 Spanish speakers (L1 French or L1 English). They reported that the use of the masculine form is not extended to comprehension in any group. In the case of masculine nouns, participants' accuracy in comprehension was significantly worse than on production for masculine nouns. McCarthy (2008), using an adapted version of White et al.'s (2004) task, studied intermediate and advanced-proficiency learners, as well as native speakers' use of gender agreement in clitics and adjectives in comprehension and production tasks. She found that in production, both intermediate- and advanced-proficiency groups relied more on

the masculine form; however, for the comprehension task, the intermediate speakers overused a feminine clitic with a masculine antecedent. A possible explanation for this is that in speech, the feminine value is more salient for the listener and therefore more salient during comprehension tasks.

The consensus in L2 Spanish adult studies seems to be that speakers use the masculine form as a default value. However, research with Spanish-speaking children has been less conclusive, and both the feminine (Anderson & Marquez, 2009; Bedore & Leonard, 2005; Bedore & Leonard, 2001; Lindsey & Gerken, 2012; Morgan et al., 2013; Restrepo & Gutiérrez-Clellen, 2001) and masculine forms have been found to be over-used (Anderson & Lockowitz, 2009; Anderson & Souto, 2005; Montrul & Potowski, 2007).

Researchers who have found that children tend to overgeneralize the feminine form have used either language samples or experimental production tasks (Bedore & Leonard, 2001, 2005; Restrepo & Gutiérrez-Clellen, 2001). For example, using language samples, Bedore and Leonard (2005), studied morphological performance in typically developing preschoolers, and preschoolers with language impairment. They reported that overall, the feminine form was the most frequently used form used in gender substitution errors. Similarly, Morgan, Restrepo, and Auza (2013; 2009) studied monolingual and Spanish-English bilingual preschoolers using an experimental morphological task and found that bilingual children made more gender errors than the monolingual children, and that the bilingual children overused the feminine form with determiners and clitics in these errors.

In contrast to the above studies, Anderson (1999) followed two Puerto Rican siblings (Beatriz and Victoria) living in the United States in a longitudinal study of 22 months. Even though parents reported that they spoke Spanish at home all the time, only Beatriz received Spanish classes twice a week at school. At the beginning of the study, Beatriz (6;7 years) had no gender errors and Victoria (4;7) produced just a few errors. At the end of the study, Beatriz made errors 5.8% of the time, while Victoria made errors on average of 20% of the time. Contrary to Beatriz whose errors did not show any specific pattern, Victoria, who started the L2 exposure at an older age and who did not receive Spanish classes, showed a tendency towards a masculine overuse.

Montrul and Potowsky (2007) reported similar results from a study with 60 Spanish-English bilingual children (6 to 11-year-olds), who were all either HSs or L2-Spanish learners attending a dual immersion program. The study also included 29 monolingual Spanish-speaking children living in Mexico for comparison. Results from two oral production tasks showed that both bilingual and monolingual children were more accurate with the masculine form than with the feminine form. The authors reported an average of 30% of errors for adjectives and 5% for determiners in the bilingual children. The authors stated that reduced input hinders appropriate lexical development, which in turns affects gender assignment and agreement.

Particularly important to the present investigation is Cuza and Pérez-Tattam's (2016) study. Researchers examined grammatical gender in monolingual and young Spanish HSs (5-10 years) in the US using a picture-naming task. They found that both monolingual and HSs were more accurate on gender agreement than on gender

assignment, contrary to Montrul and Potowsky (2007)' results. Whereas monolinguals scored at ceiling, HSs had less than 50% of accuracy in gender assignment. An error analysis showed more omissions than gender substitutions, and an overall pattern of overextension of the masculine form, with some cases of overextension of the feminine form. Nevertheless, some methodological considerations need to be addressed: (1) the stimuli used in this study targeted exclusively singular, non-canonical gender forms, such as *calle* 'street'. Even though non-canonical nouns have been reported to be the most problematic, canonical nouns could give a better understanding of how children use grammatical gender (as it has been found that children also have errors in these nouns). (2) The researchers erroneously included three feminine mass nouns. This led to determiner omissions, which is not an error in Spanish because mass nouns are mostly used without determiners. This narrowed the use of the feminine forms and the number of items that could be included in the analysis, and thus, results might not accurately reflect gender use in determiners and the relative strength and knowledge of the concord with canonical forms. (3) The researchers reported that two monolingual children made 70% of the omission errors. This makes the comparison between monolinguals-HSs problematic because it is possible that these children did not understand the task or had atypical language development. The present study addresses these methodological issues by including only count nouns, and nouns with canonical and non-canonical endings. In addition, all children in this study were tested for language ability in order to avoid confounding results.

To summarize, the arbitrariness of the Spanish gender system, the limited gender paradigm in English, the fact that young HSs are still developing their grammar, and the limited exposure to Spanish with high exposure to English contexts all make grammatical gender particularly vulnerable during language development. For young Spanish HSs, grammatical gender may be even more problematic given the change in language use patterns: as English becomes more dominant, Spanish is limited to home use and may be influenced by the lack of grammatical gender in English. In this case, the Spanish gender features may be simplified, resembling the non-grammatical gender distinction in the English system. Under these circumstances, the underspecified masculine value becomes the most available option after this simplification, as it is less cognitively demanding and more readily available in the hierarchy of gender features.

Although research on grammatical gender is abundant, to my knowledge, there is no study to date that examines grammatical gender knowledge in articles, adjectives, and clitic pronouns using a direct comparison of production and comprehension tasks from the same young HSs. Moreover, current evidence is inconclusive. Whereas some studies have found a masculine over-generalization (Anderson, 1999; Montrul & Potowsky, 2007), others have found a feminine over-generalization (Bedore & Leonard, 2001, 2005; Morgan, Restrepo, & Auza, 2009; 2013; Restrepo & Gutiérrez-Clellen, 2001). In order to clarify these competing findings, this study investigates Spanish grammatical gender in the three grammatical structures that express gender. In addition, the inclusion of both comprehension and production tasks provides a complete picture of how young children may develop this grammatical aspect in bilingual circumstances, and the examination of

gender in the parents of these HSs, will also help to interpret whether gender errors are related to the quality of the heritage language input as has been reported in previous studies (Pascual y Cabo, 2018).

The present study

This study examines grammatical gender in Spanish HSs. It has been argued that the grammar of HSs initially follows a similar development to monolinguals, but due to limited input at early ages, development stops and never reaches outcomes typically found in monolinguals (Montrul, 2008). Contrary to this theory, the present study follows Putnam and Sánchez's (2013) model, which proposes that differences in HSs' grammar may stem from a restructuring process (Lardiere, 2009), in which features from the dominant and the weaker languages converge to form a new grammatical system. As discussed earlier, this proposal is advantageous as it gives an explanation of the process of the development in HSs' grammar and does not focus only on the outcome. Moreover, it considers that differences in language use between the dominant and the heritage language result in a pattern where the less complex gender system in English restructures the grammatical gender system in Spanish. As grammatical gender is realized in Spanish, the heritage language, but not in English, the Spanish gender system may be restructured with the non-gender distinction from the dominant language, resulting in a system that retains mainly the default masculine value. To this end, this study examined grammatical gender accuracy and error patterns in determiners, adjectives, and clitics, using both comprehension and productions tasks. Finally, as stated by Pascual y Cabo and Rothman (2012), HSs' grammar may mirror the input provided by their parents, who are usually

first-generation speakers and may have undergone a language attrition process themselves. Therefore, this study also examines the performance of HSs' parents on grammatical gender accuracy in order to find whether young HSs' accuracy when using grammatical gender may be the results of their parents' performance. or the restructured grammar.

One specific goal of this study is to examine whether the differences typically found in HSs' grammatical gender use reflect IA, or a restructured grammatical system. Given that this is not a longitudinal study, two age groups were selected with similar educational history: children in preschool, who are 4 to 5 years old, and children in 3rd grade, who are 7 to 8 years old. This group combination indirectly helps distinguish between IA and restructuring by assuming that children in PK will follow similar linguistic trajectories as the children in the 3rd grade have followed. Specifically, the study addressed the following questions:

1. Are there differences between language groups (Mon vs HSs) in overall accuracy in the production of grammatical gender across ages (PK vs 3rd)?

Previous studies (Perez-Pereira, 1991) have found that in monolingual contexts, grammatical gender is mastered by age 4. Therefore, it was hypothesized that monolingual children would score at ceiling across all age-groups. For HSs, several predictions can be offered. First, if HSs' accuracy is lower than monolinguals and there is no difference between PKs and 3rd-Graders, this may suggest that grammatical gender has not been fully acquired, giving support to the IA approach. Second, if accuracy in children in the 3rd grade is lower than the accuracy in children in the PK grade, this would

suggest that the Spanish gender system is being re-constructed in a different manner, providing evidence for Putnam and Sánchez's (2013) model. Finally, it may be the case that children's accuracy improves across ages. In this case, this may be evidence that HSs need more time than monolingual children to fully master the grammatical gender system, which in turn may disprove the incomplete acquisition approach, at least at this age, and will support a protracted development.

2. Do children in the different language groups and ages and exhibit differences in grammatical gender accuracy as a function of target structure (determiners, adjectives, and clitics)?

HS are expected to be more accurate when using determiners than when using adjectives or clitics as adjectives are a more complex structure that requires mastery of additional linguistic domains.

3. Do children, in different language groups and ages, exhibit differences in grammatical gender accuracy as a function of type of task (comprehension vs. production)?

It is expected that HSs will perform significantly better in comprehension tasks than in production tasks because language production is constrained by syntactic and semantic constrains, while comprehension is mainly driven by frequency.

4. What are the gender error patterns in comprehension and production across grammatical structures?

It is hypothesized that when gender errors are made, HSs will overuse the masculine value in feminine contexts. However, a masculine overgeneralization is also expected in monolingual speakers. Therefore, if the masculine overgeneralization does not differ between PK-HSs and 3rd-HSs it would be evidence for the IA. If overgeneralization is higher in 3rd-HSs, this will go in line with the FRH (Lardiere, 2009) and Putnam and Sánchez' model (2013), giving support to the restructuring process because of the limited activation of the heritage language. Finally, if 3rd-HSs' overgeneralization is lower than PK-HSs, evidence for protracted language development would be suggested (Castilla-Earls et al., 2015; Morgan, Restrepo, & Auza; 2013; Restrepo et al, 2010).

5. Do patterns of language use (input and output) measured in number of hours per week and language proficiency predict HSs' accuracy in grammatical gender production?

In the case of grammatical gender, low frequency of Spanish use together with high proficiency in the dominant language may result in a reconfiguration by incorporating the no-gender distinction in English into the Spanish grammatical system. That is, the two gender distinctions in Spanish, feminine vs. masculine, would be reconfigured in a system with only one value: the masculine. Therefore, it is expected that patterns of Spanish use and English proficiency may predict HSs' use of grammatical gender. Children with lower patterns of Spanish use and high English proficiency will be less accurate in grammatical gender.

6. Is HSs' accuracy on grammatical gender production correlated with the accuracy in HSs' parents?

L1 attrition has been found in speakers who arrive before puberty to the L2 country, and grammatical gender is early acquired in monolingual contexts. In addition, first-generation speakers usually arrive to the US after puberty. Therefore, it may be expected HSs' parents have high accuracy in grammatical gender use and will show no correlation with their children's performance.

METHOD

Participants

A total of 128 participants took part in this study. Participants were divided into four groups of children: two groups of HSs and two groups of Spanish-monolingual children, each group divided into preschool and third-grade groups. Additionally, in order to rule out that errors in HSs' were not the result of parents' possibly attrited input that parents provided at home, a group of HSs' parents was included in the study.

HSs and their parents were recruited from the Phoenix metropolitan area from families who reported that Spanish was the primary home language. A total of 16 parents of HSs participated in the study (ages 24-48, mean 36) by taking the same experimental tasks for their children. All parents were first-generation Spanish-speakers (years residing in the US 11-25, mean 14.9). There were 15 mothers and 1 father. All families were of Mexican origin. The younger HSs (PK-HSs) were recruited from four Head Start preschools at the end of the academic year to ensure that they have been exposed to English at school for at least six months. Older HSs (3rd-HSs) attended third-grade classrooms in seven public school and started English-only education in preschool. Monolingual children were born and raised in Mexico and were recruited from preschools (PK-Mon) and third-grade classrooms (3rd-Mon) in central Mexico. All

groups were from similar low socioeconomic statuses based on the answers provided in the parent questionnaire and school demographic information.

Participant selection criteria. In order to ensure that grammatical gender differences were not the result of language impairment, cognitive or hearing deficits, children in all groups completed standardized assessments and met the following criteria:

a) All children passed a pure-tone hearing screening at 20 dB HL at 500, 1000, 2000, and 4000 Hz in both ears as a hearing screening test according to the American Speech and Hearing Association's standards (American National Standard Institute, 1996; ASHA, 2012).

b) They scored greater than 80 on the non-verbal cognitive test, the Wechsler Non-verbal Scale of Ability (WNV, Wechsler, 2006).

c) They did not have parent or teacher concern regarding language development based on parent and teacher questionnaires.

d) They scored above 78 on the Core Index Score on at least one of the Spanish or English versions of the *Clinical Evaluation of Language Fundamentals* (Semel, Wiig, & Secord, 2003, 2004; Wiig, Semel & Secord, 2006, Wiig, Secord & Semel, 2009).

e) For language history requirements, HSs were required to have been raised by first-generation immigrants and either be US-born or have arrived before age three so that they have started English-only education in preschool. All children were US-born, except for one in the 3rd HSs group. This child was born in Mexico but arrived before preschool.

All monolingual children had to show no contact with another language on a regular basis. Concerning dialectal variation, the Spanish spoken at home was from Mexico.

These criteria resulted in the exclusion of eight children for the following reasons: (1) scored below the cut-off score (78 for HSs, 85 for Monolinguals) on the language ability test indicating possible language impairment (three 3rd-HSs and one 3rd-Mon), (2) scored below 75 in the cognitive test (three 3rd-Mon), and (3) categorized as bilingual in the monolingual group (1 3rd-Mon). A total of 104 children were included in the final analysis. A *t*-test comparison for age between groups showed that neither the PK-Mon differed from the PK-HSs nor did the 3rd-Mon from the 3rd-HSs. In addition, results from the CELF-preschool showed that the PK-Mon did not differ from the PK-HSs. However, the 3rd-HSs scored significantly lower than the 3rd-Mon. Final demographic data for children are shown in Table 1.

Table 1

Participant Characteristics.

	Preschool		3rd grade	
	Mon (*n*=32)	HSs (*n*=25)	Mon (*n*=24)	HSs (*n*=23)
Gender+				
Male	17	14	11	9
Female	15	11	13	14
Age in months+	60.1 (4.5)	59.5 (6.3)	101.2 (4.5)	100.4 (7.0)
Standardized test				
CELF-Spanish*	106.0 (11.6)[a]	100.0 (10.5)[a]	103.9 (9.8)[b]	82.7 (10.5)[b]
CELF-English*	-	72.8 (12.5)[a]	-	92.3 (8.9)[b]
Wechsler*	102.6 (13.2)	104.4 (11.4)	95.4 (8.1)	97.6 (10.6)

Note: CELF – Clinical Evaluation of Language Fundamental, a) CELF-Preschool, b) CELF-4. + No significant differences between groups.

Participant selection measures

Standardized assessments

Wechsler Nonverbal Scale of Ability. (WNV, Wechsler, 2006). This scale is a nonverbal measure of cognitive ability for individuals aged 4 to 21. This measure is used to control for linguistic and cultural differences when assessing IQ. Norms for this test were based on a standardized sample of 2,200 speakers divided into 11 age groups. This sample was designed to match the U.S. population on education level, age, and sex. The screener version of the scale was used for this study according to the child's age group. For children between 4 and 7 years old, the screening includes the Matrices and Recognition subtests. For 8-year-old children, the screening includes the Matrices and Spatial Span subtests. The Matrices subtest measures perceptual reasoning where children look at an incomplete figural matrix and identify the missing part from 4 to 5 possible choices. The Recognition subtest measures immediate memory. Children look at a geometric figure for 3 seconds then select the matching stimulus out of 4 or 5 choices. The Spatial Span subtest measures working memory. Children were instructed to repeat a sequence of tapping on different blocks in the same order (forward) as demonstrated by the examiner and later tapping a new sequence in reverse order. Scores above 80 are considered normal.

The Clinical Evaluation of Language Fundamentals tests (CELF). The CELF test is an individually administered test to (a) assess a speaker's linguistic skills, (b) determine the presence of a language disorder, and (c) describe the nature of the disorder. This test assesses four linguistic aspects: morphology and syntax, semantics, pragmatics,

and phonological awareness. There are several versions of this test (Spanish and English versions) that are used according to the speaker's age and language. The CELF-Preschool-Spanish (Wiig, Secord, & Semel, 2009), and the CELF-Preschool-English (Semel, Wiig, & Secord, 2004) are used in children ages 4 to 6. The CELF-4-Spanish (Wiig, Semel, & Secord, 2006) and the CELF-4 English (Semel, Wiig, & Secord, 2003) are used in children ages 5 to 8.

The CELF is composed of a series of subtests that can be administered as an independent test and has been designed for specific language skills. According to research on test validity (Plante & Vance, 1994), sensitivity (the accuracy of correctly identifying children with language impairment) ranges from unacceptable to good, while specificity (the accuracy of correctly identifying children with typical language development) is considered good. The technical manuals indicate a test-retest reliability across subtests above .80, with most above .85.

The presence of a language disorder is determined by calculating the Core Language Index Score that is composed of different subtests (language and age-specific). Scores are reported in standard scores allowing for comparisons across subtests and tests. Standard scores of 85 to 115 are considered within the normal range. However, Barragan, Castilla-Earls, Martinez-Nieto, Restrepo, and Gray (2018) found that dual language learners, especially those with risk factors (low SES, low parental education, and language minority context), may have low scores on standardized assessment because of these risk factors. These authors suggested the use of lower cut-off scores for these dual language speakers. For the purpose of this study, I adopted their suggested cut-off score

of 78 as an indicator of possible language disorder in the bilingual group, as for the monolingual group I retained the recommended CELF cut-off score of 85.

The CELF-preschool 2-Spanish edition is composed of the following subtests: Basic Concepts, Word Structure, Recalling Sentences, and Concepts and Following Directions. The CELF-Preschool-English edition is composed of Sentence Structure, Word Structure, and Expressive Vocabulary. As for the CELF-4 Spanish and the CELF-4 English (5 to 8 years old), the core index score is composed of Concepts and Following Directions, Word Structure, Recalling Sentences and Formulated Sentences. Subtests are briefly described in Table 2.

Table 2

Description of Subtests of the CELF Test.

Subtest	Age	What this assesses	Task
Basic Concepts	3-6	Knowledge of concepts of direction, sequence, size, and position	Children point to a picture based on an orally presented sentence
Word Structure	3 – 8	Knowledge of early acquired morphological rules	Children complete an oral sentence in reference to a visual stimulus
Recalling Sentences	3 – 8	Children's ability to recall sentences varying in complexity without changing inflections, derivations	Children listen and repeat sentences orally presented
Expressive Vocabulary	3 - 6	The ability to label pictures of people or actions	Children complete sentences with target vocabulary and structure
Concepts and Following Directions	5 – 8	The ability to interpret, recall and execute oral commands	Children point to pictures following oral directions
Sentence Structure	3 – 6	The ability to interpret spoken sentences	Children identify a picture based on an orally presented sentence
Formulated Sentences	5 – 8	The ability to formulate complete, semantically and grammatically correct spoken sentences	Children provide sentences based on a given word and a visual stimulus

Language Proficiency

Frog story and Systematic Analysis of Language Transcripts (SALT Transcription). This task evaluates language proficiency through a story-retelling task. The approximate test time was 10 minutes per language. It was administered to all children with three objectives. First, it could serve as a language sample for a speech-language pathologist to evaluate the child's language ability in case of confounding scores on the CELF Core language index. Second, as this study adopts Polinsky and Kagan's (2007) definition that requires HSs be able to express themselves in Spanish, the task was also used to confirm language proficiency in Spanish. Finally, English proficiency was measured to analyze its contribution to grammatical gender performance. In this task, children retold the wordless storybook *Frog on his Own* (Mayer, 1973). The Spanish and English language samples were administered on different days. The order of presentation was counterbalanced with at least one week between each version.

The story was presented as a PowerPoint presentation with a recorded script in each language that was recorded by a native speaker of that language. Children looked at the PowerPoint presentation while listening to the story. Immediately after listening, children retold the story to the examiner in the same language while looking at the slides at his/her own pace. The language samples were recorded and later transcribed and coded by a research assistant and then reviewed by the author. Transcription and coding were done using the SALT software conventions, where unintelligible, abandoned and interrupted utterances are excluded. Sentences containing grammatical errors were coded as erroneous utterance [E]. In case of discrepancies, decisions were reached by

consensus. Code-switching within the utterance was accepted and included for all calculations. However, code-switching at the utterance level was excluded completely from the analysis. From these transcriptions, measures of language proficiency were determined for both languages using the SALT software.

Language Proficiency Measures: The measures used in this study have been identified as the most sensitive within language sample analysis (Bedore et al., 2010; Gutiérrez-Clellen, Restrepo, Bedore, Peña, & Anderson, 2000; Gutiérrez-Clellen & Simon-Cereijido, 2009; Jackson-Maldonado & Maldonado,2017; Miller et al., 2005; Restrepo, 1998) as they increase developmentally and show good sensitivity in the identification of language impairment.

Mean length of utterance (MLU). It is a measure of syntactic development. It was computed in words by adding the total number of words in a sentence and dividing the result by the number of sentences in the language sample. A sentence is any main clause and its dependent clauses.

Number of Different Words (NDW). This is a measure of general semantic diversity. To calculate the NDW, Spanish word-forms were linked to their morphological root to avoid overestimation based on multiple forms of the same root word (e.g., *llevó*, *llevaron* 'he took, they took' were linked to *llevar* 'take', *flores* 'flowers' was linked to *flor* 'flower').

Subordination Index (SI). The SI is a measure of syntactic complexity, which represents a ratio of the total clauses to the total number of terminable units (TU). To obtain this measure, samples were segmented using TUs (Hunt, 1965) following

Gutiérrez-Clellen and Hofstetter's (1994) adaptation for Spanish that allows for non-overt subjects. A TU is a main clause and all its subordinated clauses: For example, *La rana se fue cuando nadie la vio* 'The frog left when nobody saw it' represents one TU, while *La rana atrapó una mosca y se la comió en el barc*o 'The frog caught a fly and ate it' represents two TUs in Spanish but only one in English as segmenting would result in an ungrammatical sentence.

Grammaticality Index (GI). Sentences with grammatical errors were marked as ungrammatical. GI was computed by dividing the total number of grammatically correct TUs by the total number of TUs.

Questionnaires

Parent Questionnaire. A parent questionnaire was used to determine concern for language development and track information on HSs' language use. It included 29 questions related to the child's demographic information, parents' concern on the child's language abilities, and child's language background and proficiency. Questions about patterns and degree of input and output in each language were measured per hour in a typical child's week. Information about language use in a typical week and perceived proficiency was used to determine the contribution of language-use patterns on grammatical gender accuracy. The use of parent reports has been found to be a reliable measure on child's language proficiency (Gutiérrez–Clellen & Kreiter, 2003; Jackson-Maldonado et al., 2003; Restrepo, 1998).

The questionnaire also included questions for parents about their own time of residence in the US, their profession, their language and educational background. A 4-

point Likert scale was used to indicate their English proficiency for speaking (0 = Some words or phrases, 1= Can have a simple conversation, 2 = Fluently with errors, 3 = Fluently) and understanding (0 = nothing, 1= Some words or phrases, 2 = Basic commands, 3 = The majority of what is said, 4 = Everything that is said). Data on parents' English proficiency are presented in Table 3.

Table 3

Percentage of HSs' Parents at each level of Self Report of English Proficiency

	Speaking			Understanding	
	Mother	Father		Mother	Father
Not speak at all	22.9	2.1	Not at all	6.3	0.0
Some words/phrases	35.4	33.3	Some words/phrases	31.3	10.4
Simple conversations	16.7	22.9	Basic commands	22.9	39.6
Fluently with some errors	12.5	6.3	Most of what is said	25.0	14.6
Fluently	6.3	14.6	Everything that is said	8.3	14.6
Did not respond	6.3	10.4	Did not respond	6.3	10.4
Not applicable	0.0	10.4	Not applicable	0.0	10.4
Total	100.0	100.0		100.0	100.0

In order to assure proper understanding of the questions, the author administered the questionnaire. It required about 10 minutes to complete. See Appendix C for this questionnaire.

Teacher Questionnaire. A teacher questionnaire was used to discard possible concerns about the child's language ability. Teachers' ratings of proficiency and ability have been found to be significantly correlated to children's language performance. In this study, teachers were asked to report concern (either not concerned, somewhat concerned or very concerned) for hearing, speech development, oral language development, literacy

development, motor skills, thinking skills, and social skills. Even though HSs attended English-only schools, there were bilingual teachers who provided information about Spanish use in the classroom. Language use in the classroom was a 4-point Likert scale to indicate Spanish and English language use (0 = Never, 1= Occasionally, 2 = Frequently, 3 = Always). Additionally, teachers rated children's language proficiency in both languages for expressive and receptive skills on a 5-point Likert scale ranging from 1= understands/speaks very little to 5 understands/speaks as well as a native speaker. The author gave the 10-question questionnaires to the teachers to answer on their own. Reports from the teacher indicated that none were concerned' for hearing, speech development, oral language development, motor skills, thinking skills and social skills. Some were concerned with the children's literacy development. See Appendix D for this questionnaire.

Experimental tasks

In order to test for differences related to the type of task, the study included two comprehension tasks (one for determiner+adjective agreement and one for clitics) and three production tasks (determiner+noun, noun+adjective, and clitics). Only common, concrete, and countable nouns were included in the tasks. In addition, all nouns and adjectives (Appendix E) were high-frequency words that are typically used by young children. The total number of nouns included throughout the tasks was 28: 16 feminine and 12 masculine. Twenty three out of the 28 nouns are part of the *Inventario del Desarrollo de Habilidades Comunicativas* (the Spanish version of The McArthur-Bates Communicative Development Inventories, [CDI], Jackson-Maldonado et al., 2003). The

CDI is a standardized assessment that evaluates language development in children, ages 8-30 months, from Spanish-speaking families by means of a parent report. Words included in the CDI have been found to be acquired by 30-months-of age. The instrument has been normed in 2,000 Spanish-speaking children. Only one (*abierto/a* 'open') out of the 6 adjectives used in the tasks is not part of the CDI. Additionally, research assistants administered a vocabulary test to the participants in order to examine lexical knowledge of all the items used across the tasks. Further characteristics of the nouns are explained within each task.

Expressive Vocabulary test (Voc). The vocabulary test included 28 colorful cartoon images[1] that were used in the different tasks. The examiner showed an image to the child and asked him/her: *¿Qué es esto*? 'What is this?' The examiner modeled the response. There were four training items. If the child made an error or responded with an English word, the research assistant asked the child if he/she knew another word for this. An example of this task is shown in Figure 1.

[1] The images used in this study were Royalty-Free. All images were taken from a website where no membership was required.

Examiner: *¿Qué es esto?*
'What is this?'
Child: *Una cuchara*
A spoon

Figure 1. Example of The Vocabulary Task

Grammatical Gender Comprehension Tasks. There were two gender comprehension tasks, one to assess clitics and one to assess adjectives. These measures used a picture identification task adapted from White et al.'s (2004) task of two characters going on vacation. In order to identify the correct picture, children needed to rely on grammatical gender information expressed in the auditory stimulus. The experimenter administered this test on a touchscreen laptop. For each task presented, there were 8 feminine nouns (4 singular and 4 plural, each containing 2 transparent and 2 opaque nouns) and 8 masculine nouns (4 singular and 4 plural, each containing 2 transparent and 2 opaque nouns).

Clitics Comprehension (C-Clitic). This task used White et al.'s (2004) and McCarthy's (2008) format where the experimenter told the participants that two characters were going on vacation and needed to pack several things. In this study, the examiner told the children that, as the characters were playing with the children, they

were not going to mention the objects depicted in the pictures and they, the children, had to choose what they were talking about. As clitics require a previous referent, the story provided the context for the target structures. Additionally, as the use of clitics in this task is based on a traveling story, the nouns corresponded to objects that can have physical manipulation and logically match the story. For example, the words 'shoes' or 'books' are common items to be packed for traveling. Four training items were used to familiarize children with the task. This was followed by the statement: *Enséñame dónde quiere ir María* 'Show me where Maria wants to go'. An example of the training phase that included a complete dialogue is displayed in Figure 2.

Figure 2. Example of the Training Phase in The Comprehension Tasks.

After the training phase, and in order to simplify the task, the following items did not include a complete dialogue, but rather just a command that worked as the oral stimulus containing a clitic while displaying four different pictures. Consider Figure 3 for the target item *llaves* 'keys' that is a plural, feminine noun:

Oral stimulus: *Guárdalas*$_{Fem}$ 'Take them'

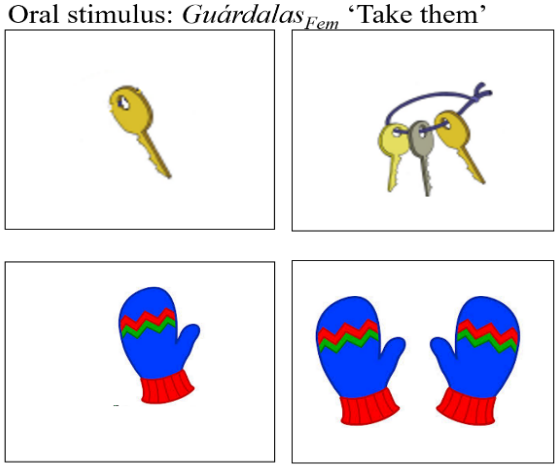

Figure 3. Example of the Clitic Comprehension Task.

In order to identify the correct item, children needed to rely on the gender and number expressed in the clitic ***LAS*** 'them$_{FemPlural}$'. Only one picture matched the information provided by the clitic (*llaves*$_{FemPlural}$), the second picture matched in number but differed in gender (*guantes*$_{MascPlural}$), the third picture differed in number and matched in gender (*llave*$_{FemSing}$), and the fourth picture differed both in number and gender (*guante*$_{MascSing}$). Children responded by touching one of the pictures on the screen. The application recorded the children's response for future analysis.

The Comprehension Determiner+Adjective Task (C-DA). As in the previous task, children were asked to identify a picture that matched a given phrase. Each phrase used null nominals (Determiner+Adjective) where correct interpretation of the nominal depends on gender features realized explicitly on adjectives and determiners (*las*$_{FemPl}$ *mojadas*$_{FemPl}$ 'the wet [ones]'). All phrases began with "*Señala…*" 'Point to…', followed by the target construction. All nouns were semantically possible with the selected adjectives and visually clear. For example, "dirty and shirt" are semantically possible and

visually clear. Adjectives for this task were also identified as early acquired. However, adjectives that do not inflect for grammatical gender were not included (*grande* 'big', *azul* 'blue' are used in feminine or masculine contexts). See Figure 4 for the target item *llave* 'key' that is a feminine+singular construction:

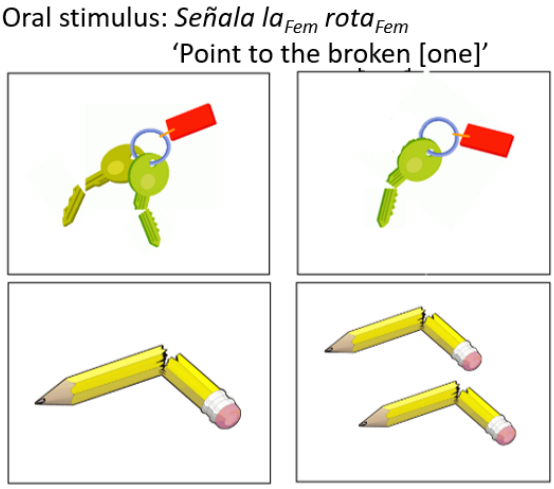

Figure 4. Example of The Determiner+Adjective Comprehension Task

As in the Clitic task, only one picture matched on gender and number (*llave*$_{\text{FemSing}}$); the second picture matched in number but differed in gender (*lápiz*$_{\text{MascSing}}$); the third picture matched in gender but differed in number (*llaves*$_{\text{emPlural}}$); and the fourth picture differed both in number and gender (*lapices*$_{\text{MascPlural}}$). Children responded by touching one of the pictures on the screen. Responses were stored for future analysis. The list of adjectives used can be found in Appendix E.

Grammatical Gender Production Tasks. There were two production tasks. One to elicit Determiner+Noun+Adjective constructions and one to elicit Clitics. As in the Comprehension tasks, items for the Determiner+Noun+Adjective and Clitics tasks included 8 feminine nouns (4 singular and 4 plural, each containing 2 transparent and 2

opaque nouns) and 8 masculine nouns (4 singular and 4 plural, each containing 2 transparent and 2 opaque nouns). There were four training items at the beginning of each task.

The Production Determiner+Noun+Adjective task (P-DA). This task was a picture description task, using Cuza and Pérez-Tattam's (2016) format with different nouns. In this format, every item in the task used two contrasting pictures as a stimulus. See example in Figure 5(a) for the target item *camisas*$_{\text{FemPl}}$ 'shirts'. The first picture served as a prompt for the target item that was displayed in the second picture. In this picture, children looked at an object and responded to the question '*¿Qué ves aquí*? 'What do you see here?' For the second picture, that displayed the same object but with contrasting characteristics, children were asked '*¿Y aquí qué ves*? 'and what do you see here?' See Figure 5(b) for the expected response *unas*$_{\text{FemPl}}$ *camisas*$_{\text{FemPl}}$ *sucias*$_{\text{FemPl}}$ 'some dirty shirts.' Nouns for this task were semantically possible and visually clear with the chosen adjectives. Four items were used as a training phase where children were told to respond with complete answers. As in the comprehension tasks, adjectives that do not inflect for grammatical gender were avoided. Expected adjectives for this task are listed in Appendix E.

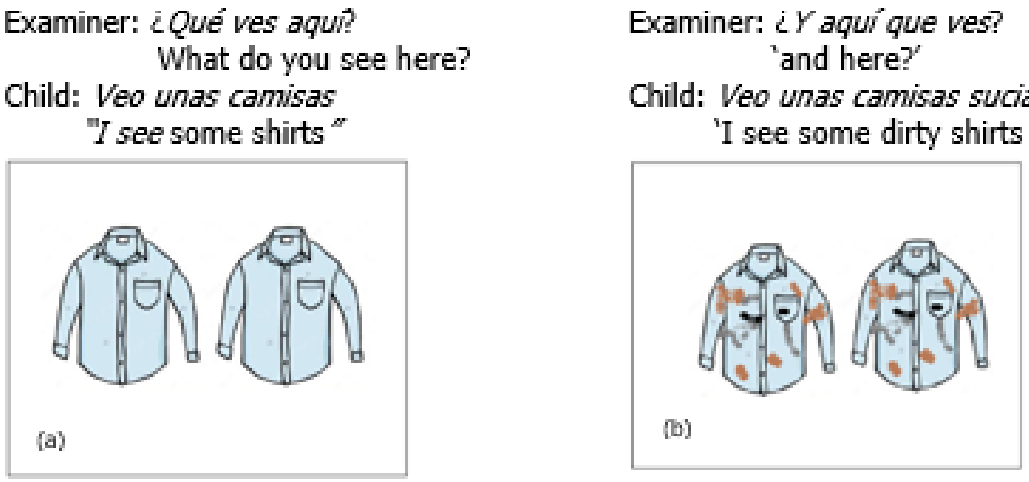

Figure 5. Example of The Determiner+Noun+Adjective Production Task

The Production Clitic Task (P-Cli). This task was an adapted version of the Spanish Screener for Language Impairment in Children (SSLIC; Restrepo, Gorin, & Gray, 2013). It follows a sentence completion or cloze format supported by pictures to elicit the target word and morpheme. Nouns for the stimulus were selected based on possible physical manipulation by the character in the picture. Care was taken to avoid that a verb could be a possible answer (e.g. What does the boy do with the broom? Sweep). Additionally, the use of continuous tense was avoided because it may elicit a continuous form as a complete answer (e.g. What is the girl doing with the dishes? Cleaning). An example of the target item *Lápiz* 'pencil' is displayed in Figure 6.

Examiner: *¿Qué hizo el perro con el lápiz?*
'What did the dog do with the pencil?'
Child: *se lo comió / lo mordio / quiere llevarselo*
[it] eatit / bit it / want to take it

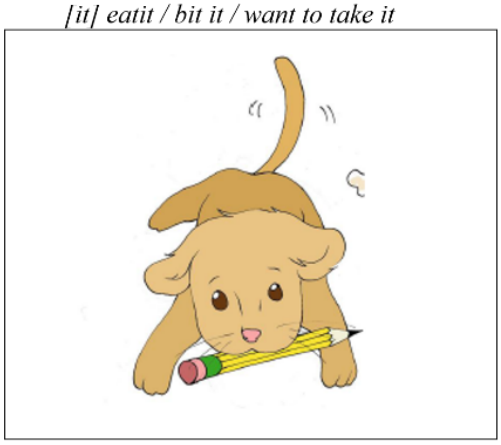

Figure 6. Example of The Production Clitic Task

Procedures

The procedures wer approved by the Institutional Review Board committee at Arizona State University (Appendix A) in accordance with the Declaration of Helsinki. Prior to their participation in the study, parent consent forms were distributed among children (Appendix B). The author interviewed the parents who authorized their child's participation and filled out the parent questionnaire (Appendix C) that tracked information about language use at home and characteristics of the child's language performance. Teachers also completed a questionnaire (Appendix D) about language performance in the classroom for each child. Either the author or a research assistant tested the children individually in a quiet area. Preschool children were tested within the school during school hours. Third-grade children were tested in a school during an after-school program. Two to four testing sessions were needed to complete the tasks, each one lasting between 20 to 40 minutes. The standardized assessment for language ability and the language proficiency test were always conducted prior to the experimental tasks.

Children who did not meet the specified criteria for these tests were not included in the study. The order of presentation for comprehension and productions tasks was counterbalanced: half of the children took the comprehension tasks before the production task, and half, the opposite order. Production tasks were recorded and later entered for analysis. Parents who agreed to participate took the same experimental tasks as their children.

When children produced non-target responses, the examiner prompted the child to respond in a different way. For example, following the response *unas flores mojándose* 'some flowers getting wet, the examiner asked *¿y cómo quedan después de mojarse?* 'and how are they after getting wet?' For adjectives, any adjective was accepted as long as it showed gender (e.g., *rotado, brokado* for *roto* 'broken'). If after two additional prompts the child still did not produce the target structure, the examiner continued with the next item.

Analysis

The first research question for this study examined the comparison of the overall accuracy in grammatical gender use in production tasks across the language groups (monolinguals vs. HSs) and age groups (PK vs. 3rd grade). The second research question examined whether children exhibit differences in grammatical gender accuracy as a function of target structure (determiners, adjectives, vs. clitics). The third research question examined whether children exhibit differences in grammatical gender accuracy as a function of task mode (comprehension vs. production). The fourth research question examined the error patterns in comprehension and production tasks. To answer these

questions, linear mixed model analyses were conducted on the data that included only responses with grammatical gender information. Language Group (Monolinguals vs. HSs) and Age Group (PK vs. 3rd grade) were entered as between-subject factors and type of task (comprehension vs. production), target structure (determiner, adjective, vs. clitics) and target gender as within-subject factors. The dependent variable was accuracy in gender.

Mixed-effect modeling allows several possibilities: First, it allows handling missing data without completely losing the participant with missing data. Second, it deals better with non-independent samples. Finally, it can consider random effects in the analysis that may occur during the course of testing; "The general principle is that a by-subject random intercept is needed whenever there is more than one observation per subject" (Barr, Levy, Scheepers, & Tily, 2013, p 262). Therefore, the analyses conducted to answer the research questions in this study included participants as a by-subject random effect.

The fifth question addressed whether HSs' use of grammatical gender is predicted by patterns of Spanish use and English proficiency. A three-stage hierarchical multiple regression was conducted to predict the overall grammatical gender accuracy in production tasks of the three target structures combined. Spanish language proficiency measures were entered at stage one, English proficiency measures were entered at stage two, and language use of Spanish was entered at stage three.

The final research question examined whether children's accuracy on grammatical gender production correlated with the accuracy of the HSs' parents. To

answer this question, a correlation analysis between HSs' accuracy and parents' accuracy was conducted to determine the correlation and its significance.

RESULTS

Data Cleaning

The purpose of this study was to examine grammatical gender use in two age groups of HSs when using determiners, adjectives, and clitic pronouns during comprehension and production tasks. In addition, I examined how HSs' performance compared to monolingual speakers of the same age. Experimental tasks were designed to elicit these grammatical structures with overt grammatical gender. Preliminary scoring indicated that some children produced responses using a different structure or produced the target structure with an element lacking explicit gender marking. For example, in the determiner task, some children produced: (a) a bare noun for a singular stimulus (e.g., *taza* 'cup'), (b) a numerical determiner (which has no gender marking) for plural stimulus (e.g., *dos flores* 'two flowers'), or (c) a plural response with no determiner (which is a grammatical response in Spanish, e.g. *flores* 'flowers'). For the adjective task, some non-target responses were: (a) adjectives with no gender marking (*felices* 'happy'), (b) the use of a description (*unas flores mojandose* 'some flowers getting wet') and (c) no adjective (*unas flores*). As for the clitics, non-target responses were: (a) the use of a noun phrase instead of a clitic, (b) the verb by itself, and (c) a case substitution (use of *le* 'to him/her').

A first analysis taking into account all the responses (with or without overt grammatical gender) was conducted in order to look at children's overall performance in production tasks. In this preliminary analysis, grammatically correct responses without overt grammatical marking were considered correct for grammatical gender use.

Responses with overt gender marking were evaluated for correct or incorrect use. Overall, children were more accurate when using determiners and adjectives than when using clitics. Results from this preliminary analysis are shown in Table 4.

Table 4

Mean Accuracy Percentage per Grammatical Structure

	PK Mean (SD)				**3rd** Mean (SD)			
	Mon		**HSs**		**Mon**		**HSs**	
Determiners	98.0	(0.14)	74.6	(0.46)	99.7	(0.05)	79.2	(0.41)
Adjectives	95.4	(0.21)	65.3	(0.48)	95.3	(0.21)	79.7	(0.40)
Clitics	77.5	(0.42)	50.3	(0.50)	89.3	(0.31)	64.6	(0.48)

Even though this analysis shows that HSs had lower performance in grammatical gender when compared to monolinguals, it only gives overall information about children's overall production on these elements and does not show what children do when using grammatical gender. Therefore, final results will be presented only on responses that overtly showed gender marking. Responses with no grammatical gender marking were considered non-valid responses and were coded as missing data. Detail of missing data is presented by grammatical category in order to provide cases within each category.

Table 5 shows missing data for Determiners, Table 6 for Adjectives, and Table 7 for Clitics.

Table 5

Percentage of Valid and Non-Valid Responses in Determiners

	Monolinguals		HSs	
	Pk	3rd	Pk	3rd
Valid Responses	85	81.5	70.5	76.3
Non-Valid Responses	15	18.5	29.5	23.7
no-Noun	3.9	1.4	28	9.9
Singular without determiner	13	1.4	22	20.9
Plurals	83.1	97.2	50	69.2
Numerical determiner*	43.8	87.0	37.3	38.1
No-determiner*	56.3	13.0	62.7	61.9

* Percentage based on total non-valid responses in plural nouns

Table 6

Percentage of Valid and Non-Valid Responses in Adjectives

	Monolinguals		HSs	
	Pk	3rd	Pk	3rd
Valid Responses	98.6	96.1	87.3	95.8
Non-Valid Responses	1.4	3.9	12.8	4.2
No noun	42.9	6.7	29.4	0.0
No response	14.3	66.7	45.1	68.8
Unrelated response	42.9	0.0	0.0	6.3
No overt marking	0.0	26.7	25.5	25.0

Table 7

Percentage of Valid and Non-Valid Responses in Clitics

	Monolinguals		HSs	
	Pk	3rd	Pk	3rd
Valid-Clitic	87.1	93.8	69.5	88.5
Non-valid	12.9	6.3	30.5	11.5
Case substitution (le)	24.2	16.7	11.5	47.7
Verb	30.3	33.3	40.2	15.9
Noun Phrase	42.4	45.8	32	34.1
Unrelated	3	4.2	16.4	2.3

Descriptive Statistics

Means and standard deviations for the productions tasks are presented in Table 8, Table 9 shows results for the comprehension tasks.

Table 8

Mean Accuracy Percentages (SD) in Production Tasks

	Monolinguals		HSs	
	PK	3rd grade	PK	3rd grade
Determiners	99.5 (6.8)	100.0 (0.0)	71.6 (45.2)	80.2 (39.9)
Adjectives	95.4 (20.9)	97.8 (14.6)	72.5 (44.7)	84.1 (36.6)
Clitics	89.0 (31.3)	95.3 (21.2)	72.3 (44.8)	72.9 (44.5)
Overall	94.6 (22.5)	97.6 (15.3)	72.2 (44.8)	79.1 (40.6)
Group	96.1 (19.8)		75.7 (42.9)	

Table 9

Mean Accuracy Percentages (SD) in Comprehension Tasks

	Monolinguals		HSs	
	PK	3rd grade	PK	3rd grade
Determines	*	*	*	*
Adjectives	58.2 (49.4)	79.5 (40.4)	54.3 (49.9)	54.3 (49.9)
Clitics	55.0 (49.8)	81.8 (38.7)	48.5 (50.0)	50.9 (50.1)
Overall	56.6 (49.6)	80.6 (39.5)	51.4 (50.0)	52.6 (50.0)
Group	68.6 (47.0)		52.0 (50.0)	

* No comprehension task was included for Determiners

Overall accuracy between groups

The first research question examined the differences between language groups (Mon vs. HSs) in overall accuracy in the production of grammatical gender across ages (PK vs. 3rd) and the possible interaction between age and language group. The linear mixed model analysis showed that the random intercept was significant F (1,102) = 6937.4, $p < .01$, justifying the inclusion of a random intercept in the model. Results showed a main effect of language group F (1, 102) = 102.1, $p < .01$ and Age Group F (1, 102) = 7.3, $p = .008$. HSs were overall less accurate than the monolingual children F (1, 102) = 102.1, $p < .001$, and the PK participants were less accurate than their 3rd grade counterparts F (1, 102) = 7.3, $p < .001$.The age by language interaction was not significant F (1, 102.8) = 1.5, $p = .23$. Simple main effects comparing performance of age groups within language groups showed that the PK-Mon did not differ from the 3rd-Mon F (1, 100) = 1.2, $p = .27$, but the PK-HSs were significantly less accurate than the 3rd-HSs F (1, 105) = 7.1, $p = .009$. Simple main effects comparing performance of language groups within age groups showed that in the preschool group, the monolingual children

were more accurate than the HSs F (1, 105) = 69.3, p < .001and in the 3rd Grade group, monolingual children were more accurate than the HSs F (1, 100) = 36.8, p < .001. As the 3rd_HSs had a lower performance than the PK-Mon, an independent sample *t*-test analysis was conducted to compare the overall accuracy in the PK-Mon and the 3rd-HS. The difference was significant t(1384) = 10.8, p < .001, showing that older 3rd-HSs differed significantly from the PK-Mon. Figure 7 shows a visual depiction of these effects. Full results of the mixed-effects model are shown in Table 10.

Table 10.

Linear Mixed-Effects Model Results for The Overall Accuracy in Production Tasks

	Estimate	*SE*	*df*	*t*	*p*
Intercept	0.792	0.021	101.3	36.7	< .001
Language Group (HSs)	0.182	0.030	100.7	6.1	< .001
Age Group (PK)	-0.080	0.030	105.4	-2.7	< .001
Language_Group * Age_Group	0.049	0.041	102.9	1.2	0.23

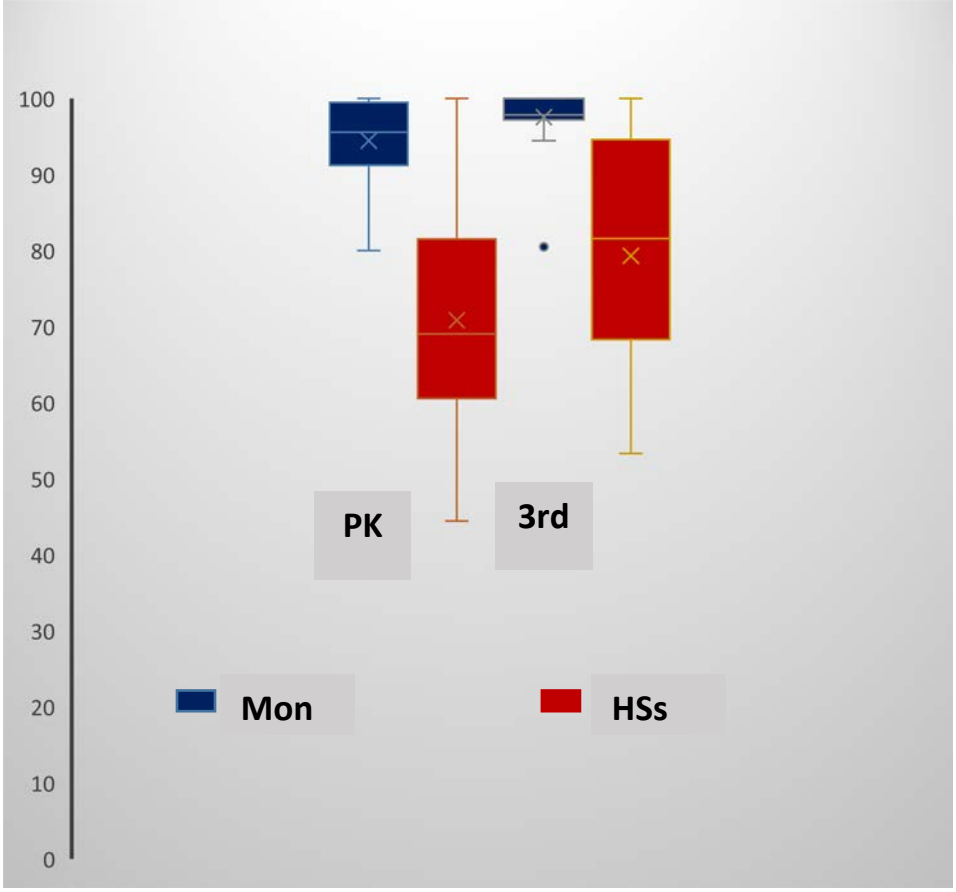

Figure 7. Overal Accuracy - Production Tasks

Accuracy per grammatical structure in production tasks

The second research question examined whether groups (PK-Mon, 3rd-Mon, PK-HSs, 3rd-HS) exhibit differences in grammatical gender production as a function of target structure (determiners, adjectives, clitics).

A linear mixed model analysis with participants as random effects was conducted. Results showed that the main effect of grammatical structure was significant F (2, 4222) = 16.1, $p < .001$. Pairwise comparisons for grammatical structured showed that the

overall accuracy for determiners did not differ from the overall accuracy for adjectives, whereas both determiners and adjectives differ from the overall accuracy for clitics. The three-way interaction of language group, age group and target structure was also significant F (2, 4222) = 5.6, p = .004. The specific results from this interaction are described below. None of the two-way interactions were statistically significant.

Comparisons across language groups within age and target structure. Comparisons within the PK age groups showed that the monolingual children were more accurate than the HSs in determiners F (1, 228) = 68.3, p < .001, in adjectives F (1, 191) = 52.7, p < .001, and in clitics F (1,229) = 28.4, p < .001. The same pattern was found in the 3rd grade groups, the monolingual children were more accurate than the HSs in determiners F (1,219) = 27.8, p < .001, adjectives F (1, 184) = 14.9, p < .001, and clitics F (1, 191) = 39.1, p < .001.

Comparison across age groups within language group and target structure. Comparisons within language groups showed that the PK-Mon did not differ from the 3rd-Mon in determiners F (1,210) = 0.03, p = .86 or adjectives F (1, 182) = .50, p > .47, but differed in clitics F (1, 194) = 3.9, p = .04. As for the HSs groups, the PK-HSs were significantly less accurate than the 3rd-HSs in determiners F (1,234) = 6.4, p = .01, adjectives F (1,192) = 12.2, p = .001, but not in clitics F (1,221) = 0.50, p = .48. See group accuracy for determiners in Figure 8, for adjectives in Figure 9, and for clitics in Figure 10.

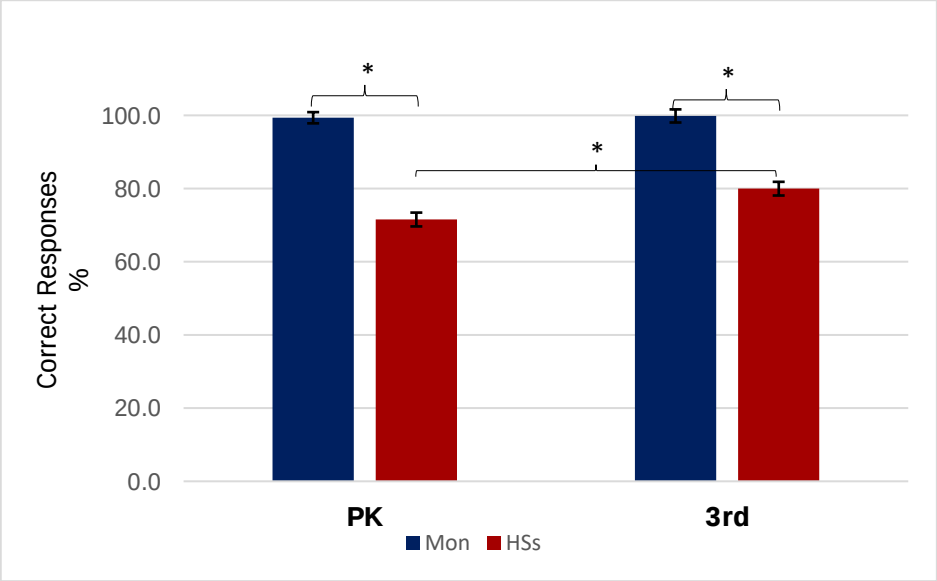

Figure 8. Accuracy In Determiners – Production

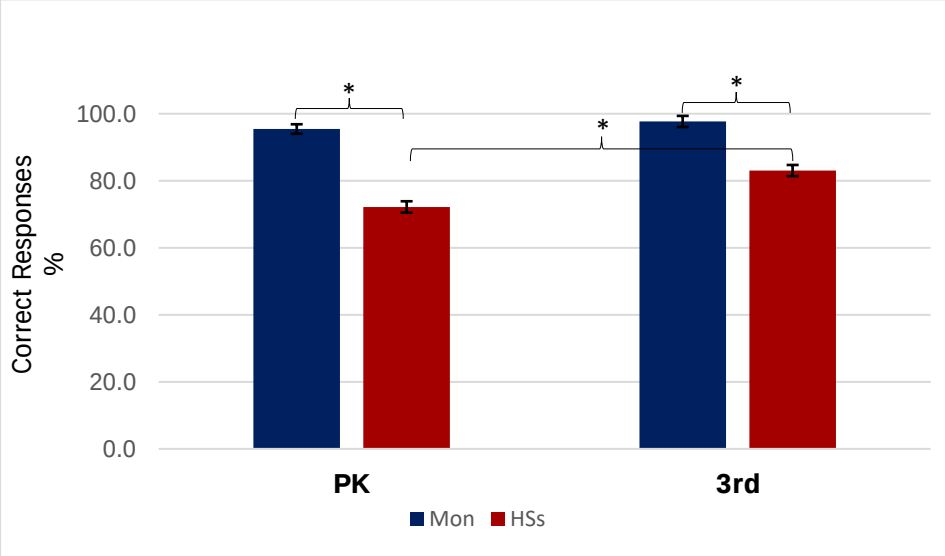

Figure 9. Accuracy In Adjectives – Production

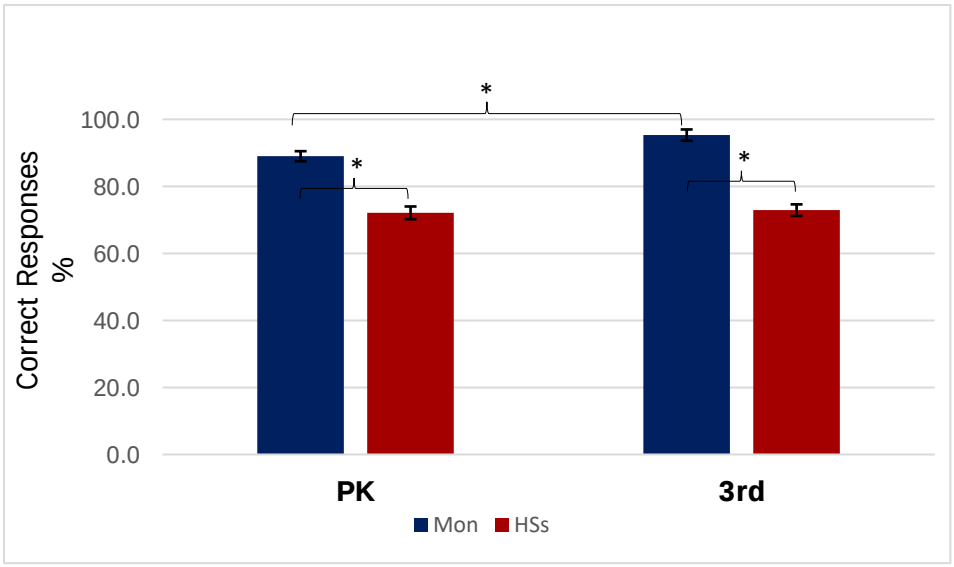

Figure 10. Accuracy In Clitics – Production

Comparisons across target structure within language groups and age.

Comparison across target structures showed that the PK-Mon showed significant differences; they were less accurate in clitics (88%), F (2, 4208) = 14.1, p < .001 compared to determiners and adjectives. The 3rd-Mon did not differ across target structures F (2, 4206) = 2.1, p = .13.

As for the HS group, children in the PK group did not show significant differences between the three different forms F (2, 4251) = .18, p = .84. The 3rd-HS showed significant differences F (2, 4210) = 11.9, p < .001, with higher accuracy in determiners and adjectives than in clitics but determiners and adjectives did not differ significantly. See

Table 9 for means and standard deviations across targets, language groups and ages.

Accuracy per task mode

The third research question examined if children's accuracy in grammatical gender differs as a function of task mode (Comprehension vs. Production). As stated above, responses with no grammatical gender information were coded as missing data and were not included in the final analysis.

In comprehension tasks, children were presented with an auditory stimulus only for adjectives and clitics as testing for determiners would have required a different type of task (such as an eye-tracker). Based on the gender information in the stimulus, children had to choose one picture out of four. Note that the only missing data was from one child in the PK-Mon group, whose data was lost due to technical difficulties. A linear mixed model analysis with participants as random effects was conducted.

Results showed that the main effect of task mode was significant F (1, 7443) = 584.7, $p < .001$. Unexpectedly, all children had a higher accuracy in the production tasks than in the comprehension tasks. Significant interactions were found between language group and task mode F (1, 7357) = 5.8, $p = .02$, language group, age group, and task mode F (3, 434) = 23.4, $p < .001$, and language group, age group, task mode and target structure F (10, 7502) = 1.9, $p = .04$.

Pairwise comparisons for the language group and task mode interaction showed that in the comprehension tasks, the monolinguals were significantly more accurate than the HSs F (1, 192) = 64.4, $p < .001$. Additionally, the difference between accuracy in

comprehension and accuracy in production was significant in both the monolinguals F (1, 6430) = 467.4, $p < .001$ and the HSs F (1, 7564) = 297.1, $p < .001$. When examining the differences between age groups, it was found that, in the PK groups, both language groups did not differ in the comprehension tasks F (1, 186) = 2.8, $p = .09$. In contrast, the 3rd-Mon differed from the 3rd-HSs in both the comprehension F (1, 198) = 87.2, $p < .001$ and the production tasks F (1, 154) = 46.9, $p < .001$.

Analyses per age groups and target structure, in the comprehension tasks, revealed that across language groups, in the PK groups there were no significant differences in either adjectives F (1, 377) = 1.1, $p = .29$ nor clitics F (1, 381) = 3.3, $p = .08$. For the children in 3rd grade, significant language group differences were found in adjectives F (1, 407) = 48.8, $p < .001$ and clitics F (1, 408) = 73.3, $p < .001$, where the monolingual children showed better performance in both adjectives and clitics than the HSs.

Age comparisons within language groups in the comprehension tasks, showed that the PK-Mon scored significantly lower than the 3rd Mon children when using adjectives F (1, 425) = 41.7, $p < .001$ and clitics F (1, 433) = 66.5, $p < .001$. As for the HSs, there were no significant difference between age groups when using adjectives F (1, 370) = .02, $p = .88$ or clitics F (1, 368) = .25, $p = .62$.

Error Patterns

Error Patterns in Production. The fourth research question examined the error patterns in production tasks. Specifically, it examined the use of the masculine forms in feminine contexts or feminine forms in masculine contexts. A linear mixed model

including age group, target structure and target gender as independent variables was conducted with accuracy as the dependent variable. Given that the errors in the monolingual group were minimal, each group was analyzed separately.

Masculine-Feminine use. Results in the monolingual group showed that, even though children were highly accurate using masculine and feminine forms, the difference between them was significant F (2, 2371) = 7.1, p = .008, showing a higher accuracy when using the masculine form. This finding shows that in case of errors, monolingual children tend to rely on the masculine form. There was a significant three-way interaction between age, target structure, and target gender F (2, 2373) = 2.9, p = .022. Pairwise comparison indicated that, in clitics, children were more accurate in the use of the masculine than the feminine form, in the PK group F (2, 2371) = 7.5, p = .006 and the 3rd Grade group F (2, 2367) = 3.9, p = .04.

Results from the HSs showed a main effect of target gender F (2, 1836) = 251.5, p < .001. Children in the HS group were more accurate when the gender in the target noun was masculine than when it was feminine. Additionally, the interaction between age group and target gender was also significant F (2, 1836) = 18.8, p < .001, showing that the PK children relied more on the masculine form than the 3rd Grade children. No other significant interactions were found.

Pairwise comparisons within age groups showed that both age groups, PK F (1, 1837) = 197.5, p < .001 and 3rd grade F (1, 1835) = 68.6, p < .001, were significantly less accurate when using feminine forms. Comparisons within Target Gender (masculine vs. feminine) per age group, showed that in masculine contexts, the PK children did not

differ from the children in 3rd grade in their accuracy F (1, 63) = .05, p = .81; however, they differed in feminine contexts F (1, 69) = 12.2, p < .001; in which the children in the 3rd-Grade performed better than the PK children. Means and standard deviations are shown in Table 11.

Table 11

Mean Accuracy Percentages (SD) in Production Tasks per Target Structure and Target Gender.

	Monolinguals		HSs	
	PK	3rd Grade	PK	3rd Grade
Determiners				
Masculine	100 (0.1)	100 (0.0)	89.0 (31.0)[a]	87.0 (34.2) [a]
Feminine	100 (0.1)	100 (0.0 [b])	52.0 (50.2) [a,b]	72.0 (44.9) [a,b]
Adjectives				
Masculine	95.0 (20.1)	99.0 (0.1)	88.0 (32.5) [a]	92.0 (26.6) [a]
Feminine	95.0 (20.1)	96.0 (1.9)	55.0 (49.9) [a, b]	74.0 (44.2) [a, b]
Clitics				
Masculine	91.0 (28.0) [a]	97.0 (16.3) [a]	88.0 (32.5) [a]	85.0 (35.5) [a]
Feminine	87.0 (34.2) [a]	93.0 (25.2) [a]	54.0 (50.1) [a, b]	60.0 (49.1) [a, b]

Note: a= Significant differences between Masculine and Feminine.
b= Significant differences between 3rd grade and PK.

Error patterns in comprehension. A linear mixed model including age group, target structure, and target gender as independent variables was conducted for each language group. The dependent variable was accuracy. Means and standard deviations are shown in Table 12.

Results in the monolingual group showed that there was no main effect of target gender. Overall, children were as accurate in the feminine context as they were in the

masculine context F (1, 1718) = 1.8, p = .18, which seems to indicate that monolingual children did not favor the use of any specific form. The age effect of group was significant F (1, 56) = 46.7, p < .001. Pairwise comparisons showed that only the PK–Mon scored significantly higher in the feminine form in adjectives F (1, 1718) = 4.0, p < .04, compared to the masculine form. No significant differences were found in clitics F (2, 1718) = 0.9, p = .76. The 3rd grade children did not differ in adjectives F (1, 1718) = 0.079, p = .41 or clitics F (1, 1718) = 0.1, p = .81.

Results in the HS group showed that only the target structure by target gender interaction was significant, F (1, 1456) = 13.8, p < .001. Pairwise comparisons revealed that HSs as a group, when using adjectives, were significantly more accurate in their use of feminine than of masculine, F (1, 1456) = 10.9, p < .001, but did not differ when using clitics F (1, 1456) = 3.8, p = .05. Comparison within age groups showed that PK-HSs did not differ in the masculine and feminine forms neither in adjectives, F (1, 1456) = 2.9, p = .08 nor in clitics, F (1, 1456) = 0.1, p = .68; however, children in the 3rd grade scored significantly higher on the feminine form in adjectives F (1, 1456) = 8.6, p = .004 than the masculine form. In clitics, they scored significantly higher on the masculine form than the feminine form F (1, 1456) = 5.2, p = .02.

Table 12

Mean Accuracy Percentages (SD) in Comprehension Tasks per Target Structure and Target Gender.

	Monolinguals		HSs	
	PK	3rd Grade	PK	3rd Grade
Adjectives				
Masculine	54.0 (49.0)[a, b]	78.0 (41.8) [b]	50.0 (50.0)	47.0 (50.0) [a]
Feminine	62.0 (48.6)[a,b]	81.0 (39.1) [b]	59.0 (49.0)	62.0 (48.7) [a]
Clitics				
Masculine	56.0 (49.0) [a,b]	81.0 (39.1) [b]	50.0 (50.0)	57.0 (49.0) [a]
Feminine	54.0 (49.0) [a,b]	82.0 (38.3) [b]	48.0 (50.0)	45.0 (49.0) [a]

Note: a = Significant differences between Masculine and Feminine.
b = Significant differences between 3rd grade and PK.

Canonical – Non-canonical Ending. An additional linear mixed model analysis was conducted in order to examine if error patterns (masculine vs. feminine) vary as a function of canonicity. Results from production and comprehension tasks showed that the effect of canonical ending was significant, F (1, 7467) = 18.4 $p < .001$. Overall, children were more accurate in canonical-ending nouns than non-canonical ending nouns. Similar patterns were found when analyzing differences within language groups. The monolingual children were significantly more accurate F (1, 7465) = 5.2, $p = .02$ with canonical endings than with non-canonical endings. The HS children who were significantly more accurate with canonical ending nouns than with non-canonical ending nouns F (1, 7468) = 13.8 $p < .001$.

Patterns within target structures were maintained with higher accuracy in canonical than non-canonical endings, across the three target structures. The PK-Mon showed no significant difference between canonical vs. non-canonical endings in

determiners, F (1, 7467) = 0.09, p = .07 or adjectives, F (1, 7462) = 2.9, p=> .08, but differed significantly in clitics, F (1, 7464) = 4.9, p = .02. They were more accurate with canonical endings than non-canonical endings. In contrast, the 3rd-Mon showed no significant differences in any of the target structures: determiners F (1, 7469) = 0.01, p = .99 adjectives, F (1, 7462) = 2.5, p = .11, clitics, F (1, 7462) = 0.7, p = .38.

In the HS group, the PK children were significantly more accurate in canonical endings in determiners, F (1, 7469) = 9.1, p = .003 and adjectives, F (1, 7466) = 4.7, p = .03, but not in clitics, F (1, 7465) = .02, p = .86. In contrast, 3rd-Grade HSs showed no significant differences in any of the target structures determiners F (1, 7468) = .27, p = .60, adjectives F (1, 7462) = 2.5, p = .11, and clitics F (1, 7463) = 2.7, p = .09.

Language use and proficiency as predictors of grammatical gender accuracy

The fifth research question examined if patterns of language use (input and output) and language proficiency predict gender accuracy in HSs. Language use was measured in number of hours per week in each language. Language proficiency was measured in MLU, NDW, SI, and GI. Results can be found in Table 13.

Table 13.

Language Use and Language Proficiency. Means (SD)

	PK	3rd Grade
Hours per week		
Speak Spanish	45.2 (13.9)	30.1 (11.1)
Listen Spanish	44.1 (13.9)	32.3 (9.1)
Speak English	52.8 (13.8)	67.9 (11.1)
Listen English	53.9 (13.9)	65.6 (9.1)
English Proficiency		
NTW	136.6 (85.5)	270.1 (75.1)
NDW	53.3 (24.9)	95.4 (19.0)
MLU	5.7 (1.6)	8.1 (1.3)
SI	1.1 (0.2)	1.3 (0.2)
GI	29.9 (19.9)	82.3 (11.3)
Spanish Proficiency		
NTW	144.8 (66.1)	226.1 (67.9)
NDW	59.6 (16.3)	75.2 (15.7)
MLU	4.9 (1.4)	6.6 (0.7)
SI	1.0 (0.1)	1.14 (0.1)
GI	83.8 (12.9)	73.3 (18.6)

* $p < .05$

Note: NTW= Number of total words, NDW=Number of different words, MLU = Mean Length of Utterance (in words), SI= Subordination Index, GI= Grammaticality Index

The analysis revealed that only two measures from Spanish-proficiency contributed significantly in the regression model to the prediction of the overall accuracy of grammatical gender in HSs, F (4, 35) = 2.9, p = .03 and accounted for 25% of the total variance (R^2 = 0.25). Neither, English proficiency measures nor measures of language use in Spanish were significant F (8, 31) = 1.6, p = .15); F (10, 29) = 1.3, p = .26). A second analysis with only the significant measures from Spanish proficiency showed that there was no significant predictor F (2, 41) = 3.08, p = .056). Intercorrelations between the multiple regression variables are reported in Table 14.

Table 14

Correlations Between the Predictor Variables and Overal Accuracy in Grammatical Gender

	1	2	3	4	5	6	7	8	9	10
1. Overall_Accuracy	-									
Spanish proficiency measures										
2. MLU-Spanish	0.21	-								
3. NDW_Spanish	0.14	.67**	-							
4. SI-Spanish	-0.06	.78**	.58**	-						
5. GI_Spanish	0.22	-.27*	-.15	-.19	-					
English proficiency measures										
6. MLU_English	0.14	.71**	.68**	.54**	-.22	-				
7. NDW_English	0.19	.75*	.72**	.63**	-.17	.66**	-			
8. SI-English	-0.10	.39**	.44**	.47**	-.28*	.70**	.34*	-		
9. GI-English	0.30*	.50**	.40**	.23	-.26	.56**	.69*	.28	-	
Language use+										
10. Hours per week listenin	0.01	.31**	-.04**	-.25	.30*	-.38**	-.27*	-.20	-.49**	-
11. Hours per week speakin	-.11	.31**	-.12**	-.18	.37*	.41*	-.30*	-.13	-.52**	.73**

Note: * p < .05, ** p < .001, + In number of hours per week

NTW = Number of Total Words, NDW = Number of Different Words, MLU = Mean Length of Utterance (in words), SI = Subordination Index, GI = Grammaticality Index

Correlation of HSs' gender accuracy with parents' gender accuracy

The last research question examined if HSs' performance in grammatical gender production was correlated with the performance of their parents. Parents of 16 HSs took the experimental tasks. Means and standard deviations of HSs' parents' accuracy in their use of grammatical gender are presented in Table 15. A correlation analysis was computed to assess the relationship between HSs' overall accuracy in productions tasks and parents' overall accuracy. Results showed that there was not a significant correlation between HSs' performance and their parents, $r = 0.32$, n=17, $p = .21$.

Table 15

Accuracy of HSs' Parents Per Target Structure

	Mean	SD
Determiners	99.3	3.0
Adjectives	100.0	0.0
Clitics	87.5	15.1
Overall	95.4	5.2

DISCUSSION

The present study examined grammatical gender use in a group of Spanish-English bilingual children in the US, who are Spanish HSs. In order to analyze possible age differences, children were selected based on two age groups (PK vs. 3rd Grade) and were compared to monolingual speakers of the same age. To this end, two comprehension and three production experimental tasks were designed for the three different grammatical structures where Spanish expresses gender (determiners, adjectives and clitic pronouns). Results from this study are discussed in terms of children's accuracy in the experimental tasks and the theoretical implications.

Accuracy

It has been observed that HSs' grammar differs from monolingual speakers of the same age (Montrul, 2008, 2014; Morgan, Restrepo & Auza, 2013). In Spanish HSs, gender errors are frequently reported (Cuza & Pérez-Tattam, 2016; Morgan, Restrepo, & Auza, 2013; Restrepo & Gutiérrez-Clellen, 2001). In the case of grammatical gender, even though it is an early-acquired structure in monolingual contexts, HSs demonstrate ungrammatical constructions at older ages. Results from the current study showed that the monolingual group mastered grammatical gender early in development. Both PK and 3rd Grade monolingual children were highly accurate, scoring above 94%. These results are comparable to previous gender acquisition studies, showing that, in monolingual contexts, gender agreement is an early acquired form (Lleó, 1998; Pérez-Pereira, 1991). As for the HS group, results indicated that they scored significantly below monolinguals, and that 3rd-HS still scored below PK-Mon. These results replicate previous findings

from Anderson (1999) and Anderson and Marques (2009) whose longitudinal studies found that grammatical gender is vulnerable in language contact situations.

Several studies on HSs have stated that this low accuracy in grammatical gender is the result of an incompletely acquired grammar due to insufficient input at early ages in development (Montrul, 2008) or due to language loss (Anderson; 1999; Anderson & Marques, 2009). Children Montrul and Potowsky's (2007) study maintained their minority language or developed it, but these children were attending dual-immersion programs, which support the use of the heritage language. Unlike Montrul and Potowsky's study, children in the present study were attending English-only schools, with no literacy or formal support for their L1. Even though HSs in the 3rd-Grade have not reached the PK-Mon's performance, and lag significantly behind them, they performed significantly better than the PK-HSs. These results may indicate that the older children continued to develop Spanish. Contrary to the studies that argue for an IA approach or language loss as an explanation for these results, the differences found between the 3rd-HSs and PK-HSs in this study do not support the IA approach because 3rd-HSs showed a better performance than younger HSs. These results suggest that HSs may still be in the developmental process for grammatical gender, showing a case of protracted language development, where the skills may take longer than the time it takes in monolingual contexts (c.f., Restrepo, et al, 2010).

The second hypothesis of this study stated that children would be more accurate with determiners than with adjectives and clitics. Most of the research in L1 and L2 acquisition (Bruhn de Garavito & White, 2002) has found that speakers master the

concord between determiners and nouns (gender assignment) earlier than the concord between the noun and the adjective and clitic (gender agreement). Results from this study showed that neither monolinguals nor HSs differed in the accuracy between determiners and adjectives, suggesting that these two structures are equally easy for both groups. These results differ from previous studies that have reported higher accuracy in determiners than in adjectives (Martinez-Gibson, 2011; Montrul, 2004; Montrul & Potowski, 2007). In addition, these results also differed from Cuza and Perez-Tatam's (2016) study that reported that children were more accurate in adjectives than in determiners. This discrepancy between studies may be the result of methodological issues, because they mistakenly included mass nouns, which led to a high proportion of determiner omissions.

It was hypothesized that clitics would be more difficult than determiners and adjectives across all groups. As expected, clitics were the most difficult for PK-Mon, 3rd–Mon, and 3rd Grade HSs, although they were equally difficult to the other targets forms for PK-HSs. There are two aspects that must be considered for this lower accuracy in clitics. First, the distance with the referent may impose more difficulty when selecting the appropriate gender for the agreement. Gabriele, Fiorentino, and Bañón (2013reported an effect of distance in grammatical gender agreement: accuracy decreases when the agreement element is outside the referential phrase. Clitics are always part of the verbal phrase, while determiners and attributive adjectives may be within the same noun phrase. Because the present study included only attributive adjectives, that is adjectives within the nominal phrase, the distance was the same as for determiners. Studies that have

considered gender agreement in a coreferential relationship between a pronoun and its antecedent are limited, and most of the studies on grammatical gender have considered agreement in a local relationship (the nominal phrase) (Rossi, Kroll, & Dussias, 2014; Silva-Pereyra et al., 2012). Future studies should include gender agreement across phrases and compare gender agreement with clitic pronouns and predicative adjectives. Second, agreement of clitics activates a set of potentially available antecedents that compete in gender selection during speech interactions. The presence of different referents in the same utterance, plus the distance with the referent make gender agreement with clitics a more difficult process than the gender agreement with adjectives or gender assignment with determiners.

Comprehension vs. Production

The third hypothesis argued that accuracy in comprehension tasks would be higher than the accuracy in productions tasks because: (a) comprehension develops before production in language development and (b) under their proposed model, Putnam and Sánchez (2013) stated that comprehension involve fewer cognitive resources than production. Results showed the opposite pattern. Children in both language groups had higher accuracy in the production tasks than in the comprehension tasks. The more plausible explanation for this pertains to the tasks used in the present study. In particular, the comprehension tasks may be considered easy because both used a picture identification task, where children only had to choose the appropriate picture among four possible choices. However, it seems that the tasks were indeed too difficult, especially for the HSs who did not show a difference between age groups. Children in both PK and 3rd

grade seemed to exhibit a performance at the chance level in these tasks, scoring around 50%. In contrast, even with the assumed difficulty of the tasks, monolingual children in 3rd grade performed better than PKs, scoring around 80%. Another possible explanation is the fact children in the production tasks had the opportunity to "rectify" their answer. When children produced non-target responses (e.g. describing the activity in the determiner task instead of providing a determiner), they were prompted to change their response. It may be the case that accuracy in production would have been lower than in comprehension if children had had only one opportunity to respond. Lastly, the comprehension of gender without contextual support may lead to inferior production performance as producing depends on the child's speech.

Clitic results also indicated that production was better than comprehension. These results are similar to Shin, Rodríguez, Armijo, & Perara-Lunde (In Press) who compared comprehension and production of direct object clitics in Spanish-HSs (ages 3 to 8). The authors argued that a possible explanation is the lack of discourse context in this type of task because during speech interactions, referents are naturally mentioned before a clitic is used. Children in the present study seemed not to rely on gender as the sole clue for referent identification.

Despite the low performance because of the difficulty of the tasks, patterns of accuracy were similar in the groups. PK-Mon, 3rd-Mon, and 3rd-HSs showed no differences between accuracy in adjectives or clitics. Only the PK-HSs scored significantly higher in adjectives than in clitics. Moreover, 3rd-Mon performed significantly better both in adjectives and in clitics than PK-Mon. This indicates that even

with the difficulty of the tasks, monolingual children are better at correctly identifying the picture based on grammatical gender information than HSs. These results support research where grammatical gender has been found to be vulnerable under bilingual circumstances (Anderson, 1999; Montrul & Potowski, 2007). Importantly, monolingual children also showed more accuracy in production than in comprehension tasks. This similarity in accuracy between language groups suggests HSs develop in the same way as monolingual children but may require longer to achieve higher performance.

Error Patterns

The fourth hypothesis stated that, because unmarked forms (masculine) are acquired earlier (Romanova & Gor, 2016) marked forms (feminine) are affected more than unmarked forms (Alarcón, 2011; Cuza & Pérez-Tattam, 2016; McCarthy, 2008; Montrul, 2008; Montrul & Potowski, 2007). Therefore, it was expected that children would have more errors in feminine nouns than in masculine nouns, overusing the masculine form, as it represents the no-gender distinction in English. In addition, following Putnam and Sánchez's (2013) model and the FRH (Lardiere, 2009), it was reasonable to believe that HSs may develop or reconfigure a different grammatical system. In this new system, the dominant language, having more activation than the heritage language, would result in a gradual replacement of L1 values with L2 values in which masculine forms take over the feminine forms.

Results from this study showed that in production tasks, children in both language groups relied more on the masculine form and frequently overgeneralized it. Even though monolingual children hardly made mistakes, when they did, they also overgeneralized the

masculine form; therefore, monolingual children were more accurate in masculine contexts than in feminine contexts. In the same way, HSs showed a reliance on the masculine form. These results are in line with results found in children acquisition studies (Anderson, 1999; Anderson & Lockowitz, 2009; Montrul & Potoski, 2007), and adult L2 speakers (Martinez-Gibson, 2010; White et al., 2004) and contrast with results where the overgeneralization of the feminine form has been reported (Lindsey & Gerken, 2012; López-Ornat, 1997; Restrepo & Gutiérrez-Clellen, 2001).

It is important to note that while the monolingual speakers in both age groups showed a stable performance across the three target structures, the HS groups presented high variability, especially in the feminine form. This wide variability shows that despite the higher performance at older ages, the distinction between feminine vs. masculine is not completely clear to HSs, who may be using this value in a probabilistic way. According to Sorace (1993), when grammatical structures are not completely acquired the speaker's use is random. Therefore, results from this study suggest that HSs are following the same developmental path as monolingual speakers, but the IA approach or a restructuring grammatical process cannot be ruled out with certainty. Given the high level of variability, it is also possible that there is variability in the HS's gender acquisition processes: while some may continue to develop, others may be restructuring their grammar.

The PK-HSs in production relied more on the masculine form than the 3rd-HSs who had a significant higher performance for feminine than the PK-HSs. The performance in the feminine and masculine in the 3rd-HSs was significantly higher than

that of PK-HSs. This higher accuracy in the 3rd grade suggests that relying on the masculine form gradually decreases with age, and thus, the accuracy in feminine forms improves. These results contrast with Putnam and Sánchez's (2013) model as it anticipates that the crosslinguistic influence from English, with no gender distinction, to Spanish, with a feminine-masculine distinction, would result in a reconfiguration of the grammatical system. These results neither support a reconfiguration of the Spanish grammatical gender system nor the IA approach (Montrul, 2008), where no changes in accuracy and patterns were expected. Similarly, the results do not seem to support Putnam and Sánchez's model where we would expect that the reliance on the masculine form actually increases with age as English becomes the dominant language with no grammatical gender distinction. As stated by Morgan et. al (2013) and Restrepo et al (2010), HSs' grammatical errors may obey to a protracted language development that is due to the limited opportunities to use the heritage language. In contrast to the IA approach, in protracted language development, children follow a similar grammatical development to monolingual children, but development takes longer to complete. It is also possible, but beyond the scope of this study, that this protracted development interacts with the typology of the dominant language. If this is the case, grammatical characteristics of the dominant language only hinder the heritage language development, but do not stop it. To test this possibility, studying Spanish in contact with a majority language that marks gender, such as French, Italian, or Hebrew, may be an ideal case for examining the interaction of different language typologies in gender marking.

In addition to the overgeneralization of the masculine form, children's production was analyzed for canonicity. Results in this study indicated that overall, children were more accurate in the production and comprehension of canonical forms than non-canonical forms. These results are in line with previous studies (Anderson & Lockowitz, 2009; Martinez-Gibson, 2010) that have found that speakers have more difficulty with the use of grammatical gender in nouns with non-canonical ending. Children in both language groups were more accurate using nouns with canonical ending in each grammatical structure. As reported by Perez-Pereira (1991), Spanish-speaking children seem to rely more on morphological clues rather than semantic clues. Studies on Spanish grammatical gender have reported that L2 speakers and HSs have more difficulty with non-canonical nouns because canonical ending provide a clue for gender identification. Even though this study did not include animate nouns that could have provided semantic clues for gender identification, it was found that, during the language sample, some children produced gender agreement errors in nouns with canonical ending and clear natural gender (e.g. *el mamá* 'the$_{Masc}$ mom$_{Fem}$', *la niño* 'the$_{Fem}$ boy$_{Masc}$'). Grammatical errors where the feminine form *la* 'the$_{Fem}$' is used in masculine forms may be the result of phonological salience and the regularity of the feminine form that make some children more aware of the Spanish-gender feature. In addition, individual differences should be considered in this type of errors as it may be the case that some children overgeneralize the feminine form and not the masculine form. More research is needed in order to explore potential explanations for these cases.

In contrast to production, in the comprehension tasks, the PK-Mon and the 3rd-HSs were more accurate in the feminine form in adjectives, but the reverse pattern occurred in clitics where both groups had higher accuracy in the masculine form. Even though comparisons for masculine vs. feminine in the other groups, PK-HSs and 3rd-Mon, did not reach significance, the tendency was the same: In adjectives, they had a better performance with the feminine, but in clitics, they scored higher in the masculine form. As suggested by previous studies (Lindsey & Gerken, 2012; Restrepo & Gutiérrez-Clellen, 2001), higher accuracy with the feminine form for adjectives may be due to the saliency of the form that may be reinforced for adjectives. Given that the stimulus for the comprehension task for adjectives was a command with the structure *enseñame la*$_{Fem}$ *sucia*$_{Fem}$ 'show me the dirty [one]', the feminine form of the determiner is reinforced with the feminine ending of the adjective. This regularity of the feminine form (*la -a* combination) may make the feminine form more salient than the masculine combination (e.g. *el -o*). In addition, feminine forms are more transparent than masculine forms (i.e. *la/las vs. el/los*). All these factors may influence children's sensitivity to the feminine morphological form.

Theoretical implications

Research on HSs has reported that the grammar of these speakers usually differs from that of monolingual speakers and has usually referred to these differences as an incompletely acquired grammar (Benmamoun et al., 2013a; S. Montrul, 2008) due to the limited input at early ages in language development. As stated by some authors, this conclusion may be erroneous and misleading (Kupisch & Rothman 2016; Pascual y

Cabo, 2018; Pascual y Cabo & Rothman, 2012; Pires & Rothman, 2009; Putnam & Sánchez, 2013). First, the IA approach sees HSs' grammar solely as an outcome and not as a process and does not explain how differences in HSs' grammar arise. Second, these authors have found that the input HSs receive may already differ from the input monolingual children receive (Pascual y Cabo, 2013, 2018; Pires & Rothman, 2009).

The IA approach cannot explain the differences in grammatical gender use in HSs in this study. Under this approach, it is assumed that linguistic development stops and fossilizes, showing and maintaining ungrammatical constructions that are not present in monolingual speakers of the same age. Results do not support this theory for the following reasons: First, the higher accuracy in the 3rd HS group suggests continued development beyond the preschool years. Second, the quantity of errors differs between HS and monolingual groups, but the error patterns do not. These results together suggest that Spanish as a heritage language may follow similar trajectories as monolingual speakers, at least concerning grammatical gender, but may need more time to develop. These findings are consistent with researchers who have stated that language development in bilingual children in minority contexts face a case of protracted language development (Morgan, Restrepo & Auza, 2013).

Concerning type of input, adults in this study did not show erroneous constructions when using grammatical gender. Therefore, the quality of the input does not seem to be the reason of the low accuracy of young HSs. Results in this study differ from previous studies that have found that HSs' outcomes result from differences in the quality of input they receive (Pascual y Cabo, 2018; Pires & Rothman, 2009). This

difference in results may be due to the grammatical aspect under investigation. Pascual y Cabo (2018) studied a specific type of verb that could be more affected in adult Spanish-speakers than grammatical gender marking. More studies are needed in order to examine the vulnerability of different grammatical structures in minority environments. Conclusions about the IA approach or restructured grammatical system should be consider in relation to specific the grammatical aspects.

Language use and proficiency

It was hypothesized that high proficiency in English together with low patterns of activation, input and output, may predict gender accuracy in HSs (Putnam & Sánchez, 2013). As having high proficiency in one language does not imply being deficient in the other, both Spanish and English proficiency were included in the model in order to assess their independent contribution to gender accuracy. Results showed that none of the variables significantly predicted gender accuracy. The results were not consistent with previous studies that have found that proficiency in the language predicts performance in some grammatical constructions vulnerable to change in bilingual environments. For example, Polinsky's (2008) study, who found that higher-proficiency Russian HSs retained a three-way gender system, but lower-proficiency Russian HSs had a two-way distinction system. However, these results may be due to the small sample size in the study that led to a limited statistical power.

In addition, results from the language sample analysis showed that PK-HSs had not achieved sufficient proficiency in English, as their narrative was more limited and highly ungrammatical, while 3rd-HSs had more complex and grammatical utterances.

However, this English performance did not influence their Spanish performance. This means that achieving high proficiency in English does not directly hinder Spanish grammatical gender use but achieving a better proficiency in Spanish may result in a better performance in grammatical gender. This highlights the importance of giving support to the heritage language through literacy and community.

Another possible explanation is that parent questionnaires were filled as an interview in order to assure complete and accurate responses; however, it was observed that parents equated production with input. That is, when asking in which language the child typically responds, parents tended to answer that children respond in the same language that was directed to them, resulting in a proportional distribution of input and output. However, that may not be the case. Frequently, children respond in their dominant language because they feel more comfortable using it, especially if parents understand the dominant language. Additionally, parents reported that children who were firstborn tend to use the heritage language more, and have higher proficiency, than second or third-born children. Therefore, patterns of language use with siblings and birth order should be considered when using parent questionnaires

In addition to input and output factors from the family, reading and writing in the heritage language was not taken into account, partly because all the children came from English-only schools, and thus they received no formal instruction in Spanish. HSs typically do not learn how to read and write, but some children in the present study reported reading in Spanish. These reading skills combined with language use of the heritage language may result in different patterns of activation, which in turn may result

in different levels of mastery of grammatical gender. Future studies should consider specific questions about literacy in the home language.

Input from HSs' Parents

Young HSs are usually children of first-generation speakers who have migrated to the country. Many of these parents have been in the host country for several years. Even though high proficiency in the L2 is not the norm in these parents, they may have learned the L2 and are certainly surrounded by it. In this way, their Spanish may have been subject to language attrition, and parents may have been providing an input that already differs from monolingual speakers. If this is the case, HSs' use of grammatical gender may be just the result of the input available during development (Pires & Rothman, 2009). In order to discard this possibility, a group of parents took the same tasks as their children. Results from this analysis showed that first-generation speakers retain highly proficient performance in grammatical gender, and therefore, it is not likely that the input they provide is not accurate and does not explain young HSs' performance. Studies in HSs should include HSs' parents with different levels of proficiency in the L2 in order to discard possible L1 attrition in parent's grammar changing the quality of input HSs receive.

LIMITATIONS AND FUTURE DIRECTIONS

There are two important limitations in this study. The first pertains to the cross-sectional design. In order to give more support to the study of HSs' grammar, the author tried to follow Polinsky's (2011) and Pascual y Cabo's (2018) design and included different experimental groups of children and adults as well as monolingual children of the same age. A longitudinal study could provide patterns of use during the course of development. However, it was not possible for reasons of practicality. Moreover, a longitudinal design would allow us to see if grammatical gender in HSs can reach monolingual attainment, in order to support the IA approach (Montrul, 2008) or a protracted language development (Morgan, Restrepo & Auza, 2013.

The second limitation in this study relates to the tasks' design. Even though the comprehension task seems to be promising where important patterns of performance can be seen, the low accuracy in all the groups clearly shows that it was too difficult for children at the ages tested here. More training items or more explicit directions may be needed in order to have a better performance. In addition, determiners cannot be tested for comprehension without the use of expensive equipment, such as an eye-tracker. As for the production tasks, pictures could be presented with several items (and not only two) in which children are not tempted to count the items; this would avoid the use of numerals in the responses, which would lead to an obligatory use of a determiner with overt grammatical gender marking. Finally, even though this study targeted items in singular and plural forms, the effect of number was not included in the analysis and there

were some instances of number errors. Future studies should analyze the effect of number as it may be the case that this feature may impose additional difficulty for HSs.

Educational and clinical implications

Disentangling language disorders from language differences is difficult for speech-language pathologists. The gold standard for evaluating bilingual children is a language sample analysis, in which grammaticality is considered one of the key areas to identify developmental language delays. As stated by previous research, a high percentage of ungrammatical utterances may be indicative of language disorder (Jackson-Maldonado & Maldonado,2017; Restrepo, 1998). In Spanish-English bilingual children, grammatical gender errors are one of the most frequently reported errors. As recommended by researchers in language disorders, children in this study were tested for language ability in both languages (i.e., Bedore & Peña, 2008). Even though children performed better in the dominant language, English, their scores in the heritage language, Spanish, were within the typical range. Therefore, the lower performance in Spanish grammatical gender cannot be attributed to a language disorder. When assessing HSs, clinicians should take into consideration that ungrammatical constructions in grammatical gender may not be the result of language disorders, but the effect of a protracted language development due to the bilingual environment where Spanish skills may take longer to consolidate.

Considering the type of errors, in addition to the number of errors, may be more informative for differentiating language differences from language disorders. For example, a child may produce a high rate of ungrammatical sentences, but all his/her

errors correspond to grammatical gender errors, in such case the level of ungrammaticality should not have the same weight as a child with a lower rate of ungrammaticality but with different type of errors. In terms of educational implications, dual language programs must consider that gender is a grammatical aspect that needs to be reinforced, as the minority environment does not foster its development. As observed in the results of this study, HSs may need more time to master this grammatical aspect and literacy support may help to strengthen it. Kupisch and Rothman (2016) reported that when HSs have been educated in the heritage language, the performance of HSs does not differ from monolinguals. It seems that the differences usually observed in HSs' grammar are no longer significant when HSs have access to literacy.

CONCLUSION

Results from this study showed that HSs perform below monolingual speakers on gender acquisition, who typically master grammatical gender by the age of four (Perez-Pereira, 1991). Further, results suggest that performance improve with age, as HS children in the 3rd grade performed significantly better than HS children in PK. This suggests that HSs' performance on grammatical gender continues to develop after preschool. Examination of the different target forms indicates that, while monolingual children seem to perform equally well in determiners and in adjectives, and better than in clitics, only the 3rd-HSs had more difficulty when using clitics while all forms were equally as difficult for HSs in the PK grade. Overall, across ages and language groups, children performed better with masculine forms than feminine forms and with canonical than non-canonical forms. These findings are consistent with those obtained by Anderson (1999) and Montrul and Potowsky (2007).

To conclude, this study has provided evidence that the term incomplete acquisition may not be adequate to explain the differences in grammatical gender in young HSs (Kupisch & Rothman 2016; Pascual y Cabo, 2018; Pascual y Cabo & Rothman, 2012; Pires & Rothman, 2009). The results showed that the young Spanish HSs included in this study did not follow a different developmental pattern from monolingual speakers but a protracted one. Therefore, neither Putnam and Sánchez's (2013) model nor the IA approach (Montrul, 2008) explain the differences in HSs' when using grammatical gender in Spanish. Results from children in this study suggest that Spanish grammatical gender in HSs continues to develop after the preschool years, giving evidence for a

protracted language development (Kupisch, Akpinar & Stöhr, 2013; Morgan, Restrepo & Auza, 2013).

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APPENDIX A

ARIZONA STATE UNIVERSITY INSTITUTIONAL REVIEW BOARD APPROVAL

ASU Knowledge Enterprise Development

APPROVAL: EXPEDITED REVIEW

Maria Restrepo
Speech and Hearing
480/727-8795
Laida.Restrepo@asu.edu

Dear Maria Restrepo:

On 4/10/2017 the ASU IRB reviewed the following protocol:

Type of Review:	Initial Study
Title:	Spanish Grammatical Gender Knowledge in young Heritage Speakers
Investigator:	Maria Restrepo
IRB ID:	STUDY00005979
Category of review:	(6) Voice, video, digital, or image recordings, (7)(b) Social science methods, (7)(a) Behavioral research
Funding:	None
Grant Title:	None
Grant ID:	None
Documents Reviewed:	• Hearing_Screening_Results.pdf, Category: Screening forms; • SELPS, Category: Screening forms; • CELF-4 Spanish, Category: Screening forms; • Parent Consent-V2.pdf, Category: Consent Form; • Wechsler Scale, Category: Screening forms; • SchoolLetter.pdf, Category: Off-site authorizations (school permission, other IRB approvals, Tribal permission etc); • Experimental Tasks, Category: Measures (Survey questions/Interview questions /interview guides/focus group questions); • CELF-Preschool, Category: Measures (Survey questions/Interview questions /interview guides/focus group questions); • MartinezNieto_IRB_GramGender_V4.docx, Category: IRB Protocol;

	• GG_Parent Questionnarie.pdf, Category: Measures (Survey questions/Interview questions /interview guides/focus group questions); • Teacher Q.pdf, Category: Measures (Survey questions/Interview questions /interview guides/focus group questions); • TEACHER CONSENT FORM.pdf, Category: Consent Form; • Approval Letter from Head Start, Category: Off-site authorizations (school permission, other IRB approvals, Tribal permission etc); • Child_Assent-Form_E.pdf, Category: Consent Form;

The IRB approved the protocol from 4/10/2017 to 4/11/2018 inclusive. Three weeks before 4/11/2018 you are to submit a completed Continuing Review application and required attachments to request continuing approval or closure.

If continuing review approval is not granted before the expiration date of 4/11/2018 approval of this protocol expires on that date. When consent is appropriate, you must use final, watermarked versions available under the "Documents" tab in ERA-IRB.

In conducting this protocol you are required to follow the requirements listed in the INVESTIGATOR MANUAL (HRP-103).

Sincerely,

IRB Administrator

cc: Ma De Lourdes Martinez Nieto
Ma De Lourdes Martinez Nieto
Maria Restrepo

APPENDIX B

CONSENT FORM

ARIZONA STATE UNIVERSITY

COLLEGE OF HEALTH SOLUTIONS
SPEECH AND HEARING SCIENCE

Main Campus
PO Box 870102
Tempe, AZ 85287-0102

(480) 965-2374
Facsimile
(480) 965-8516

Dear parent:

My name is Dr. Maria Adelaida Restrepo and I am the director of the Bilingual Language and Literacy Laboratory and a professor in the Speech and Hearing Department of Arizona State University. Along with my doctoral student, Lourdes Martinez Nieto, we are conducting a project about Spanish language development in bilingual children. We want to determine how the Spanish of bilingual children may change while acquiring English in school. Results of this study will help us understand the development of Spanish in bilingual circumstances.

We would like to invite you and your child to participate in this study. Your child would participate in 2 sessions of 40 to 60 minutes each that will take place in the school during the time your child attends class. In these sessions, your child will take part in language activities such as naming objects or telling a story. One part of this testing would include audio recording your child's voice as they respond to the tasks or tell the story. However, the name of your child will not be recorded. Participation in this study is voluntary. If you decide that you do not want your child to participate now or at any time during the study, there will be no penalty and it will not affect your child in any way. The results of this study will be published, but the names of the participants will not be used.

There are no direct risks to your child because of their participation in this project. In addition, as a way to **thank you we will give your child $10**, once he/she finishes the testing. We are also inviting you to participate and take the same tasks. **If you participate, you will also receive $10**. If you and your child participate in this project, you will receive the total amount immediately at the end of your testing. If only your child participates, you the amount will be given when you pick up your child at the school.

If you decide to allow your child to participate in this study, **please sign the consent form** and return it with your child. Please, mark on the consent form if you also want to participate.
We invite the parents to participate in this project by filling out the questionnaire that is attached. This questionnaire will allow us to learn about your child's language background and habits at home. This information is very important for the study. Please, take the time to complete the questionnaire and return it with your child. It should not take longer than 10 minutes.

Confidentiality will be maintained using participant codes, so your child's name will not be used in any of the assessments. All electronic information, including audio recordings, will be stored on a password-protected server in the Bilingual Language and Literacy laboratory, and only people directly related to this study will have access to the information. Any physical paperwork will be stored in a locked cabinet in the principal investigator's office.

If you have any questions about the study or about your child's participation, please call my doctoral student Lourdes Martinez Nieto, at 480-207-8816, or me (Dr. Restrepo) at 480-727-8795.

Sincerely,
Dr. Maria Adelaida Restrepo & Lourdes Martinez Nieto

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ARIZONA STATE UNIVERSITY

Please return this form with your child

CONSENT FORM

By signing below, I give my permission for my child to participate in the study discussed above.

Parent/Guardian Signature _____ Printed Name _____ Date _____

Child's Name _____ Child's Date of Birth _____

School _____ Teacher's Name _____

I give permission for my child to participate in this study.

☐ Yes ☐ No

My child's recordings can be used for educational purposes.

☐ Yes ☐ No

I also want to participate in the study.

☐ Yes ☐ No

Parent Signature _____ Date _____

If you have any questions about you or your child's rights as a subject/participant in this research, or if you feel you or your child has been placed at risk, you can contact the Chair of the Human Subjects Institutional Review Board, through the Office of Research Integrity and Assurance, at (480) 965-6788.

ASU IRB IRB # STUDY00005979 | Approval Period 4/10/2017 – 4/11/2018

APPENDIX C

PARENT QUESTIONNAIRE

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ID#__

_____

I. LANGUAGE DEVELOPMENT

Please fill out the following information about the language background of your child and your family as best as you can. If you can't or don't wish to respond to any question, please feel free to skip it and move on to the next question.

(1) Are you worried about how your child speaks? Mark one.

____ No, he/she speaks very well
____ Yes, a little worries, sometimes he/she is not clear
____ Yes, I worry. Many times he/she is not clear
____ Yes, very worried, he/she does not speak clearly

(2) Speech and Language Development — YES NO

a. Is your child easy to understand? ___ ___
b. Does your child speak as well as other children his/her age? ___ ___
c. Are the sentences your child uses similar to those used by other children his/her age? ___ ___
d. Are the sentences your child uses as long as those used by other children his/her age? ___ ___
e. Does your child say sentences that aren't grammatical or don't sound right ___ ___
f. Is it difficult for your child to understand what others say to him/her ___ ___
g. Does your child understand the majority of what you and your family say to him/her. ___ ___
f. Do you have to repeat yourself to your child more often than with other children? ___ ___
g. Is there a history of difficulty or disorder of learning, speech, language or reading in your family?
With the child's siblings? ___ ___
With the father or the father's parents? ___ ___
With the mother or the mother's parents? ___ ___

(3) Has your child repeated any school grade or year?

YES ☐ NO ☐

(4) Has your child been in special education services?

YES ☐ NO ☐

a) What type:

☐ Language therapy ☐ Physical therapy ☐ Early Intervention ☐ Hearing

II. LANGUAGE BACKGROUND

(5) What languages are spoken in your home?

_____

(6) What is the primary language spoken at home?

Spanish ☐ English ☐

(7) Was your child born in the US?

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(8) Indicate the places where your child has lived
Example:
Place: Cuba from: 2010 to: 2012

Place: _____ **from :** _____ **to:** _____
Place: _____ **from :** _____ **to:** _____
Place: _____ **from :** _____ **to:** _____

(9) What type of Spanish does your child speak?
☐ Mexican ☐Cuban ☐Puerto Rico ☐Honduran ☐Guatemalan ☐ Other _____

(10) At what age did your child start **listening Spanish**? _____

(11) At what age did your child start speaking Spanish? _____

(12) At what age did your child start **listening English**? _____

(13) At what age did your child start speaking English? _____

(14) How much does your child speak and understand in English? Mark one in each column.

☐ **Speaks English**
1. _____ Does not speak at all
2. _____ Says some words and phrases
3. _____ Can have a simple conversation
4. _____ Speaks fluently with some errors
5. _____ Speaks fluently

☐ **Understand English**
1. _____ Does not understand at all
2. _____ Understands a few words and phrases
3. _____ Understands basic commands
4. _____ Understands the majority of what is said
5. _____ Understands everything that is said

(15) If the person listed below lives in the home, please select what language or languages they speak

Person	Spanish	English	Other (specify)
Mother (female guardian)			
Father (male guardian)			
Sibling -1			
Sibling 2			
Sibling 3			
Grandmother			
Grandfather			
Other people living at home			
After school program			
School – English only vs bilingual			

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(16) Does your child attend an After School program?

NO ☐ YES ☐ If YES, in which language? Spanish ☐ English ☐ Bilingual ☐

(17) How much does your child speak and understand in Spanish? Mark one in each column.

☐ **Speaks Spanish**	☐ **Understands Spanish**
1. _____ Does not speak at all	1. _____ Does not understand at all
2. _____ Says some words and phrases	2. _____ Understands a few words and phrases
3. _____ Can have a simple conversation	3. _____ Understands basic commands
4. _____ Speaks fluently with some errors	4. _____ Understands the majority of what is said
5. _____ Speaks fluently	5. _____ Understands everything that is said

(18) Which language does your child speak with each person? Mark one for each person.

With his/her mom	With his/her Dad	With siblings and other family members
_____ Spanish	_____ Spanish	_____ Spanish
_____ English	_____ English	_____ English
_____ Spanish and English	_____ Spanish and English	_____ Spanish and English

(19) Does your child read at home?

YES ☐ NO ☐

If the answer is **yes**:

1) How many times per week? _____
2) In which languages does he/she read?_____
3) How well does your child read in English?
   _____Well for his/her age
   _____With some difficulty
   _____He/she cannot read well
4) How well does your child read in Spanish?
   _____Well for his/her age
   _____With some difficulty
   _____He/she cannot read well

III. SCHOOL INFORMATION

(20) Please, complete the following chart about the schools your child has attended, and the language used in each case.

Age	Type			Language		
	Home/Family	Daycare	School	Spanish	English	Both
0 – 1 years old						
1 – 2						
2 – 3						
3 – 4						
4 – 5						
5 – 6						
6 – 7						
7 - 8						

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IV. LANGUAGE USE

(20) Please, complete the following table with information about the language your child LISTENS to during the week

Time	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday
6 -9 am	○ Spanish ○ English ○ Both	○ Spanish ○ English ○ Both	○ Spanish ○ English ○ Both	○ Spanish ○ English ○ Both	○ Spanish ○ English ○ Both	○ Spanish ○ English ○ Both	○ Spanish ○ English ○ Both
2 – 4 pm	○ Spanish ○ English ○ Both	○ Spanish ○ English ○ Both	○ Spanish ○ English ○ Both	○ Spanish ○ English ○ Both	○ Spanish ○ English ○ Both	○ Spanish ○ English ○ Both	○ Spanish ○ English ○ Both
4 - 6	○ Spanish ○ English ○ Both	○ Spanish ○ English ○ Both	○ Spanish ○ English ○ Both	○ Spanish ○ English ○ Both	○ Spanish ○ English ○ Both	○ Spanish ○ English ○ Both	○ Spanish ○ English ○ Both
6 - 8	○ Spanish ○ English ○ Both	○ Spanish ○ English ○ Both	○ Spanish ○ English ○ Both	○ Spanish ○ English ○ Both	○ Spanish ○ English ○ Both	○ Spanish ○ English ○ Both	○ Spanish ○ English ○ Both

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(21) Please, complete the following table with information about the language your child <u>SPEAKS</u> during the week

Time	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday
6 -9 am	○ Spanish ○ English ○ Both	○ Spanish ○ English ○ Both	○ Spanish ○ English ○ Both	○ Spanish ○ English ○ Both	○ Spanish ○ English ○ Both	○ Spanish ○ English ○ Both	○ Spanish ○ English ○ Both
2 – 4 pm	○ Spanish ○ English ○ Both	○ Spanish ○ English ○ Both	○ Spanish ○ English ○ Both	○ Spanish ○ English ○ Both	○ Spanish ○ English ○ Both	○ Spanish ○ English ○ Both	○ Spanish ○ English ○ Both
4 - 6	○ Spanish ○ English ○ Both	○ Spanish ○ English ○ Both	○ Spanish ○ English ○ Both	○ Spanish ○ English ○ Both	○ Spanish ○ English ○ Both	○ Spanish ○ English ○ Both	○ Spanish ○ English ○ Both
6 - 8	○ Spanish ○ English ○ Both	○ Spanish ○ English ○ Both	○ Spanish ○ English ○ Both	○ Spanish ○ English ○ Both	○ Spanish ○ English ○ Both	○ Spanish ○ English ○ Both	○ Spanish ○ English ○ Both

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ID#___

_____

V. FAMILY INFORMATION

(22) If not born in the U.S., how long have you lived in the U.S. for?

a) Mother: _____ b) Father: _____

(23) Mother's Profession: _____

(24) Father's Profession: _____

(25) Highest level of education:

MOTHER	Language	FATHER	Language
Elementary		Elementary	
High School / GED		High School / GED	
College/Technical School		College/Technical School	
Postgraduate/Professional		Postgraduate/Professional	
Field/Degree		Field/Degree	

(26) Does the **MOTHER** speak English?

☐ **Speak**

1. _____ Does not speak at all
2. _____ Says some words and phrases
3. _____ Can have a simple conversation
4. _____ Speaks fluently with some errors
5. _____ Speaks fluently

☐ **Understand**

1. _____ Does not understand at all
2. _____ Understands a few words and phrases
3. _____ Understands basic commands
4. _____ Understands the majority of what is said
5. _____ Understands everything that is said

(27) **Does the FATHER speak English?**

☐ **Speak**

1. _____ Does not speak at all
2. _____ Says some words and phrases
3. _____ Can have a simple conversation
4. _____ Speaks fluently with some errors
5. _____ Speaks fluently

☐ **Understand**

1. _____ Does not understand at all
2. _____ Understands a few words and phrases
3. _____ Understands basic commands
4. _____ Understands the majority of what is said
5. _____ Understands everything that is said

(28) **How important is it to you that your child speaks Spanish? Circle one number.**

1	2	3	4	5	6	7	8	9	10
Not very important				Somewhat Important					Very Important

(29) **How important is it to you that your child speaks English? Circle one number.**

1	2	3	4	5	6	7	8	9	10
Not very important				Somewhat Important					Very Important

Thank you for your time

APPENDIX D

TEACHER QUESTIONNAIRE

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Teacher Questionnaire

Identifying information will be removed and replaced with a code

Child's Id# _____

School: _____ Grade: _____ Date: _____

Teacher: _____

1. **Please, rate this child's use of Spanish and English:**

ENGLISH	Never	Occasionally	Frequently	Always
Speaks to you in English				
Speaks to other adults in the classroom in English				
Speaks with classmates in the classroom in English				
Speaks with classmates outside the classroom in English				
SPANISH				
Speaks to you in Spanish				
Speaks to other adults in the classroom in Spanish				
Speaks with classmates in the classroom in Spanish				
Speaks with classmates outside the classroom in Spanish				

2. **How would you rate this child's understanding of ENGLISH?**

- O Doesn't understand anything
- O Understands a little
- O Understands only the main ideas
- O Understands most of what is said
- O Understands as well as a native speaker of English

3. **How would you rate this child's understanding of SPANISH?**

- O Doesn't understand anything
- O Understands a little
- O Understands only the main ideas
- O Understands most of what is said
- O Understands as well as a native speaker of Spanish

4. **How would you rate this child's ability to speak ENGLISH?**

- O Cannot speak any English
- O Speaks a little English
- O Speaks limited English with errors
- O Speaks fluent English with errors
- O Speaks like a native speaker of English

5. **How would you rate this child's ability to speak SPANISH?**

- O Cannot speak any Spanish
- O Speaks a little Spanish
- O Speaks limited Spanish with errors
- O Speaks fluent Spanish with errors
- O Speaks like a native speaker of Spanish

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Teacher Questionnaire

Identifying information will be removed and replaced with a code

Child's Id# _____

6. **Please, rate your concern about this child's development or skills:**

	Not concerned	Somewhat concerned	Very concerned
Hearing			
Speech development			
Oral Language development			
Literacy development			
Motor skills			
Thinking skills			
Social skills			

7. To your knowledge, has this child ever received any special education services? Yes NO

8. To your knowledge, has this child ever participated in speech or language therapy? Yes NO

9. To your knowledge, has this child ever repeated a grade? Yes NO

10. **If you have concerns, please explain more below:** _____

_____

_____

APPENDIX E

LIST OF TARGET STIMULUS

List of Nouns Used in the Tasks **Expected Adjectives**

	Noun	Gender	Included in CDI
1	Botas	fem	yes
2	Camisas	fem	yes
3	Carro	mas	yes
4	Casa	fem	yes
5	Columpio	mas	yes
6	Cuchara	fem	yes
7	Flor	fem	yes
8	Fresas	fem	yes
9	Fuente	fem	no
10	Galleta	fem	yes
11	Guante	mas	yes
12	Lapiz	mas	yes
13	Libro	mas	yes
14	Llave	fem	yes
15	Maleta	fem	no
16	Mano	mas	yes
17	Pantalones	mas	yes
18	Paquetes	mas	no
19	Pared	fem	no
20	Peine	mas	yes
21	Platos	mas	yes
22	Playeras	fem	yes
23	Queso	mas	yes
24	Taza	fem	yes
25	Tele	fem	yes
26	Torre	fem	no
27	Tren	mas	yes
28	Zapatos	mas	yes

Adjective	Included in CDI
Rota	yes
Mojada	yes
Sucio	yes
Pequeño	yes
Abierto	no
Viejo	yes

CDI-Communicative Development Inventories, (Jackson-Maldonado et al., 2003)